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SWEET'S CATALOG FILE

A File of Manufacturers' Catalogs designed for the use of Architects, Engineers, Contractors and others whose practice it is to select, specify or purchase building materials, equipment and allied services.

SWEET'S CATALOG SERVICE

DIVISION OF F. W. DODGE CORPORATION
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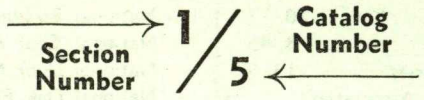

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See Inspection and Testing—Structural Materials; Equipment; Efficiency; etc.

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PITTSBURGH TESTING LABORATORY

Inspection and Testing of Materials and Appliances Used in Building Construction—for Architects, Contractors, Owners

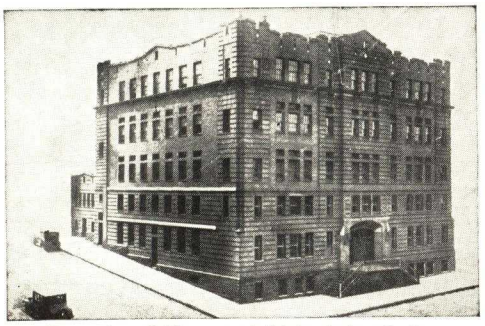
EXECUTIVE OFFICES AND MAIN LABORATORIES
PITTSBURGH, PA.

Branch Offices

BOSTON
NEW YORK
PHILADELPHIA
BUFFALO
CLEVELAND
DETROIT
MILWAUKEE
CHICAGO
ST. LOUIS
DALLAS
HOUSTON
NEW ORLEANS
BIRMINGHAM
JACKSONVILLE

Chemical Laboratories

CHICAGO
NEW YORK
PITTSBURGH
NEW ORLEANS
ST. LOUIS
BIRMINGHAM
DALLAS



Executive Offices and Main Laboratories, Pittsburgh, Pa.

Physical Testing Laboratories

NEW YORK
PHILADELPHIA
BUFFALO
PITTSBURGH
CLEVELAND
CHICAGO
DETROIT
MILWAUKEE
ST. LOUIS
NEW ORLEANS
DALLAS
HOUSTON
BIRMINGHAM
JACKSONVILLE

European Office

LIEGE, BELGIUM

Associates

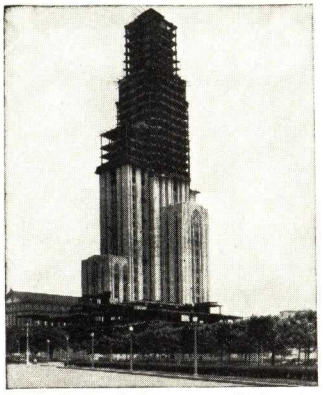
LOS ANGELES
SAN FRANCISCO
SEATTLE
TORONTO

FIFTY-SEVEN YEARS OF SERVICE TO THE BUILDING INDUSTRY

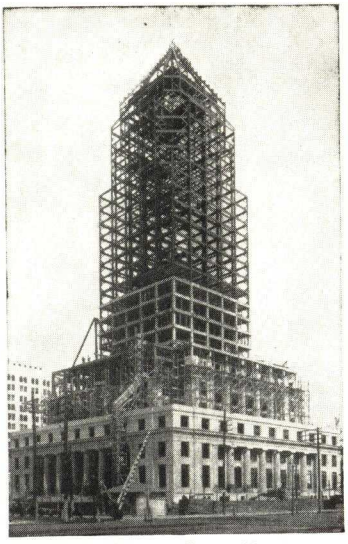
PITTSBURGH TESTING LABORATORY has been serving the building industry for over half a century through its inspection and testing services. With its own organization and affiliates PITTSBURGH TESTING LABORATORY covers the entire country, so that no matter where materials or appliances are manufactured, a PTL inspector is near at hand, ready to render service on a day's notice.

PITTSBURGH TESTING LABORATORY is not only prepared to make inspections and conduct tests, but also, as a result of long and varied experience, is in a position to offer helpful suggestions to architect, builder and owner, in the preparation of specification clauses pertaining to this class of service.

PTL Service covers inspection at point of manufacture and in the field.



Cathedral of Learning University of Pittsburgh
CHARLES Z. KLAUDER, Architect
H. L. BALCOM, Engineer
STONE & WEBSTER ENG. CORP., Builder



Dade County Court House, Miami, Fla.
A. TEN EYCK BROWN, Architect
L. W. HANCOCK, Builder

New York Life Building, New York, N. Y.
CASS GILBERT, Architect
GUNVALD AUS CO., Engineer
STARRETT BROS., Builder

FROM THE STANDPOINT OF THE ARCHITECT

The architect owes it to himself as well as to his client to see that his plans and specifications are met in all details, and to prevent, in so far as he can, the inclusion in building construction of any sub-standard materials or equipment.

PITTSBURGH TESTING LABORATORY'S services are available to those architectural firms not equipped to conduct the inspections and tests necessary to determine compliance of materials and devices with the requirements of their specifications. These services are, of course, available also, when desired, to supplement the inspections of the architect who may be in a position to do such work.

FROM THE STANDPOINT OF THE CONTRACTOR

Adequate inspection of steel in the mills, in the fabricating shops and during erection; qualification of welders, field inspection of welding and witnessing of the mixing of concrete are insurance against construction delays, with their attendant losses and penalties.

FROM THE STANDPOINT OF THE BUILDING OWNER

The building owner who declines to permit his architect to have adequate inspection and tests runs the risk of delays in construction through delivery of unsuitable materials and erection errors. Delays cause greater interest charges and loss of revenue or use of the structure.

A PRECAUTION AGAINST FREQUENT REPAIRS

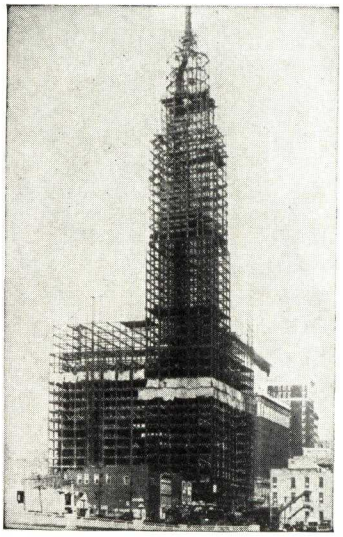
The small cost of prevention, as represented by close and continuous inspections and tests, compared with the yearly expenditures, after a time, for replacements and repairs in an indifferently constructed building, causes wonder that any important building operation is conducted without adequate service of this nature.

The properly equipped inspection agency and testing laboratory must necessarily be able to offer a great variety of services to the building construction industry.

The practice of requiring the contractor to set up a figure covering inspection and tests, and to engage the inspection agency is fundamentally wrong. Such work, being a safeguard to the owner, should obviously be under the jurisdiction of the owner and his architect. They should be the ones to determine and specify its permissible cost and to designate the inspection organization, or at least to pass judgment on the competency of the organization to be retained.

Arc Welded Job—Tonawanda Power Co. Building, Tonawanda, N. Y.
A. H. HOPKINS, Architect
DERDENGER CONSTRUCTION CO., Contractor

David Stott Building, Detroit, Mich.
DONALDSON & MEIER, Architect
C. J. STEIGLEDER, Engineer
MARTIN KRAUSMAN CO., Builder



American Insurance Union, Columbus, Ohio
C. HOWARD CRANE, Architect
JNO. GILL & SONS, Builder

Alabama Power Co. Building, Birmingham, Ala.
WARREN KNIGHT DAVIS and S. NESSILROTH, Architects
DIXIE CONSTRUCTION CO., Builder

HOW TO SECURE ADEQUATE INSPECTIONS AND TESTS

(For insertion in Specifications)

We suggest that one of the following three clauses covering inspection and testing services be included in specifications:

(1) All materials and equipment shall be subject to inspection at all times by the architect or his duly appointed agent. The cost of inspections and tests, unless otherwise provided for by standard specifications, shall be borne by the owner.

(2) All materials and equipment shall be subject to inspection at all times by the architect or his duly appointed agent. The cost of inspections and tests, unless otherwise provided for by standard specifications, shall be borne by the contractor, who shall set up in his bid a figure sufficient to cover the cost of doing the work, based upon fair and equitable fees named by the architect.

or (3) All materials and equipment shall be subject to inspection at all times by the architect or his duly appointed agent. The cost of inspections and tests, unless otherwise provided for by standard specifications shall be borne by the contractor, who shall set up in his bid a figure sufficient to cover the cost of doing the work, based upon fair and equitable fees named by the architect. If it is found that the amount set up by the contractor is not sufficient to cover the cost of all inspections and tests desired, the owner will pay the additional cost as an extra. If the amount is found to be more than sufficient, the difference will be returned to the owner by the contractor.

THE NEED FOR PROOF OF PERFORMANCE

During the past few years many desirable new building materials and appliances have reached the market. In the absence of long service record, the laboratory is the one means available of judging the probable life or performance of new products. Upon request, almost any manufacturer would be glad to submit his products for reasonable test, to satisfy the architect's desire for such information.

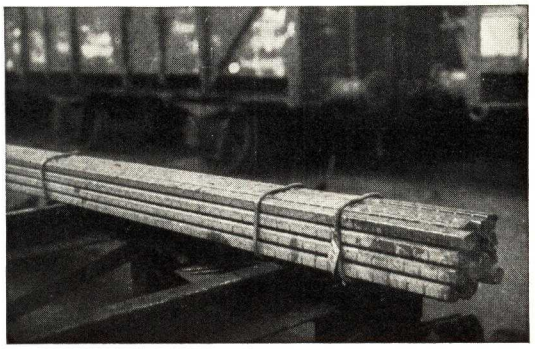
WE RECOMMEND INSPECTION AND TESTS IN CONNECTION WITH THE FOLLOWING MATERIALS

(1) Sub-Surface Conditions—Bearing value of the soil, or rock upon which foundations rest.

(2) Tests of Cement—All cement manufactured is not perfect. It is not thrown away. Somebody gets it.

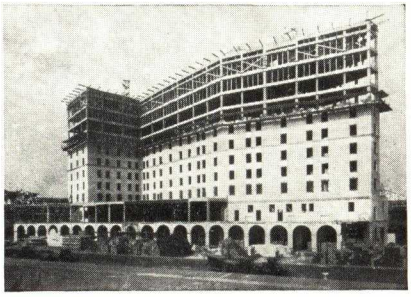
(3) Concrete and Concrete Aggregates—So much has been written on this subject that the need for inspection and testing is obvious to any one. Proper control at batching and mixing plants is almost mandatory. Too much water can ruin otherwise excellent concrete. Compression tests can be made showing the quality, as a final step.

(4) Reinforcing Steel—Some of these bars are scant in section or off in quality. Examination and tests are necessary to disclose these characteristics.

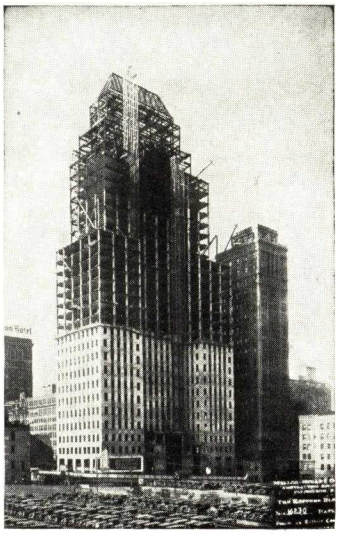


Deformed Bars for San Francisco
Inspected in Luxembourg

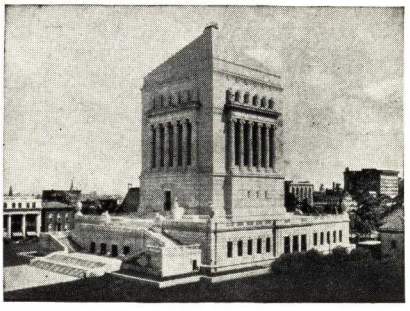
(5) Structural Steel—With the higher permissible stresses now in use, testing in the rolling mills for quality; inspection of fabrication for workmanship, fit and dimensions; and inspection during erection in the field



Buccaneer Hotel, Galveston, Tex.
Andrew Frazier, Architect
Bellows-MacLay Co., Builder



Koppers Building, Pittsburgh, Pa.
Graham, Anderson, Probst & White, Architects
Mellon Stuart Co., Builder



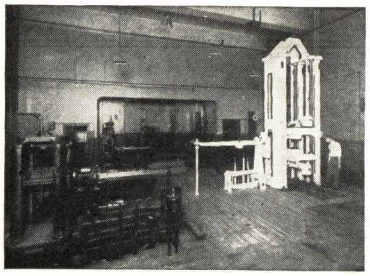
Indiana World War Memorial, Indianapolis, Ind.
Walker & Weeks, Architects
Hunkin Construction Co., Builder

are more necessary than ever before. These are generally termed:

(a) Mill Inspection—Inspection for section, surface and size; witnessing physical tests to determine quality and examination of the chemical record, together with reports.

(b) Shop Inspection—Inspection in the structural shop, covering the steps of laying out, punching or drilling, assembling, reaming, if required; riveting and painting. Workmanship and dimensions are examined. Rivets are tested, and particular attention is paid to field connections.

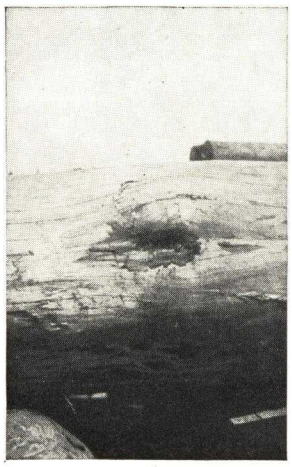
(c) Erection Inspection—This service includes seeing that the various members are erected in their proper places; lining up and plumbing of columns and seeing that rivets are sound, well formed and tight. It also covers the application of the coat of field paint.



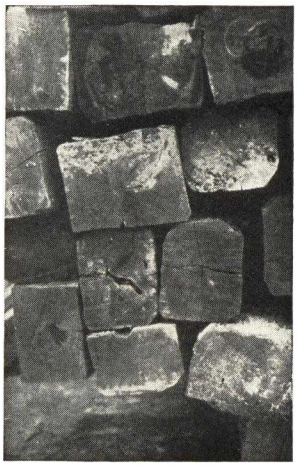
Physical Laboratory, Pittsburgh, Pa.

(6) Welding Structural Steel—The quality of a weld is largely dependent upon the skill of the workman. His skill can be determined through what are known as "Qualification Tests," made before he is permitted to work on the structure involved, and periodically during the life of the job. The application of welds to building construction should be inspected in addition to the performing of "Qualification Tests" on all welders. Our National Weld Testing Bureau, a wholly owned division, has been set up to test welders and inspect welded construction.

(7) Building Stone—Tests for absorption, compressive strength, weight, expansion and for the effect of freezing and thawing; uniformity of color and for manufacturing exactness.



Punk Knot
Rejected



Loaded on Treatment Tram
Note defects

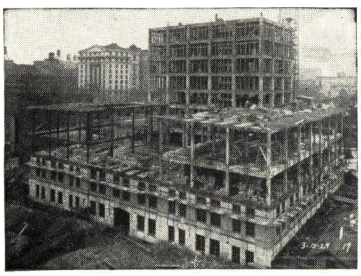
(8) Lumber and Timber—Lumber is a product of nature. It does not grow to specification. There is a wide variation in its quality. To avoid wood-destroying insects, there is an increasing demand for treated lumber. It would be well to have the process controlled by independent inspection.

(9) Building Block—Both load bearing and non-load bearing—many of these are of questionable quality. They should be tested under existing building code requirements.

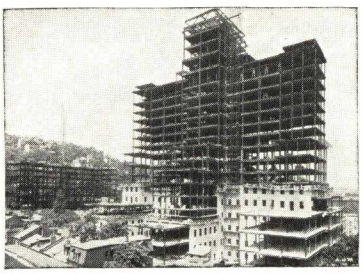
(10) Building Brick—Many building brick are made of materials containing soluble salts, which leach out and stain otherwise artistically designed structures. They should be tested for this property as well as for strength and absorption.

(11) Tile—For floors, walls and partitions—they should be tested for compliance with existing specifications. Visual inspection alone is not sufficient to determine their fitness for building construction.

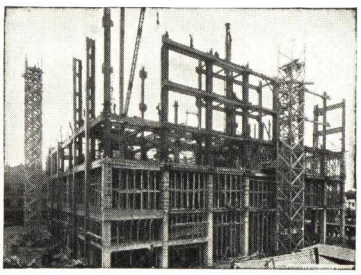
(12) Plaster—There has been much more trouble in building construction during recent years with plaster, than was previously experienced when lime mortar was used almost exclusively. Some ready-mixed plasters contain soluble materials which leach out. Some of these materials, when used for mortar, are the cause of so-called "efflorescence," usually blamed on the brick, which may not be at fault. There are very definite specifications for plastering materials.



City Hall, Atlanta, Ga.
G. Lloyd Preacher & Co., Architects
National Construction Co., Builder

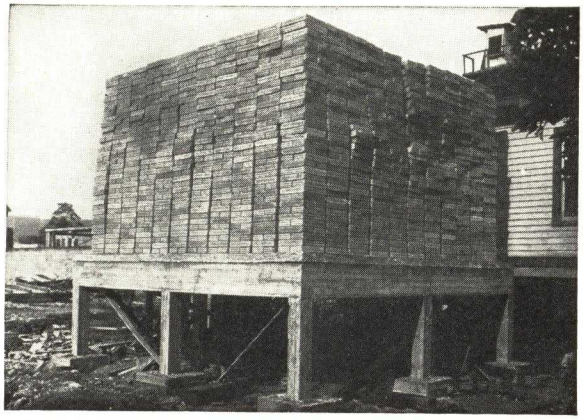


Allegheny General Hospital, Hospital and Nurses Home, Pittsburgh, Pa.
York & Sawyer, Architects
James L. Stuart, Engineer
Mellon Stuart Co., Builder



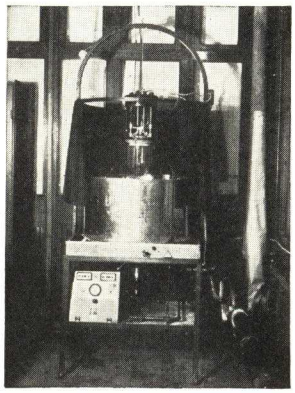
Bell Telephone Company, Louisville, Ky.
Marge, Alger & Vinor, Architects
Barge Thompson Co., Builder

(13) Roofing Materials—Prepared bituminous roofing materials will bear careful examination, not only of the quality of the material itself, but also of the method of application. The building owner is particularly interested in how good his roof may be several years from the time it is laid. Indifferent roofing materials carelessly applied, have little protective value when new, and deteriorate rapidly.



A New type of floor construction was developed by a prominent manufacturer of building materials. PTL engineers supervised the erection of a test unit and conducted a thorough test and investigation into the merits of the product and its recommended use. Client has received wide acceptance of this product as a result of the facts developed

(14) Waterproofing Materials—There are several hundred different brands of waterproofing materials on the market, some possessing excellent qualities. Definite tests of the materials offered will determine these qualities.

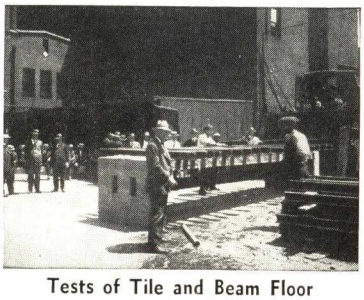


Weatherometer

For determining weather resisting qualities of paint, varnish, roofing materials, corrosion resisting metals

(15) Floor Surfacing Materials—Floor surfaces may have a life extending from one or two years up to an indefinite age. Tests for wearing quality and cleaning characteristics are advisable before making selections.

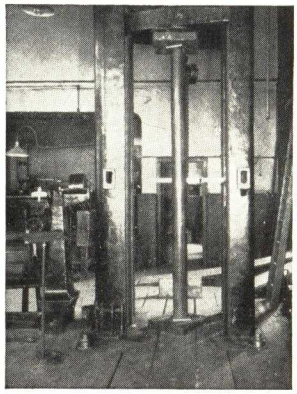
(16) Floor Systems—With the development and use of the many new types of floor construction, it becomes important to have before one full information and data regarding the behavior of such construction. Unbiased data, from actual load tests, will go far toward clearing up perplexing problems confronting those charged with the selection of the type of floor construction to be used.



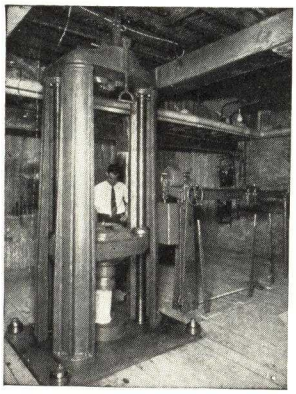
Tests of Tile and Beam Floor Construction

(17) Metals — There is hardly a metal used in building construction today that will not deteriorate under some conditions. Ornamental trim, gutters, drains, water piping, hardware, metal windows, doors and screening materials are all in this category. Deterioration of metal is really a laboratory—not an office—problem. It would be advisable to demand independently proven facts regarding these materials when considering any new metal for an old use, or a new use for an old metal.

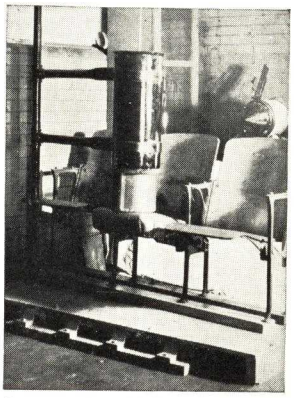
(18) Paint—There is scarcely another form of manufactured product in which there are so many variations of quality, as that of paint or varnish. An analysis of a finish paint is not always a satisfactory yardstick with which to measure its quality. Analyzing the ingredients, however, and witnessing the mixing of them is such a measuring device, and anyone buying paint in quantity would do well to set up such a procedure.



Compression Tests of Columns

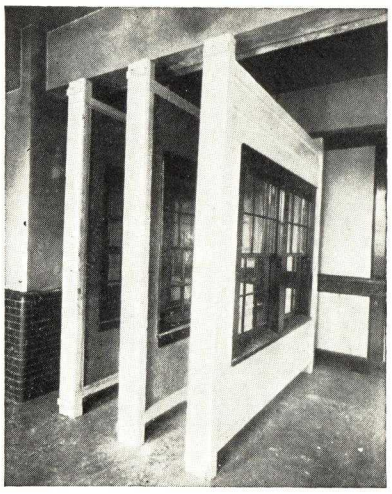


Physical Laboratory, Detroit, Mich.

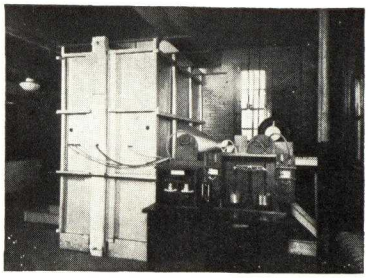


Apparatus for Subjecting Furniture to Repeated Impact

(19) Insulating Materials—The building industry and owners are today much concerned over the value of walls, ceilings and floors as barriers to heat flow. These values should be determined in connection with the insulating materials used in their construction, because of their effect on the heating cost in the winter and cooling cost in the summer. Insulating materials can be effectively tested, not only by means of small samples, but also, if desired, by tests of typical large size floor, wall and roof panels. We are set up in the laboratory for both of these testing procedures.

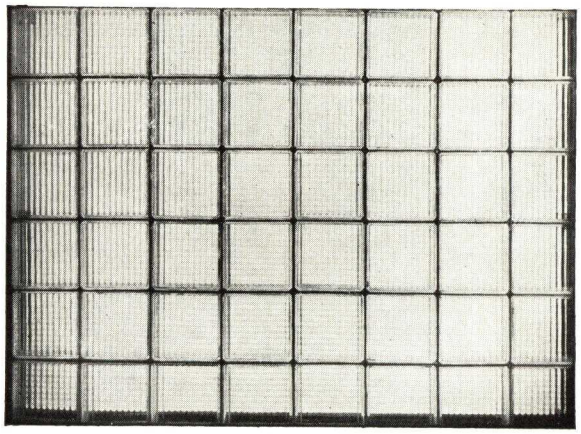


A mid-western client retained PTL to conduct an investigation into the air leakages and the resulting heat loss of various types of window construction. The illustration shows typical wall sections ready for test in an air infiltration apparatus



Apparatus for determining air leakage of windows, doors and similar equipment

(20) Heating Appliances — Many and varied claims are made by suppliers of heating appliances of all kinds. These claims are susceptible to independent proof. Whether or not they perform in accordance with the values used in the design of a heating system, has a very definite effect on the fuel bill.

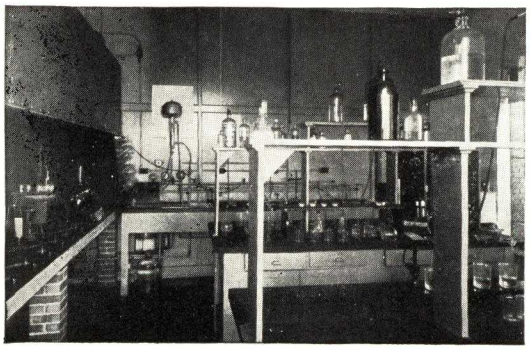


Glass building block heat and sound transmission test panel

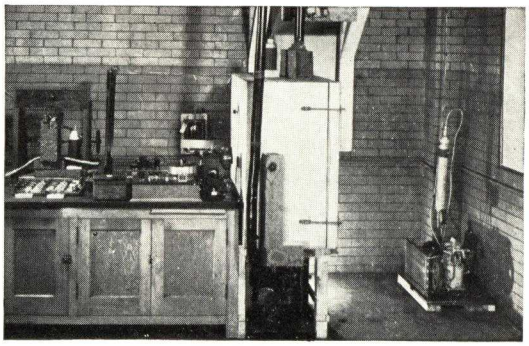
(21) Ventilating Equipment — Large ventilating installations should perform in accordance with the specifications under which they are built, and it is not difficult to determine this. Small ventilating equipments, sold on manufacturers' ratings, should be accompanied by proof of performance by a disinterested testing laboratory.

(22) Noise—Building owners and occupants are becoming noise conscious. It is now possible to specify permissible noise levels. It is also possible for a properly organized testing laboratory to measure the noise transmitted through walls, partitions, and also noise made by heating, ventilating and air conditioning equipment, to determine if noise specifications are met.

(23) Windows—The extent to which windows and doors leak in their frames is now easily determined. Air leakage in and heat leakage out materially affect the building owner's heating bill. It is possible to specify limits and to have a properly equipped testing laboratory determine compliance with such limits. In our equipment it is possible, not only to determine leakage and heat flow at ordinary temperatures, but it is possible to have a combination of room temperatures inside and extremely cold temperatures outside, supplemented by wind at various velocities.



View of one section of Chemical Laboratory, Pittsburgh



Hot plates for determining thermal conductivity of building materials

TESTING AND INSPECTION OF BUILDING MATERIALS BEFORE SHIPMENT

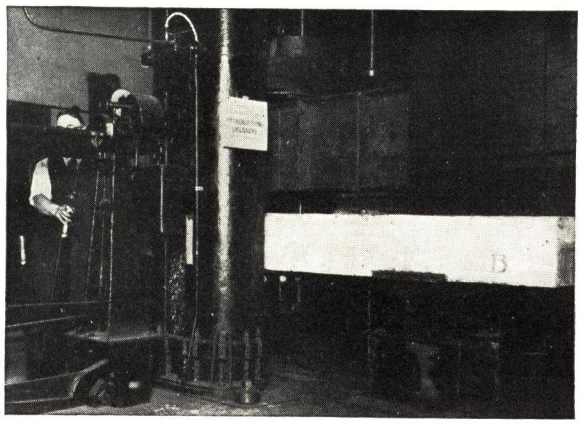
Much of this discussed testing and inspection of materials and equipment can be performed during the process of manufacture, and before delivery to the building site, thus insuring delivery of materials and equipment which will meet the architect's specifications. It is obvious that any extended testing procedure, involving special laboratory setups and considerable length of time in arriving at conclusions, is not possible after contracts for materials and equipment have been placed.

Under such circumstances it would be advisable to require those who are furnishing materials to present independently obtained data regarding performance and quality.

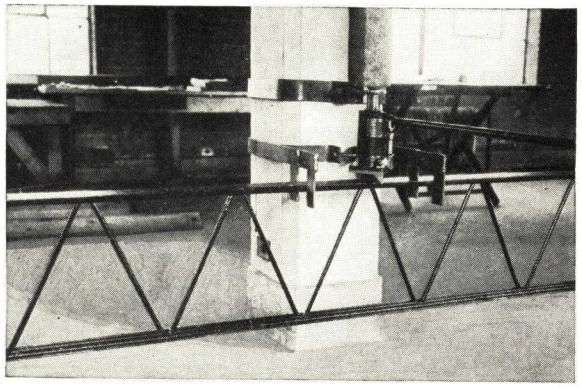
Architects and engineers are and should be reluctant to permit the use of untried materials and devices in structures under their control. The burden of proof as to quality of materials and performance of equipment and devices should be upon those who propose their use. This proof should be obtained by a disinterested, experienced, and thoroughly equipped testing laboratory.

PITTSBURGH TESTING LABORATORY is a fact finding institution. It not only operates a well equipped central laboratory in Pittsburgh, but has branch laboratories in twelve other large cities. Its personnel consists of experienced engineers, inspectors and laboratory technicians.

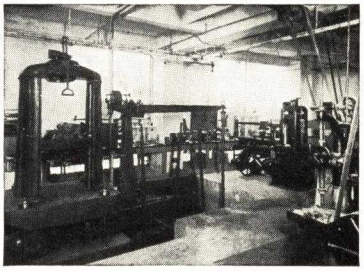
Correspondence is invited on any of the subjects covered in the foregoing pages.



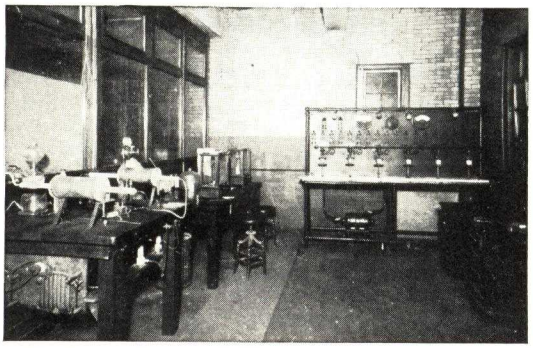
An Eastern railroad had contracted for a deck girder bridge and its engineers were in doubt as to the type of reinforcement they would use in the slab deck. Two types of construction were under consideration, one representing a more costly construction than the other. The steel company which had been awarded the contract for the bridge offered the cheaper type for consideration. Typical concrete beams were made, the result showing that the construction submitted by the steel company gave slabs of adequate strength



The approval of a State Industrial Commission was sought by a manufacturer of bar joist construction used for floors. Specifications set down by the industrial engineer of that State were particularly rigid. Results of PTL tests, showing full compliance of client's product with specifications, were submitted to the commission and accepted as entirely satisfactory



Physical Laboratory, Birmingham, Ala.



Steel, iron, bronze, babbitt and other special alloys are analyzed in this laboratory. In the accompanying illustration, equipment for the electro-deposition of copper and certain other metals is shown. A small rotary-converter unit supplies the necessary direct current for the plating process. Electric combustion furnaces are used in the determination of carbon in steel and iron

Here lineman's rubber gloves, overshoes, leggings and protectors, transformer switch and breaker oils, insulators and insulating compounds are tested for dielectric strength. This equipment, of the most modern type, was designed especially for this work by engineers of one of the large electrical manufacturers

FEDERAL HOUSING PROJECTS FOR WHICH PTL WAS AWARDED THE INSPECTION AND ANALYSES OF MATERIALS

Location	No. of Housing Projects
Cleveland, Ohio	2
Montgomery, Ala.	2
Atlanta, Ga.	2
Indianapolis, Ind.	1
Milwaukee, Wis.	1
Buffalo, N. Y.	1
Louisville, Ky.	2
Jacksonville, Fla.	1
Chicago, Ill.	2
Columbia, S. C.	2

Location	No. of Housing Projects
Detroit, Mich.	2
Louisville, Ky.	2
Charleston, S. C.	2
Boston, Mass.	1
Memphis, Tenn.	2
Williamsburg, N. Y.	1
Birmingham, Ala.	2
Cincinnati, Ohio	1
Enid, Okla.	1
Nashville, Tenn.	1
Dallas, Tex.	1

Marking Accepted Material with PTL Monogram

A FEW OF THE MANY LARGE BUILDINGS WHERE PTL INSPECTORS WERE ON THE JOB

Buffalo, N. Y.
Liberty Bank Building
Genesee Building
Buffalo Athletic Club
Victor Building
New York Telephone Building
Buffalo City Hall
State Office Building

Niagara Falls, N. Y.
United Office Building

Cleveland, Ohio
Cleveland Discount Building
Moreland Court Apartments
Hanna Building
Cleveland Athletic Club
Statler Hotel
Distribution Terminal
Public Auditorium

Detroit, Mich.
New Penobscot Building
Fort Shelby Hotel
Union Trust Company
General Motors Building
Detroit Central Fire Station
Hudson Stores
Stott Building

Indianapolis, Ind.
Indiana World War Memorial
Scottish Rite Cathedral
Ayers Building
Butler College

Columbus, Ohio
American Insurance Union Building
Buckeye State Building & Loan Building
Despatch Building

Youngstown, Ohio
Mahoning Valley Bank Building
Realty Building
Stambaugh Auditorium

Milwaukee, Wis.
City County Building

St. Louis, Mo.
Penny Warehouse Building
Villa Du Chesne
Park Plaza Hotel
Park Royal Apartments
University City Senior High School
President Apartment
Lewis Marr Apartment

Chicago, Ill.
Cook County Jail and Criminal Court Building
Chicago Municipal Court Building
Madison-Clark Building
1500 Lake Shore Drive
1430-32 Lake Shore Drive
7321 South Shore Drive

Pekin, Ill.
Powerton Power Station

Davenport, Iowa
American Commercial & Savings Bank Building

Battle Creek, Mich.
Battle Creek Sanitarium

Waukegan, Ill.
Waukegan Filtration Plant

New York, N. Y.
New York Life Building
Equitable Trust Building
Sherry-Netherlands Hotel
New York Dock Co. Warehouse

Brooklyn, N. Y.
Abraham-Straus Warehouse
Paramount Building

Philadelphia, Pa.
St. Lukes Hospital
Strawbridge & Clothier Store
Gimbel's Store

Newark, N. J.
Bell Telephone Co. Building

Erie, Pa.
Lawrence Hotel
Erie City Trust Building
Mercyhurst Buildings
Wilson Junior High School
Erie Dry Goods Co. Store

Birmingham, Ala.
Protective Life Insurance Building
Alabama Power Building

Memphis, Tenn.
Peabody Hotel

Miami, Fla.
Dade County Court House

Beaumont, Tex.
Edson Hotel

Houston, Tex.
San Jacinto Hotel

Baltimore, Md.
Baltimore City Hospital
Maryland Training School for Boys

Pittsburgh, Pa.
Koppers Building
William Penn Hotel
Grant Building
Keystone Athletic Club
Gulf Building
Allegheny General Hospital
Duquesne Club
Federal Reserve Bank Building
Cathedral, University of Pittsburgh

ROBERT W. HUNT COMPANY

Engineers

Inspection and Tests of Materials for Buildings and Structures

GENERAL OFFICES AND LABORATORIES

175 W. Jackson Boulevard
CHICAGO, ILL.

NEW YORK, N. Y.
PHILADELPHIA, PA.
NEW ORLEANS, LA.
PITTSBURGH, PA.
BIRMINGHAM, ALA.
TORONTO, ONT.
ST. LOUIS, MO.
PORTLAND, ORE.
LONDON, ENGLAND
SAN FRANCISCO, CAL.
LOS ANGELES, CAL.
MONTREAL, QUE.

Cement and Concrete Inspection

Cement is sampled on the Hunt Individual Sample Basis in car load or bin lots at the mills or warehouses or when delivered on the work, each lot being identified with serially numbered blue tags. These samples are tested in accordance with American Society for Testing Materials requirements or as specified.

Concrete aggregates are analyzed to determine suitability for construction purposes.

Concrete cylinders are cast to check the designed mix, to determine the quality of concrete and for job control to assure safety in the removal of forms and economy in their use.

Supervision during construction of reinforced concrete, mass concrete and fireproof concrete structures includes analysis of concrete materials and the design of the concrete mix, check of the mixing operations, checking the alignment and construction of forms and the proper placing of reinforcements and supervision of the curing of concrete under abnormal weather conditions.

Special tests and investigations to determine permissible loads on floor panels and individual concrete members.

Concrete failures investigated to determine the cause of failure and recommend corrections.

Structural Steel Inspection

Inspection of structural material at the mills and foundries, including identification and witnessing of physical tests.

Supervision and inspection of workmanship, checking the sections, dimensions and detail connections during fabrication at the shops, insuring the proper handling of material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating erection at the site.

Supervision and detail inspection of the structure during erection.

Welding of structural materials inspected in detail at the fabricating plant and during erection of the structure. Our laboratories are equipped for procedure control of welders.

Reinforcing steel is inspected and tested at mill or warehouse as required and tagged for identification.

Estimation of weights from detail drawings, and checking shipped weights of finished work.

Bank vault materials and workmanship inspected and tested at the several points of manufacture and the installation at the building carefully supervised to assure proper assembly and satisfactory operation.

THE STAMP OF QUALITY
H
SINCE 1888
HUNT
INSPECTION – TESTS
SUPERVISION
RESEARCH

Specification Forms

Structural Steel—Shall be tested and inspected at the mill, fabricating shop, and during erection.

Reinforcing Steel—Shall be tested and inspected at the mill or warehouse before shipment to the site.

Cement—Portland cement shall conform to the latest Standard Specifications and tests for Portland Cement of the American Society for Testing Materials. Tests shall be made on individual samples. Bags sampled to be tagged for identification.

Aggregates—The Testing Engineer shall run sieve, decantation and organic tests on both fine and coarse aggregate after the material has been delivered to the job and as often as, in his opinion, it is necessary so to do to control the concrete.

Placing of Concrete—The Testing Engineer shall be present at all times during the mixing and placing of concrete; he shall be in direct control of its quality and shall be responsible directly to the architect, or whomever he may designate.

Testing Engineer—Wherever testing and inspection of materials and [or] supervision of construction is mentioned in these Specifications, it is understood that the work is to be performed by the ROBERT W. HUNT COMPANY, who are hereby appointed for this service.

Laboratories

Cement, Concrete, Physical, Chemical and Metallurgical Laboratories complete in personnel and apparatus are maintained at convenient points in relation to the principal manufacturing centers of the United States, Canada, England and Continental Europe for tests, check analysis, research or special investigations of all engineering materials.

General Engineering

Consultation in the various fields of engineering: Civil, Mechanical, Electrical, Hydraulic, Chemical, Metallurgical and Mineral Industries.

Research on building materials.

Soil tests and test borings to determine the areas of foundations, permissible loads per square foot and the probable ultimate settlement under load, based on an engineering analysis of these tests and borings to assure uniform settlement of structure.

Investigations and tests to determine the existing condition and safety of both old and new structures.

Efficiency, capacity and economy tests of engines, boilers, pumps, compressors and other mechanical equipment.

1/3

THE PRODUCERS' COUNCIL

INCORPORATED

Affiliated with

THE AMERICAN INSTITUTE OF ARCHITECTS

19 West 44th Street
NEW YORK, N. Y.

JOHN F. GOWEN
Executive Secretary

The Council and Its Membership

THE PRODUCERS' COUNCIL, INCORPORATED, is a national organization of manufacturers and associations of manufacturers of building materials and equipment. All responsible American manufacturers of quality building products, who are in sympathy with the aims of The Council and otherwise meet the membership requirements, are welcomed to membership.

Official Seal

Objects of the Council

(1) To promote better mutual understanding between architects, engineers, contractors and producers of building materials.

(2) To make more effective the services rendered by each in relation to the others and to the public.

(3) To promote every legitimate interest of producers of building materials and equipment.

(4) To establish and maintain standards in building which will encourage the production of dependable materials, good construction, meritorious architecture and sound trade practices.

Facilities for Carrying Out Its Objects

All activities of The Council are directed towards attainment of these objectives. The Council provides facilities for discussion of mutual problems and for constructive action toward their solution by periodic meetings of the members; through The Council Office, through joint activities and meetings with other organized groups in the building field; and through local Council Clubs.

Affiliation of The Council with the American Institute of Architects and membership in the Construction League, representing all elements of the construction industry, give manufacturers of quality products an influential voice in dealing with problems vital to their welfare.

Community of Interest

The Council recognizes the common interest that embraces all factors of the building industry. Through its affiliation with the American Institute of Architects and the Construction League, and with growing interest and support by responsible manufacturers it is admirably fitted to foster improved conditions in the industry and better service to the public.

General Industry Promotion

The Council accepts its obligation to promote the interests of its members by educating the public, financial institutions, contractors, builders, realtors, etc., to a realization that the welfare of the industry depends on the welfare of the home owner and that both will benefit from a comprehensive program, devoted to quality materials, sound construction, adequate planning, good design, proper selection of site and sound financing.

Producers' Council Clubs

Producers' Council Clubs have been organized in several large cities to promote locally the objectives of The Council. They function under regulations of the national body. Membership is confind to representatives of Council members.

The Clubs promote better acquaintance and closer co-operation between member representatives, architects, engineers and local building interests. They provide facilities for study of mutual problems, promote mutual welfare and better understanding of the qualifications and economic use of quality products. A steady growth of interest on the part of architects and producers evidences the valuable service these clubs render to both members and allied building interests.

Through the Informational Meeting members have an unusual opportunity to present the story of their products to sympathetic audiences of architects, engineers, builders, etc.

Below is a list of the clubs already organized.

As Council membership increases and local need indicates, additional Clubs are being organized with consequent increasing benefit to all concerned.

PRODUCERS' COUNCIL CLUBS

PRODUCERS' COUNCIL CLUB OF BOSTON
Boston, Mass.

PRODUCERS' COUNCIL CLUB OF CHICAGO
Chicago, Ill.

PRODUCERS' COUNCIL CLUB OF CINCINNATI
Cincinnati, Ohio

PRODUCERS' COUNCIL CLUB OF CLEVELAND
Cleveland, Ohio

PRODUCERS' COUNCIL CLUB OF MICHIGAN
Detroit, Mich.

PRODUCERS' COUNCIL CLUB OF NEW YORK
New York, N. Y.

PRODUCERS' COUNCIL CLUB OF NORTHERN CALIFORNIA
San Francisco, Calif.

PRODUCERS' COUNCIL CLUB OF PHILADELPHIA
Philadelphia, Pa.

PRODUCERS' COUNCIL CLUB OF PITTSBURGH
Pittsburgh, Pa.

PRODUCERS' COUNCIL CLUB OF ST. LOUIS
St. Louis, Mo.

PRODUCERS' COUNCIL CLUB OF SOUTHERN CALIFORNIA
Los Angeles, Calif.

PRODUCERS' COUNCIL CLUB OF WASHINGTON, D. C.
Washington, D. C.

PRODUCERS' COUNCIL CLUB OF WISCONSIN
Milwaukee, Wis.

MEMBERS OF THE PRODUCERS' COUNCIL, INC.

(As of November 1, 1937)

AIR REDUCTION COMPANY
60 E. 42nd Street
New York, N. Y.

ALUMINUM COMPANY OF AMERICA
801 Gulf Building
Pittsburgh, Pa.

AMERICAN BRASS COMPANY
Waterbury, Conn.

AMERICAN RADIATOR COMPANY
40 West 40th Street
New York, N. Y.

ANTHRACITE INDUSTRIES, INC.
Chrysler Building
New York, N. Y.

ARMSTRONG CORK PRODUCTS COMPANY
Lancaster, Pa.

THE BARBER COMPANY, INC.
1600 Arch Street
Philadelphia, Pa.

BENJAMIN MOORE & CO.
511 Canal Street
New York, N. Y.

BIGELOW SANFORD CARPET CO., INC.
140 Madison Ave.
New York, N. Y.

BURNHAM BOILER CORP.
Irvington, N. Y.

CARRIER CORPORATION
Chrysler Building
New York, N. Y.

THE CASEMENT HARDWARE COMPANY
406 No. Wood Street
Chicago, Ill.

CHAMBERLIN METAL WEATHERSTRIP CO.
Detroit, Mich.

CRANE COMPANY
836 So. Michigan Ave.
Chicago, Ill.

CURTIS COMPANIES, INC.
Clinton, Iowa.

DETROIT STEEL PRODUCTS CO.
2250 E. Grand Boulevard
Detroit, Mich.

EDISON ELECTRIC INSTITUTE
420 Lexington Avenue
New York, N. Y.

THE FLINTKOTE COMPANY
50 W. 50th Street
New York, N. Y.

GENERAL BRONZE CORP.
34-19 Tenth St.
Long Island City, N. Y.

GENERAL ELECTRIC COMPANY
1 River Road
Schenectady, N. Y.

Producers' Council Seal for Members

The Official Seal of The Council carries the words "Affiliated with the American Institute of Architects". A variation of this, carrying the message "Consult an Architect—Use Quality Products", is available for use by all members in their advertising literature, on salesmen's calling cards, and on products and packages. As a symbol of the broad objectives of The Council the use of this seal emphasizes the fact that the member has met the requirements of The Council in qualifying for membership.

HAUGHTON ELEVATOR CO.
671-693 Spencer St.
Toledo, Ohio

HOFFMAN SPECIALTY CO., INC.
500 Fifth Avenue
New York, N. Y.

INTERNATIONAL NICKEL CO.
67 Wall Street
New York, N. Y.

INDIANA LIMESTONE CORP.
Bedford, Ind.

JOHNS-MANVILLE CORPORATION
22 E. 40th Street
New York, N. Y.

THE KAWNEER COMPANY
Niles, Mich.

KOHLER COMPANY
Kohler, Wis.

LIBBEY-OWENS-FORD GLASS CO.
Nicholas Building
Toledo, Ohio

MASONITE CORPORATION
Conway Building
Chicago, Ill.

THE MASTER BUILDERS CO.
7016 Euclid Avenue
Cleveland, Ohio

NATIONAL ELECTRICAL MANUFACTURERS' ASSN.
155 E. 44th Street
New York, N. Y.

NATIONAL LEAD COMPANY
111 Broadway
New York, N. Y.

NATIONAL LUMBER MANUFACTURERS' ASSOCIATION
1337 Connecticut Avenue
Washington, D. C.

NATIONAL RADIATOR CORP.
Johnstown, Pa.

THE OKONITE COMPANY
Passaic, N. J.

OTIS ELEVATOR COMPANY
260 Eleventh Avenue
New York, N. Y.

PECORA PAINT CO., INC.
3501 North 4th Street
Philadelphia, Pa.

THE PEELLE COMPANY
47 Stewart Avenue
Brooklyn, N. Y.

PITTSBURGH PLATE GLASS CO.
Grant Building
Pittsburgh, Pa.

RICHMOND SCREW ANCHOR CO., INC.
245 Bush Street
Brooklyn, N. Y.

H. H. ROBERTSON CO.
2000 Grant Building
Pittsburgh, Pa.

ROLSCREEN COMPANY
Pella, Iowa

SISALKRAFT COMPANY
205 W. Wacker Drive
Chicago, Ill.

THE SPENCER TURBINE CO.
Hartford, Conn.

THE STANLEY WORKS
New Britain, Conn.

TREMCO MANUFACTURING CO.
393 E. 131st Street
Cleveland, Ohio

THE TRUMBULL ELEC. MFG. CO.
Plainville, Conn.

THE W. S. TYLER COMPANY
3615 Superior Avenue, N. E.
Cleveland, Ohio

UNIVERSAL ATLAS CEMENT CO.
208 So. La Salle Street
Chicago, Ill.

VERMONT MARBLE COMPANY
Proctor, Vermont

WESTINGHOUSE ELECTRIC & MFG. CO.
East Pittsburgh, Pa.

WEYERHAEUSER SALES COMPANY
First National Bank Building
St. Paul, Minn.

SPECIAL MEMBERS

COLUMBIA STEEL COMPANY
Russ Building
San Francisco, Calif.

GLADDING McBEAN COMPANY
660 Market Street
San Francisco, Calif.

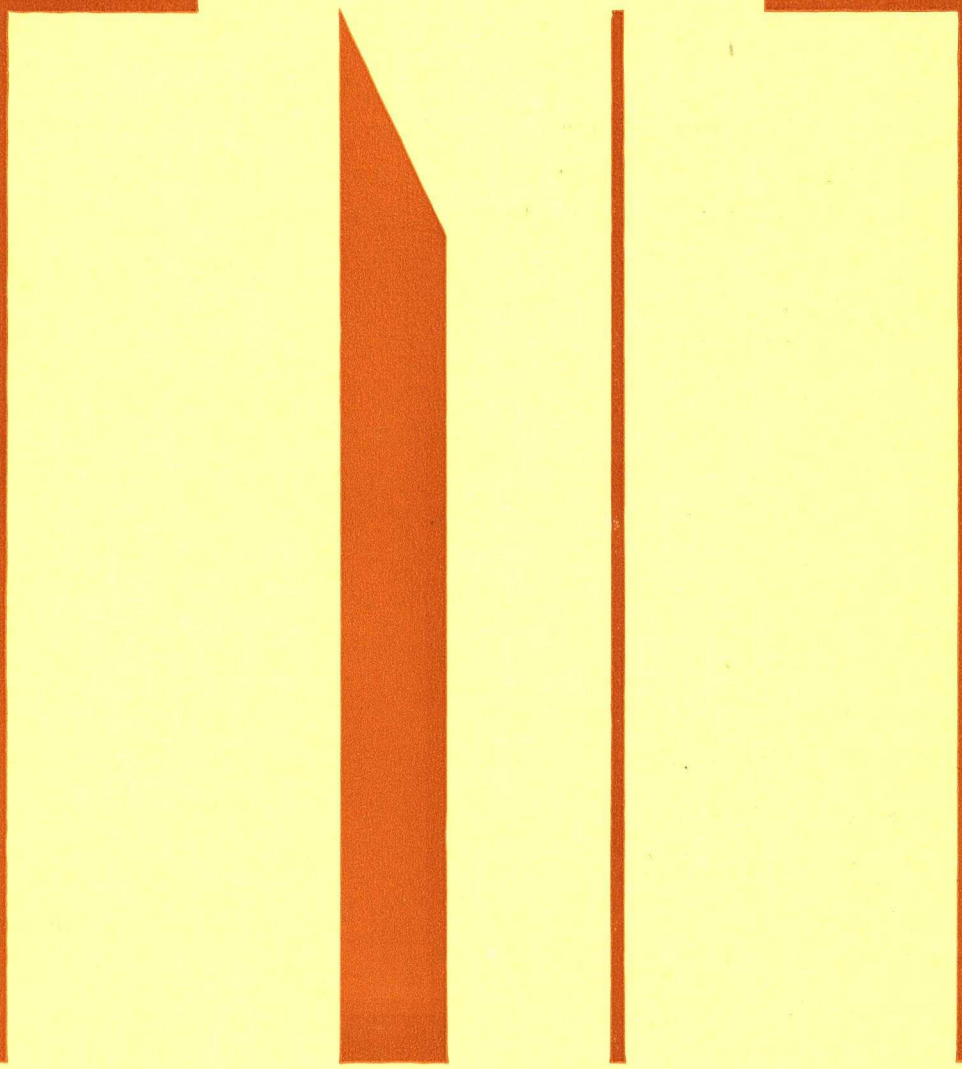
W. P. FULLER & COMPANY
301 Mission Street
San Francisco, Calif.

MEMORANDA

1/4

BUILDING MARKET

PUBLICATIONS *and* SERVICES



F. W. DODGE CORPORATION

F. W. DODGE CORPORATION

119 West 40th Street, New York, N. Y.

(For District Offices, see Inside Back Cover)

FOREWORD

All Dodge publications and services have been designed to serve the needs of architects, engineers, contractors and manufacturers and their representatives by making easier, more effective and economical, the operations of planning, specifying, contract letting, buying and selling. Each is basically a communication service, to expedite the exchange of information between the professional and the manufacturing groups and between the individual members of each. Their application to the many and varied needs of the building industry is described in the following pages.

Dodge Construction Reports ..... Pages 3 to 11
Home Owners' Catalogs ..... Pages 12 to 13
Dodge Statistical Research Service ..... Pages 14 to 15
Architectural Record ..... Pages 16 to 17
Real Estate Record ..... Pages 18 to 19
Sweet's Catalog Service ..... Pages 20 to 22
District Offices ..... Inside Back Cover

DODGE CONSTRUCTION REPORTS

ISSUED BY

F. W. DODGE CORPORATION
119 West 40th Street
New York, N. Y.
(For District Offices, see Inside Back Cover)

DODGE REPORTS DEFINED

DODGE REPORT SERVICE is a daily news service, established in 1891, which gives all essential facts about construction activity, present and contemplated, on building and engineering projects. It covers the territory east of the Rocky Mountains. This area, the 37 eastern states, normally includes about 91 per cent of the construction volume of the entire country. DODGE REPORT SERVICE is the only daily building news service that has more than a limited local coverage.

Private projects, alterations and additions, federal, state, county and municipal projects of all kinds are reported. Names and addresses of owners, architects, engineers, bidders and contractors are given, together with the location, condition and description of the job.

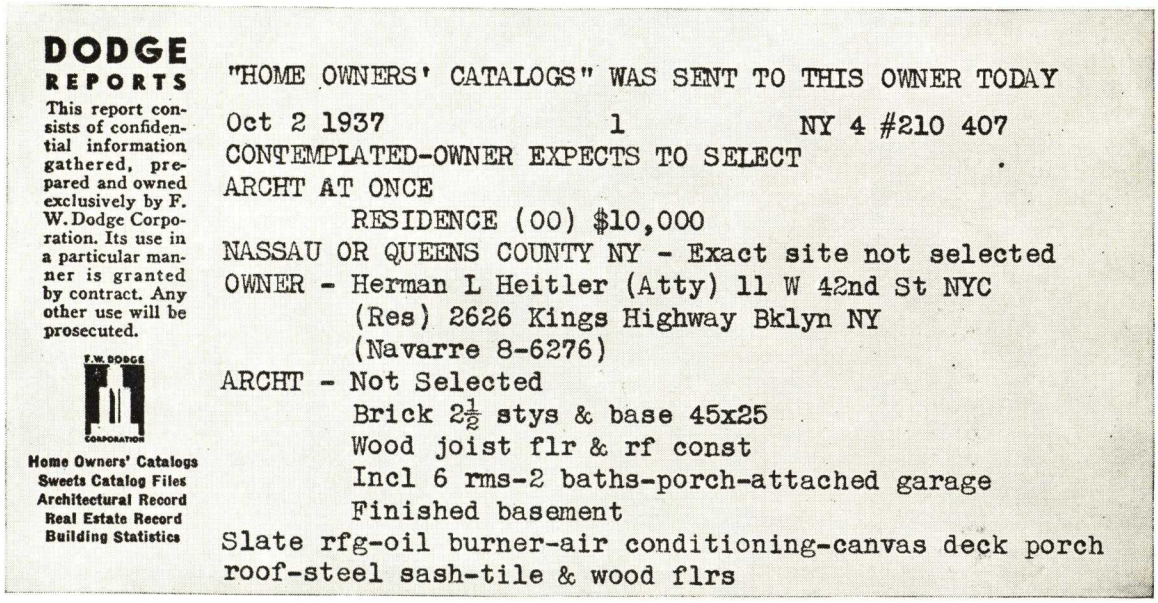
Each REPORT is issued on an individual slip of paper 6 x 3⅛ inches. (See Fig. 1). The REPORTS are mailed each evening to subscribers from 15 issuing offices. The service each subscriber receives consists of REPORTS selected precisely to meet the individual needs of those who specify and buy building products and those who sell them. This important and exclusive Dodge feature is described on the next page, under the heading, *Selectivity.*

HOW NEWS IS COLLECTED

The information issued in DODGE REPORTS is collected by our own staff of trained news gatherers. This staff of more than 750 persons, the largest reporting organization of its kind in the country, makes more than 1,216,800 personal calls and 814,700 telephone calls in gathering news each year. Every item of news is verified, prior to release, by a responsible person directly connected with the job.

This news comes from some 138,000 sources including owners, real estate brokers, financial institutions, architects, engineers, contractors and other reliable sources. These sources are contacted regularly, some daily. A special corps of reporters spends full time in Washington, keeping in close touch with every federal department and bureau concerned with construction. A Dodge reporter attends every important bid opening in Dodge territory. Thousands of newspapers are read and checked against our active job files, but no newspaper information is released until all details have been verified.

The news gathered by our reporters is delivered or transmitted by teletypewriter, telephone, telegraph, or fast mail to our issuing offices, where it is edited and immediately released to subscribers. DODGE REPORTS are complete, accurate and as up-to-the-minute as men and money can make them.



DODGE REPORTS

This report consists of confidential information gathered, prepared and owned exclusively by F. W. Dodge Corporation. Its use in a particular manner is granted by contract. Any other use will be prosecuted.

F.W. DODGE CORPORATION

Home Owners' Catalogs
Sweets Catalog Files
Architectural Record
Real Estate Record
Building Statistics

"HOME OWNERS' CATALOGS" WAS SENT TO THIS OWNER TODAY

Oct 2 1937 1 NY 4 #210 407
CONTEMPLATED-OWNER EXPECTS TO SELECT
ARCHT AT ONCE
RESIDENCE (00) $10,000
NASSAU OR QUEENS COUNTY NY - Exact site not selected
OWNER - Herman L Heitler (Atty) 11 W 42nd St NYC
(Res) 2626 Kings Highway Bklyn NY
(Navarre 8-6276)
ARCHT - Not Selected
Brick 2½ stys & base 45x25
Wood joist flr & rf const
Incl 6 rms-2 baths-porch-attached garage
Finished basement
Slate rfg-oil burner-air conditioning-canvas deck porch
roof-steel sash-tile & wood flrs

FIG. 1—By means of DODGE REPORTS, those who supply materials and services know which architects, engineers and general contractors have need for information and figures, and exactly when they need it. A typical DODGE REPORT, *full size,* is illustrated above.

HOW ARCHITECTS BENEFIT

It is natural that architects should have been quick to see the advantages of giving Dodge reporters news of their projects. By giving this news to Dodge, they are able to advise the industry without cost about the work in their offices. Doing this, not only saves numerous sales calls that would otherwise be made upon them, but they also learn of new materials and methods specially adapted to work on their boards. Indeed, if this news were not available, architects might have to engage extra reception clerks to answer the flood of questions from persons who would call to learn what work was being done.

Quite aside from the personal aspect of the service which Dodge renders to architects, there is a larger economic value. Architects profit, indirectly, by giving news to Dodge because Dodge Service to the construction field tends to reduce distribution costs of building products. This has a definite bearing on new construction. The cost of learning what work there is, and who has it, is very great. If each manufacturer and contractor had to develop this essential information for himself, each would have to spend the equivalent hundreds of thousands of dollars which Dodge spends. With Dodge doing it for *all,* the information can be distributed at a small fraction of the initial cost. In this way, Dodge makes a major contribution to the reduction of selling costs which means better building products, lower prices and more building.

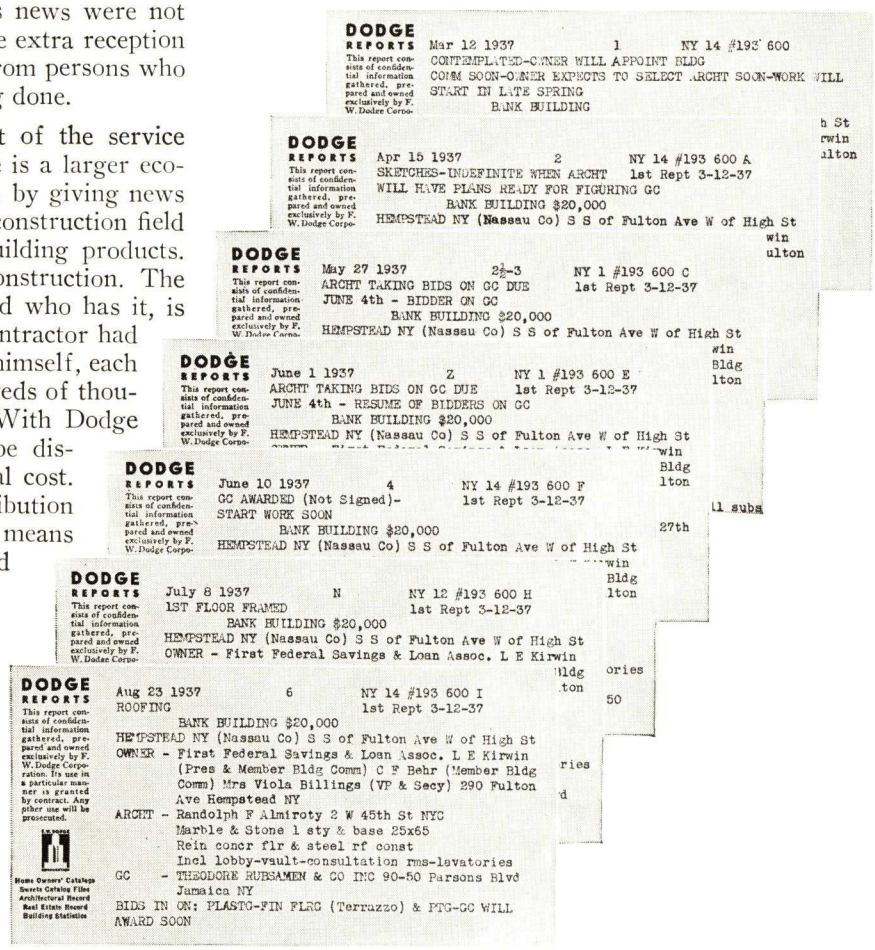
SELECTIVITY

The selective method by which DODGE REPORTS are issued is a chief reason why this news service has been successful in keeping the professional, technical, structural and manufacturing groups of the construction industry advised of the activities occurring from day-to-day in this far-flung field.

FIG. 2—Issue clerk distributing DODGE REPORTS into subscribers' pigeon-holes. Above each pigeon-hole is a card which indicates the selective report service to be issued to the subscriber. DODGE REPORTS is the only construction news service offering this highly developed degree of selectivity.

While DODGE REPORTS give all essential information on construction projects of every kind, and while a complete series of reports is issued on each project, few organizations have need for all this information. Through the selective method of issuing, the subscribers receive only the REPORTS needed to meet their particular requirements, and from them know which architects to see. This selectivity is ordered, and assured, by a selective service form which each subscriber checks. (See form on page 11 of this catalog.) REPORTS are selected as to (1) location of project, (2) type of project, (3) construction status of project, (4) valuation of project, and (5) sub-contract information.

This selectivity saves time and money for everybody. It makes it easy for those who need each other to get together at the proper time. The general contractor knows



DODGE REPORTS
This report consists of confidential information gathered, prepared and owned exclusively by F. W. Dodge Corporation. Its use in a particular manner is granted by contract. Any other use will be prosecuted.

Home Owners' Catalogs · Sweets Catalog Files · Architectural Record · Real Estate Record · Building Statistics

Mar 12 1937 1 NY 14 #193 600
CONTEMPLATED-OWNER WILL APPOINT BLDG COMM SOON-OWNER EXPECTS TO SELECT ARCHT SOON-WORK WILL START IN LATE SPRING
BANK BUILDING

Apr 15 1937 2 NY 14 #193 600 A
SKETCHES-INDEFINITE WHEN ARCHT 1st Rept 3-12-37
WILL HAVE PLANS READY FOR FIGURING GC
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St

May 27 1937 2½-3 NY 1 #193 600 C
ARCHT TAKING BIDS ON GC DUE 1st Rept 3-12-37
JUNE 4th - BIDDER ON GC
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St

June 1 1937 Z NY 1 #193 600 E
ARCHT TAKING BIDS ON GC DUE 1st Rept 3-12-37
JUNE 4th - RESUME OF BIDDERS ON GC
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St

June 10 1937 4 NY 14 #193 600 F
GC AWARDED (Not Signed)- 1st Rept 3-12-37
START WORK SOON
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St

July 8 1937 N NY 12 #193 600 H
1ST FLOOR FRAMED 1st Rept 3-12-37
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St
OWNER - First Federal Savings & Loan Assoc. L E Kirwin

Aug 23 1937 6 NY 14 #193 600 I
ROOFING 1st Rept 3-12-37
BANK BUILDING $20,000
HEMPSTEAD NY (Nassau Co) S S of Fulton Ave W of High St
OWNER - First Federal Savings & Loan Assoc. L E Kirwin (Pres & Member Bldg Comm) C F Behr (Member Bldg Comm) Mrs Viola Billings (VP & Secy) 290 Fulton Ave Hempstead NY
ARCHT - Randolph F Almiroty 2 W 45th St NYC
Marble & Stone 1 sty & base 25x65
Rein concr flr & steel rf const
Incl lobby-vault-consultation rms-lavatories
GC - THEODORE RUBSAMEN & CO INC 90-50 Parsons Blvd Jamaica NY
BIDS IN ON: PLASTG-FIN FLRG (Terrazzo) & PTG-GC WILL AWARD SOON

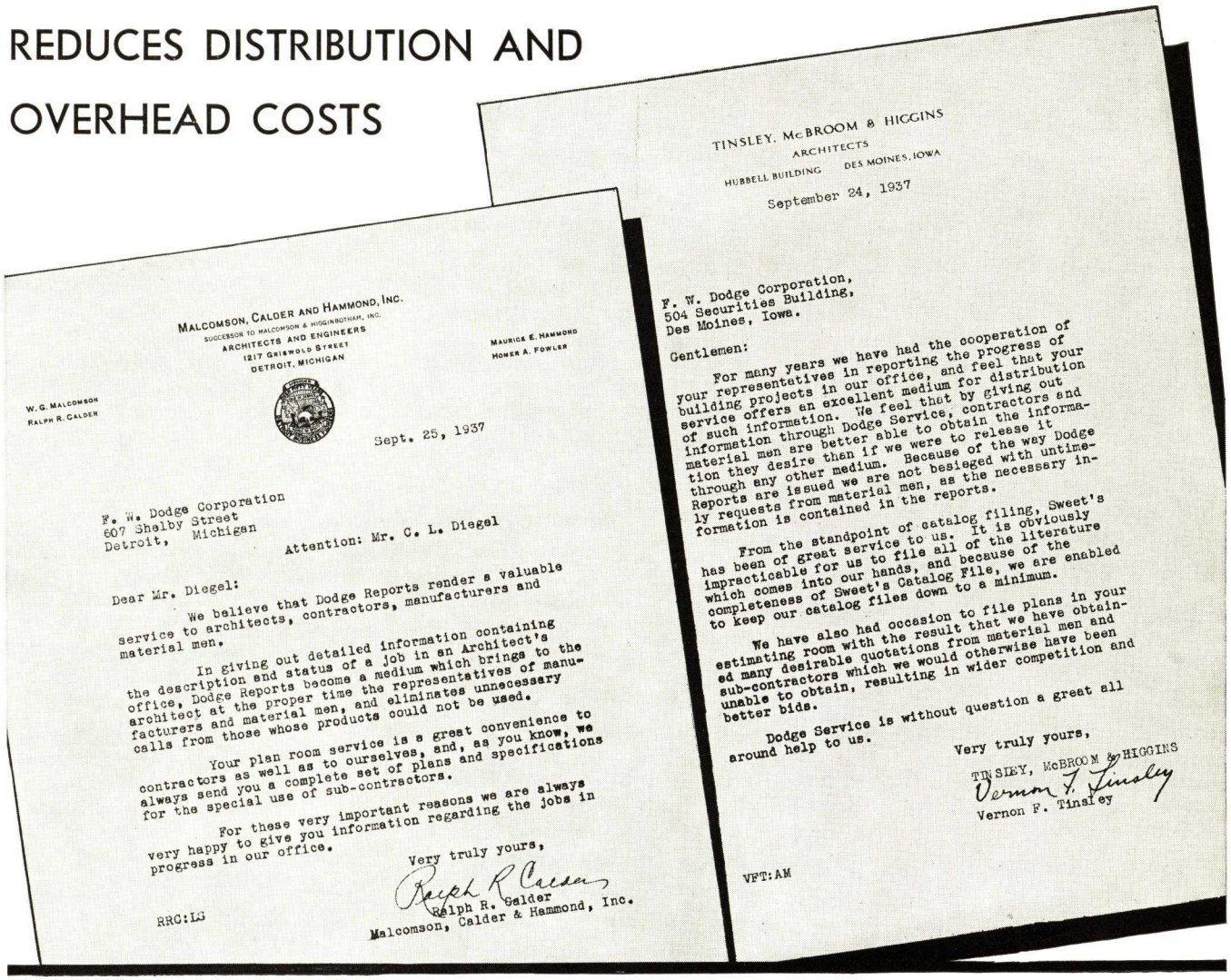
FIG. 3—A series of REPORTS is issued on each project. Above are shown seven in the series issued on a $20,000 bank building project. By means of selective issuing, the subscriber receives only the REPORTS he needs.

which architects to see and when to call. This saves him money, gives him more time on his jobs, as he spends less time selling. The sub-contractor knows which general contractors need estimates from his trade. The bank vault salesman does not call on the architect who is designing a residence.

Another reason why architects are ready to co-operate with Dodge reporters is because a sympathetic understanding has developed between them and our reporters. They repose confidence in us. No rule is more rigidly enforced throughout our news gathering staff than that prohibiting the violation of any confidence placed with us by an architect.

But let the architect speak for himself. He knows why DODGE REPORTS benefit him. On the following pages a few letters from leading architects are reproduced. These letters set forth the reasons why architects find it good business to give news of their work to Dodge reporters.

GIVING NEWS TO DODGE REDUCES DISTRIBUTION AND OVERHEAD COSTS



MALCOMSON, CALDER AND HAMMOND, INC.
SUCCESSOR TO MALCOMSON & HIGGINBOTHAM, INC.
ARCHITECTS AND ENGINEERS
1217 GRISWOLD STREET
DETROIT, MICHIGAN

W. G. MALCOMSON
RALPH R. CALDER

MAURICE E. HAMMOND
HOMER A. FOWLER

Sept. 25, 1937

F. W. Dodge Corporation
607 Shelby Street
Detroit, Michigan

Attention: Mr. C. L. Diegel

Dear Mr. Diegel:

We believe that Dodge Reports render a valuable service to architects, contractors, manufacturers and material men.

In giving out detailed information containing the description and status of a job in an Architect's office, Dodge Reports become a medium which brings to the architect at the proper time the representatives of manufacturers and material men, and eliminates unnecessary calls from those whose products could not be used.

Your plan room service is a great convenience to contractors as well as to ourselves, and, as you know, we always send you a complete set of plans and specifications for the special use of sub-contractors.

For these very important reasons we are always very happy to give you information regarding the jobs in progress in our office.

Very truly yours,

Ralph R. Calder

Ralph R. Calder
Malcomson, Calder & Hammond, Inc.

RRC:LG

TINSLEY, McBROOM & HIGGINS
ARCHITECTS
HUBBELL BUILDING DES MOINES, IOWA

September 24, 1937

F. W. Dodge Corporation,
504 Securities Building,
Des Moines, Iowa.

Gentlemen:

For many years we have had the cooperation of your representatives in reporting the progress of building projects in our office, and feel that your service offers an excellent medium for distribution of such information. We feel that by giving out information through Dodge Service, contractors and material men are better able to obtain the information they desire than if we were to release it through any other medium. Because of the way Dodge Reports are issued we are not besieged with untimely requests from material men, as the necessary information is contained in the reports.

From the standpoint of catalog filing, Sweet's has been of great service to us. It is obviously impracticable for us to file all of the literature which comes into our hands, and because of the completeness of Sweet's Catalog File, we are enabled to keep our catalog files down to a minimum.

We have also had occasion to file plans in your estimating room with the result that we have obtained many desirable quotations from material men and sub-contractors which we would otherwise have been unable to obtain, resulting in wider competition and better bids.

Dodge Service is without question a great all around help to us.

Very truly yours,

TINSLEY, McBROOM & HIGGINS
Vernon F. Tinsley
Vernon F. Tinsley

VFT:AM

These letters illustrate the economic importance of the Dodge Reporter. Welcome him when he calls.

Let us show you the letters these architects have written to us

The Ballinger Company
T. P. Barnett Company
Bley & Lyman
A. Ten Eyck Brown
Burns & James
Childs & Smith
Cameron Clark
Paul A. & Carroll Coletti
Coffin & Coffin
Frank Irving Cooper Corp.
Paul Philippe Cret
Delano & Aldrich
Densmore, Le Clear & Robbins
Robert O. Derrick, Inc.
John Eberson, Inc.
Eschweiler & Eschweiler
Felt and Kriehn
Frohman, Robb & Little
Giffels & Vallet, Inc.
Gordon & Kaelber
Granger & Bollenbacher
Guilbert & Betelle
Holabird & Root
William M. Ingemann
Wyatt C. Hedrick
Wm. B. Ittner, Inc.
Albert Kahn, Inc.
Keffer and Jones
Kiehnel & Elliott
Knappe & Morris
Kohn, Butler & Stein
Lang & Raugland
Leech and Schmidt
Mark Lemmon
Lockwood Greene Engineers, Inc.
Long & Thorshov, Inc.
George I. Lovatt
McGuire & Shook
Malcomson, Calder and Hammond, Inc.
Magney & Tulser
Mauran, Russell & Crowell
Mills, Rhines, Bellman & Nordhoff
Paist & Steward
Geo. B. Post & Sons
Prack & Prack
George Ernest Robinson
Charles A. Smith
Smith & Senter
Arnold Southwell
Harold Spitznagel
Starrett & Van Vleck
Eugene A. Stopper
Penrose V. Stout
Sturgis Associates, Inc.
Matthew Sullivan
Taylor and Fisher
Tinsley, McBroom & Higgins
Walker & Weeks
Warfield & Keeble
Warren, Knight & Davis
Weiss, Dreyfous & Seiferth
Emmons H. Woolwine

WHY ARCHITECTS GIVE NEWS TO DODGE

Architects and engineers welcome Dodge Reporters when they call, and tell about their work. They realize it is good business for them to give news to Dodge. This is shown in the following letters:

From the Office of Coffin & Coffin, New York

Based upon several years experience, we feel that you are affording Architects a very satisfactory service in allowing plans and specifications to be on file at your office while jobs are being figured. This eliminates overcrowding and waiting for the use of our plans and specifications on the part of sub-contractors. Also, your Reports issued to contractors and sub-contractors assures us and our clients of sufficient bids.

From the Office of Densmore, Le Clear & Robbins, Boston

We have found in all our dealings with your organization that we can rely upon your accuracy, cooperation and helpful service. We feel free to give you information with respect to projected work knowing that when necessary you will respect our confidences and that information from us, when published, will be clear and accurate.

From the Office of Paist & Steward, Miami

It is felt by our office that Dodge Reports is a most excellent way of distributing construction news, and has benefited us not only in the selection of materials, but in passing along to the trades information regarding jobs on our drafting boards. These services save us many interruptions during working hours. Your plan of filing blueprints and specifications for the use of contractors and sub-contractors enables us to secure prompt, accurate and low bids, as many contractors would not otherwise be able to figure on the work.

From the Office of Emmons H. Woolwine, Nashville

The efficient services of the F. W. Dodge Corporation to the architects, contractors, and material men cannot be over estimated. From the standpoint of an architect, through the medium of your Dodge Reports information is widely distributed promptly, thereby saving the architect many individual inquiries. We are more than pleased to give information relative to our commissions to your representative who, we feel, by the distribution of this information is doing us a genuine service.

From the Office of Giffels & Vallett & Rossetti, Detroit

Recognizing Dodge Reports as a reliable medium for the distribution of information to contractors and material men, we are always glad to give you information on projects in this office. These reports save us and salesmen calling on us valuable time by stating correctly the status of the work in our office. We also find your Plan Room Service very helpful in securing estimates and bids on our work.

From the Office of Magney and Tusler, Minneapolis

We wish to thank you for announcing in the Dodge Reports several of our most recent jobs. As a result of these announcements, we have received catalogs and communications from manufacturers' representatives which have been of great assistance in assembling the necessary information to complete our drawings and specifications.

From the Office of Mark Lemmon, Dallas

Representatives of the Dodge Reports have been calling on this office for years and I have always been very glad to give them news concerning jobs under way because the information they release to the subscribers in their reports relieves this office of many inquiries which, of course, take up a considerable amount of time.

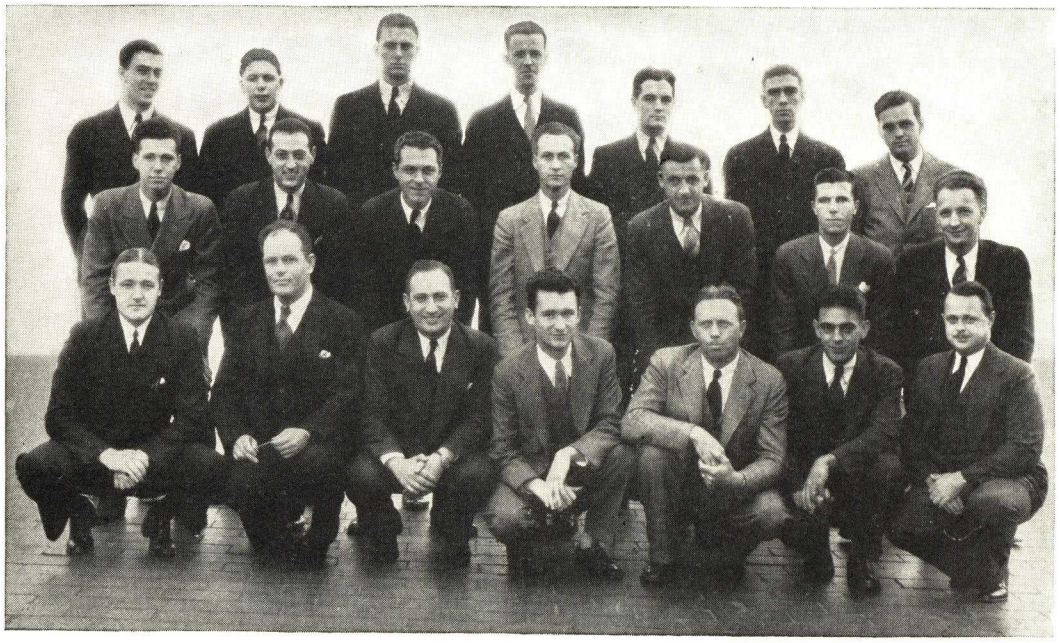


FIG. 4—Group of 21 of the Dodge reporters attached to the New York Office. Typical of our news gathering organization throughout the country, each of these men is trained especially for his work and covers a definite territory. Through long contact they have gained the confidence and friendship of the architects, engineers, contractors and others on whom they call. Welcome the Dodge Reporter when he calls and answer his questions.

OTHER ADVANTAGES THE ARCHITECT GAINS

SPECIAL INQUIRY SERVICE

Architects and engineers find this feature of DODGE REPORTS as valuable as do Dodge subscribers. During the course of a year, we answer thousands of questions from architects. These questions pertain to a variety of subjects. The following are typical:

What types of work are the most active now?

How many schools were contracted for in this state last year?

How do wage scales and material prices in Atlanta compare with those current in Chicago?

What jobs do you know of in Fort Wayne on which the architect has not been selected?

What Kansas City contractors handle large building projects?

Can you give me five heating and ventilating contractors in Montreal capable of handling a $500,000 hospital job?

Who sells the products of X.Y.Z. Manufacturing Company here in town?

Can you give me the name of the maker of the Blank specialty?

Who are the members of the Building Committee for the Main Street Baptist church?

What kind of marble was used for floors in the First National Bank?

Dodge also answers hundreds of questions daily on behalf of architects, thereby conserving their time and relieving them of much bother and many interruptions.

PLAN ROOM SERVICE

Architects are cordially invited to make use of Dodge Plan Rooms. This service has greatly increased estimating convenience and both architects and contractors have benefited. The reasons why Dodge Plan Rooms appeal to architects are summarized as follows:

Fewer material men and sub-contractors will call at your office wanting to figure jobs. Those who do call may be requested to use the Dodge Plan Room to save congestion in your office.

On jobs to be built in distant cities, the task of securing bids from sub-contractors in those cities is simplified.

When plans are received in a Dodge Plan Room, your interests and those of your client are fully protected.

We do *not* allow plans to be removed from the Plan Room.

We do *not* permit any mutilation.

We do *not* permit general contractors to use our Plan Rooms except at the request of an architect.

We do *not* interpret plans or specifications to any estimator who may question us.

Any estimator known to represent a reliable firm may examine plans on file.

Plans may be sent to us express collect, or we will send a messenger to your office for them.

After contract is awarded we return plans, with the specifications, to your office.

When having plans blue printed, order one or more sets prepared for Dodge Plan Rooms. Make this a standard practice in your office just as hundreds of other architects are doing. Ask your Dodge reporter about this service.

FIG. 5—Plan Room, New York Office of DODGE REPORTS. Dodge offices in many cities have Plan Rooms. This Plan Room service is popular with both architects and DODGE REPORT subscribers. It meets the needs and promotes the interests of both at no cost to either.

HOW DODGE REPORTS ARE USED

We do not believe the interest of the architect and engineer, so far as giving news of current work to Dodge reporters is concerned, is limited to the personal advantages they gain by doing so. What happens to their news interests them also, for it is the use of this news that lowers sales expense and, as pointed out earlier, reduces distribution costs and hence promotes construction. Therefore the way in which DODGE REPORTS are used is important to the architect, as well as to the subscriber.

DODGE REPORTS are used for three purposes: (1) Field Selling, (2) Direct Advertising, and (3) Sales Control.

FIELD SELLING

DODGE REPORTS tell the salesman and the contractor whom to see, where to find him, when to see him and what job to talk about. In short, the salesman using DODGE REPORTS knows an architect has a job in his line before he calls. He gets right down to business, keeps to the subject, and speeds the interview. He does not wander from office to office looking for a chance to tell his story. His employer saves the cost of useless sales calls; the architect is spared the annoyance of such calls. Salesmen learn of jobs early enough to acquaint architects with new products and methods before plans and specifications are completed. Salesmen are enabled to show dealers, particularly on the smaller projects, an immediate market for their products and so gain the active co-operation of local distributors in following up selling opportunities.

DIRECT ADVERTISING

DODGE REPORTS are coded so that the advertising or sales promotion manager can send pertinent letters or pieces of advertising to the buying factors named on the REPORTS just as specifications are being written and as buying decisions are being made. This timed distribution of letters and advertising is economically handled in an almost routine manner. Duplication of mailings is prevented. Mailings are made only to *qualified prospects,* saving the heavy waste and cost of mass, scatter-shot circularization which accomplishes little but filling architects' waste baskets. Timed advertising benefits everybody.

Timed advertising is also used to secure small orders where it is too costly or impossible to send salesmen. If salesmen are not employed, timed advertising is used to support the salesmen of agents or distributors, and takes the manufacturers' own sales stories direct to prospects. Timed advertising to architects, engineers and general contractors makes a catalog filed in *Sweet's* more effective as letters calling attention to the catalog may be sent at the time plans are being drawn or when bids are being prepared on a given job. Timed advertising to new home owners ties in with manufacturers' literature in *Home Owners' Catalogs* at the time buying decisions are being made.

Timed advertising increases the effectiveness of advertising in *Architectural Record* and other professional journals and business papers, as well as the effectiveness of general advertising. Timed advertising crystallizes the acceptance which other forms of advertising build for a product, and converts this acceptance into orders when buying decisions are being made. The completely equipped Dodge mailing department is prepared to handle timed mailings for DODGE REPORT subscribers.

SALES CONTROL

When DODGE REPORTS are used as the basis, simple sales-control files on active projects may be set up in home and branch offices. Such files give accurate, clear pictures of the active market, present and near future. If any job is being neglected, it becomes evident while there is still time to do something about it. Salesmen or field representatives who are doing the best work, or who need help, or who may have to be replaced, are known. Control files make it possible to keep selling effort adjusted to sales potential by season, by territory, by product.

Control files make accurate sales direction possible, and insure proper follow-up, on "split" jobs. They are the jobs where the architect is in one territory, the contractor in another and the job in a third. These files clearly indicate territories where competition is being beaten, or where competition is gaining, and the reasons for the change by types of projects, and by project valuations. In many ways, sales-control work helps the manufacturer to cut his costs, with consequent benefit to all.

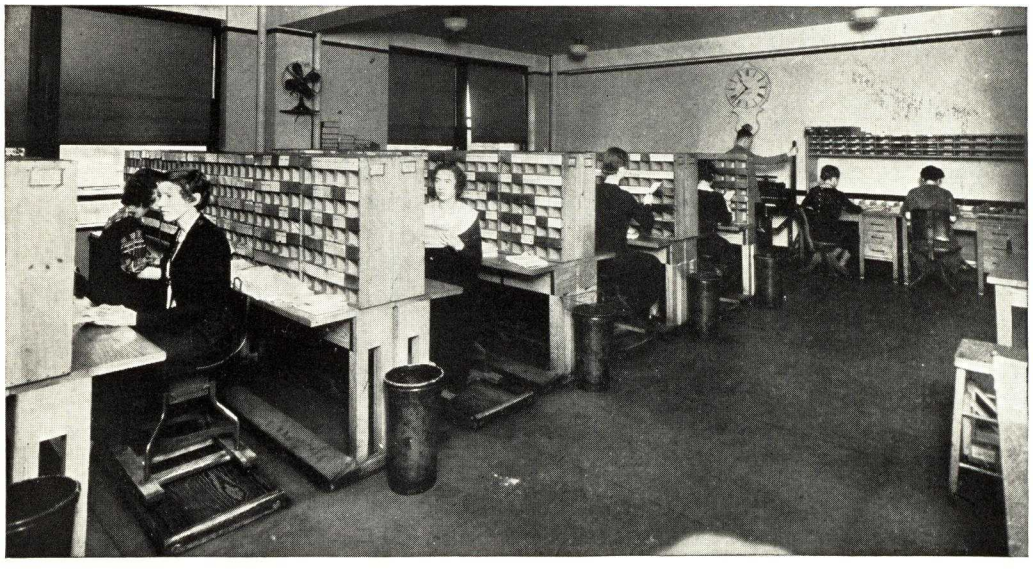


FIG. 6—Boston Office, DODGE REPORTS, issuing department. Throughout the 37 states east of the Rocky Mountains, Dodge uses the same tested methods for collecting and distributing construction news.

CO-ORDINATED SELLING

When DODGE REPORTS are used for the three purposes described, the subscriber gains several advantages through the resulting coordination of all selling forces.

The greatest possible results are secured from advertising due to the close follow-up of prospects by the field sales staff. Salesmen's accomplishments are increased, through coordinated advertising, because they have supporting cultivation of all buying factors on each project. The active interest of jobbers and dealers is secured and their efforts in local selling parallels that of the manufacturer. The timed combination of all selling efforts is much more likely to gain sales for the product of the DODGE REPORT subscriber at reasonable cost, than is the scattered application of unrelated efforts by the manufacturer whose selling is neither controlled nor coordinated.

FIG. 7—Pittsburgh Office, DODGE REPORTS. The services of many trained workers in each office are required to keep track of all construction work.

STRAIGHT LINE SELLING

In order that the news collected from architects may be used to the best advantage, we have developed the *New* Dodge Method of Straight Line Selling. This Method includes the use of REPORTS for field selling, direct advertising and sales control. During the last several years, it has been thoroughly tested and is now in use by the makers of a variety of building products and equipment, including small, medium sized, and large organizations. Subscribers tell us it is far more efficient than methods they used formerly in eliminating waste and detail in sales follow-up. Our representatives and service men are ready to explain the proper use of construction news and how it will solve sales problems in the building field. We invite inquiry.

COUNTY ISSUE

We have perfected our issuing system to a point where we can now render selective service by county or groups of counties. Distributing REPORTS direct to salesmen, each service covering just the county or counties in each man's territory, and supplying one or more control services to the home and branch offices of the subscriber, eliminates detail and saves time, vital factors in competitive selling.

To illustrate: Assume a manufacturer has his home office in New York and a branch in Cleveland. The control service for Ohio goes to his New York office where it is used for advertising and sales-control purposes. Individual services are mailed by us direct to each of his salesmen, covering selected projects located in the counties comprising the territory of each Ohio salesman. There is no limit to the number of "divided mailings" or county services one manufacturer may use. Suppose he has a man in Cleveland, contacting only architects—that man will get a special service. Suppose he has several salesmen in northern Ohio, contacting the trade—each one will get a service covering his territory.

Under the old method a single service would have been mailed to the New York office where it would be copied, sorted and relayed to the Ohio salesmen. Or it would have been sent to the Cleveland branch and the home office would have no knowledge of jobs in Ohio. Delay in the old method often resulted in salesmen calling in an effort to secure a change in specifications at a time when a change would be costly.

FIG. 8—Chicago Office, DODGE REPORTS, reporters' room. Note files wherein work of each architect and other news sources assigned to the reporter is carefully recorded. To prevent errors, each reporter copies his reports on a typewriter.

FIG. 9—Philadelphia Office, DODGE REPORTS. Because of our ample facilities, long experience and dependable service, thousands of firms look to Dodge for building information of all kinds.

FIG. 10—Atlanta Office, DODGE REPORTS. This office, like all other Dodge offices is fully equipped and ready to serve architects and manufacturers with information quickly and efficiently.

DEPENDABILITY

The news issued in DODGE REPORTS is verified, dependable information, secured by competent representatives and carefully edited before it is released to subscribers. There are four points upon which to judge a news service: (1) complete coverage of projects, (2) prompt reporting of architects selected, bidders, award of general and sub-contracts, (3) accuracy, (4) job details. Hundreds of subscribers to Dodge Service have written letters testifying to the timeliness, accuracy and completeness of Dodge construction news.

SUPPLEMENTARY SERVICES

Reference has been made to Dodge Special Inquiry Service. This service is of value to the subscriber as well as to the architect. When a sales manager or salesman has need for special last-minute information pertaining to a certain job, or seeks facts concerning a rumored job, this service is available. Every day we take care of these situations by answering such questions as:

Who is the owner, or architect, or engineer, on such and such a job?
Who is figuring the general contract?
When are bids on the general contract due?
Has the general contract been awarded?
What is to be built on site at (location)?
Has the sub-contract for (trade) been awarded?

Reference has also been made to Dodge Plan Room Service and to Dodge Mailing Service. There is still another service which Dodge renders that is important to subscribers and to architects.

REPRESENTATIVES REGISTER

In many of our offices we maintain a Sales Representatives' Register. This service consists of a listing of manufacturers' names and products, and the names, addresses and telephone numbers of these manufacturers' local sales representatives, so that we may promptly answer the many inquiries we receive from architects, contractors and others who are constantly asking us to tell them who represents a certain product locally. To take advantage of it, architects need only telephone the Dodge office or ask their Dodge Reporter.

DODGE REPORT USERS

Literally thousands of individuals and firms use DODGE REPORTS. Dodge subscribers represent more than 700 different lines of business. The first firm to sign a contract for DODGE REPORT service has been a subscriber since October, 1891. Numerous other subscribers have been in uninterrupted service for 30 years and longer.

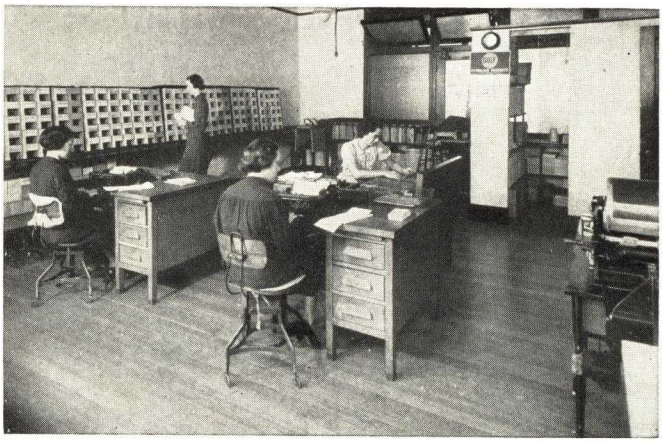


FIG. 11—New Orleans Office, DODGE REPORTS. Here as in most Dodge offices, Plan Room and Special Inquiry facilities are available.

FIG. 12—Buffalo Office, DODGE REPORTS. In number of jobs reported, in speed, in accuracy, in job details given, Dodge news is superior.

DODGE SERVES INTERESTS OF ALL

As a national clearing house for construction news, Dodge renders the entire construction industry a service of fundamental importance. This service might be likened to a huge telephone exchange which automatically connects architect, engineer, general contractor, sub-contractor, material man, owner, financing institution and the many other factors involved. It puts them in touch with each other at the time their functions must meet in order to complete a project. Distances are shortened, time is saved, delay is avoided, costs are reduced. Were it not for this national system of orderly distribution of news, a chaotic condition would exist, characterized by tremendous duplication of effort, confusion and needless expense. Finally, it should be recalled that each time an architect gives information to a Dodge reporter, he is aiding in the compilation of statistics of the construction industry. Dodge statistics are regarded as authoritative by the Federal Government, the Federal Reserve Banks, the U. S. Chamber of Commerce and the press of the country. The value of these statistics to the industry and to the public is obvious.

The more widely and the more intelligently Dodge Publications and Services are used, the better the interests of all will be served. Each one of these publications and services has been designed especially to aid those concerned in any way with construction, and to help them to perform their particular function with less trouble, at lower cost, and greater profit.

Dodge Report service is available for almost any territory desired. The price is very low because we are able to distribute our costs over thousands of contracts. The application of the Dodge Reports Plan for using the service is neither difficult nor costly. Our representatives are sales consultants; they know the construction field through long contact; confidence may be placed in their recommendations. Further information will be cheerfully supplied. Address Dodge Reports, 119 West 40th Street, New York, N. Y.

SELECTIVE SERVICE ORDER BLANK

Territory Subscribed for ..... | **Business**

.....

.....

STATUS OF PROJECT IN WHICH WE ARE INTERESTED

Stage

— 1. "CONTEMPLATED"—prior to selection of architect.

— 2. "ARCHITECT SELECTED," "PLANS IN PROGRESS" and later stages to and including "TAKING BIDS."

— 3. "LIST OF GENERAL CONTRACT BIDDERS."

Stage

— 4. "GENERAL CONTRACT AWARDED."

— 5. (Only on projects built by separate contracts.) "WORK STARTED."

— 6. "ROOFING" and later stages to completion.

☐ Send only coded reports bearing the following symbols — 1 — 2 — 2½ — 3 — 4 & 4L — 5 — 6 — O — O — A — Z — N

SUB CONTRACTS IN WHICH WE ARE INTERESTED

(Encircle code symbols desired)

1—Excavating
2—Foundations and Piling and Caissons
3—Mason (brick, stone and concrete)
4—Fireproofing
5—Carpenter
6—Cut Stone
7—Structural Steel
8—Ornamental Iron and Bronze
9—Plumbing
10—Heating and Ventilating
11—Electric
12—Elevators
13—Roofing
14—Sheet Metal
15—Plastering
16—Painting
17—Glazing
18—Marble and Tile
19—Floors (Finished)
20—Mill Work
21—Metal Trim, Hollow Metal and Kalamein
22—Bank and Store Fixtures
23—Interior Decorating
58—Sprinklers

PROJECT TYPES AND VALUATIONS IN WHICH WE ARE INTERESTED

Max. Value — Min. Value

Commercial Buildings

— — 1—Bank Buildings
— — 2—Garages—Service Stations—Hangars
— — 3—Loft Buildings and Warehouses
— — 4—Office Buildings
— — 5—Restaurants
— — 6—Stores and Markets

Educational Buildings

— — 7—Educational Buildings—Parochial Schools
— — 8—Libraries and Museums
— — 9—Public Schools

Hospitals and Institutions

— — 10—Hospitals and Institutions

Industrial Buildings

— — 11—Manufacturing Buildings
— — 12—Power Plants and Transmission Lines
— — 13—Refrigerating Plants

Public Buildings

— — 14—Armories—Auditoriums—Rinks—Stadiums
— — 15—Capitols—Court Houses—Post Offices
— — 16—Monuments and Mausoleums
— — 17—Municipal Buildings—Jails
— — 18—Railroad Stations—Car Barns—Freight Houses

Religious Buildings

— — 19—Churches and Chapels—Funeral Parlors
— — 20—Convents—Monasteries

☐ Check here if projects built by separate contracts are not wanted.
☐ Check here if "Out of Town" news is desired.

Max. Value — Min. Value

Residential Buildings

— — 21—Apartments
— — 22—Apartments and Stores
— — 23—Hotels
— — 24—Residences (Owner Occupy)
— — 25—Residence (For Sale)
— — 26—Residences (five or more)

Social and Recreational Buildings

— — 27—Clubs—Lodges—Parish Houses—Gymnasiums
— — 28—Park Buildings
— — 29—Theatres

Miscellaneous Buildings

— — 30—Greenhouses
— — 31—Stables and Farm Buildings

Public Work and Utilities

— — 32—Airports
— — 33—Bridges
— — 34—Dams—Reservoirs—Retaining Walls—Dredging
— — 35—Docks and Piers
— — 36—Parks—Golf Courses—Playgrounds—Swimming Pools
— — 37—Railroads—Subways—Tunnels
— — 38—Gas Plants—Electric Lighting Systems
— — 39—Sewers—Gas and Water and Oil Mains—Drainage Ditches
— — 40—Streets and Highways
— — 41—Water Supply and Sewage Disposal Plants

☐ Check here if "In Abeyance and Abandoned" reports are desired.
☐ Check here if "Announcements of Plans on File" are not wanted.

Fig. 13—Each Dodge Report subscriber indicates, on the above form, the service desired. The form as checked is followed by the Dodge issuing department, and the subscriber receives a service of selected Reports on projects of particular interest to him. With this service, he is able to control his advertising and selling, concentrating his effort on active jobs. He saves money by eliminating useless sales calls and wasteful advertising. The architect benefits because the manufacturers' salesmen do not call, except when the architect has a job on which the manufacturer's product may be used.

HOME OWNERS' CATALOGS

HOME OWNERS' CATALOGS is another very important reason why it is to the advantage of the architect to give early and complete information to the Dodge reporter on all "owner occupy" residential projects.

HOME OWNERS' CATALOGS is a handsomely bound volume, containing the individual catalogs of manufacturers of home building materials, equipment, services and furnishings. All are written in simple, comprehensive terms which are easily understood by the layman. It is delivered, without charge or other obligation, to owners planning to build—or modernize—their own homes, within twelve months, in the 37 states east of the Rocky Mountains, and who will spend $4,000 or more for construction, exclusive of land.

From the standpoint of the architect it has the following advantages:

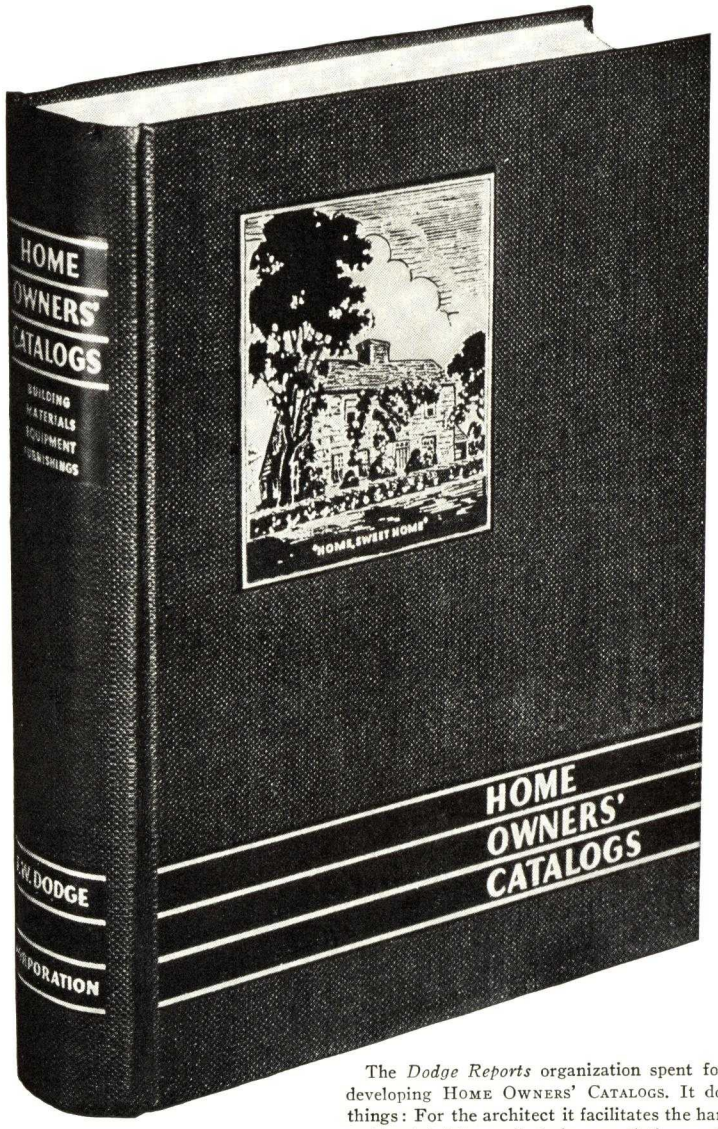
It places manufacturers' literature in the owners' hands at one time. In the present unorganized state of affairs owners receive catalogs at all stages of their projects. As a result, they raise questions at every meeting with their architects and often changes in plans and specifications follow. When we first discover (through property transfers or other sources) an owner who is planning to build a new home, or when an architect gives us the name and address of his client while the new house is in the

(*Continued on next page*)

PROMINENT FIRMS
in the
BUILDING INDUSTRY

present the stories of their products and services in various editions of Home Owners' Catalogs

American Brass Company
American Lumber & Treating Co.
American Radiator Company
Architectural Decorating Co.
Armstrong Cork Company
Barber-Colman Co. of Mass.
Bartlett Tree Expert Co., F. A.
Bell & Fletcher, Ltd.
Bennett Fireplace Corporation
Bryant Heater Company, The
Burnham Boiler Corporation
Carey Company, The Philip
Celotex Corporation, The
Chambers Distributing Co., Inc.
Chase Brass & Copper Co.
Colonial Fireplace Company
Crane Co.
Davey Tree Expert Co., The
Delco-Frigidaire Conditioning Div. General Motors Sales Corp.
Detroit Steel Products Company
Donley Brothers Company, The
Excel Metal Cabinet Co., Inc.
Fitzgibbons Boiler Company, Inc.
Florida Louisiana Red Cypress Co.
Fox Furnace Company, The
Gar Wood Industries, Inc.
Heatilator Company
Herman Nelson Corp., The
Illinois Brick Company
International Heater Co.
Johns-Manville Corp.
Kerner Incinerator Co.
Libbey-Owens-Ford Glass Co.
Lightolier Company
Littlefield-Wyman Nurseries
Majestic Company, The
Masonite Corporation
Metal Lath Manufacturers Association
Minneapolis-Honeywell Regulator Co.
New Haven Copper Co.
New York Telephone Co.
Overhead Door Co., Inc.
Pittsburgh Plate Glass Co.
Rolscreen Company
Sisalkraft Company, The
Sloane, W. & J.
Stanley Works, The
Streamline Pipe & Fittings Division Mueller Brass Co.
Tile-Tex Company, The
Trane Company, The
Truscon Steel Co.
Waterman-Waterbury Co.
Wayne Iron Works
Webster, Warren & Co.
Weis Mfg. Co., Inc., Henry
Western Pine Association



The *Dodge Reports* organization spent four years developing HOME OWNERS' CATALOGS. It does three things: For the architect it facilitates the handling of residential jobs and their negotiations with their clients. For the owner it supplies needed information at the right time. For the manufacturer it eliminates costly waste.

sketch stage, or earlier, we send HOME OWNERS' CATALOGS to that owner with the result that most questions are out of the way before working drawings are started and troublesome changes in plans or specifications are largely avoided.

ARCHITECTS SAY THIS ABOUT HOME OWNERS' CATALOGS

"I have just spent a very enjoyable half hour going through your latest copy of HOME OWNERS' CATALOGS and was sorry to have to give it up so soon . . . a handy and compact means of informing those who are about to build new homes or remodel old ones just what should be put in their plans and specifications.

"This book should be a wonderful help to an architect when going over preliminary plans with his client and in saving of time on the selection of things that are built into the house."—John W. Keyes, Philadelphia.

"We wish to commend you at this time for the services you render the architects, especially with your HOME OWNERS' CATALOGS. We have had several clients remark about it and we believe it helps them to better understand building problems."—Alfred Hill, of Sorey, Hill and Sorey, Oklahoma City.

SPONSORS ARCHITECTURAL SERVICE

In the letter which we send to each owner with HOME OWNERS' CATALOGS and in the *Foreword,* as well as in the *Contents,* we are doing all within our power to point out the advantages and true economies of architectural services.

The carrying letter states: "To adjust individual ideas to the complete plan, and things to budget, is often a difficult task. It is here that the sympathetic, architecturally trained man renders vital service. Again architectural supervision of the home during construction is a safeguard. Architectural service from first to last is true economy."

In the *Foreword* is the following: "Building a home is more than a romantic experience. Intensely practical aspects are involved, and the satisfaction you derive over the years will depend largely upon the success with which you meet the practical phases of house construction. Of these none is so important as Design and Plan. Design and Plan must be adjusted to your desires, your needs and your budget. The architecturally trained man is better able to handle this phase of the home building operation than any one else."

LOWERS COSTS

This new development of *Dodge Reports* is important to architects for the further reason that it lowers manufacturer's costs. Here are the reasons:

1—Owners spending $4,000 or more are covered with job-by-job precision. It goes to no one else. HOME OWNERS' CATALOGS is not sent to any owner after work has been started.

2—It is issued in 13 editions, each covering a trading area east of the Rocky Mountains. A manufacturer may limit distribution of his catalog to those editions covering areas wherein he sells, to prevent waste.

3—The volume arrives at the time the owner is seeking information upon which to base decisions.

4—It will be retained throughout the life of the job and in most cases, long after.

5—It costs the manufacturer no more to distribute a 28-page booklet than a four page folder—plenty of space for a complete sales story.

6—Manufacturer pays on basis of catalogs actually delivered.

STOCK PLANS PROHIBITED

We reserve the right of editorial approval of the contents of each individual catalog. We will not accept a catalog which features or recommends stock plans.

Realizing that owners will show the volume to their friends, some of whom will be contemplating new homes or considering changes to existing dwellings, we provide in the volume application forms which persons expecting to build can send us. Thus HOME OWNERS' CATALOGS will crystallize desire and promote construction.

Ask your Dodge reporter to show you a copy of HOME OWNERS' CATALOGS. *Then make it standard practice in your office to give the Dodge reporter the names and addresses of your residential clients at the earliest possible moment. Doing so will confer a favor upon the client and facilitate the progress of the job through your office.*

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DODGE STATISTICAL RESEARCH SERVICE

F. W. DODGE CORPORATION

119 West 40th Street, New York, N. Y.

(For District Offices, see Inside Back Cover)

DODGE STATISTICS

"WHY" AND "HOW" COMPILED

Constant change characterizes the construction market. Educational building may be most active at one time, highways the next; then, perhaps, industrial buildings or small homes. One month, quarter, or year, it is the New York area that is forging ahead, and maybe the next period it is Texas.

Government spending, industrial prosperity, droughts, frozen mortgages, low interest and liberal loans, industrial unrest, seasonal trends—all these forces mould the country's construction program.

The composite effect of all these factors is recorded by Dodge Statistics, which are based upon Dodge Reports. These reports contain construction information gathered from all available sources (architects, engineers, contractors, development companies, real estate operators, public officials, banks, owners, etc.). The reports are mailed daily from Dodge Reports issuing offices to the Statistical and Research Division in New York and constitute, in fact, a daily census of construction.

BULLETIN SERVICE

The broad current statistical needs of the factors interested in the construction market are served, on a subscription basis, through *Dodge Statistical Research Service* in the following manner:

a. Monthly bulletins showing fundamental data of new building and engineering contracts awarded east of the Rocky Mountains (37 states), giving number of projects, number of buildings, new floor space in square feet, total value, and new family dwellings provided.

b. Monthly bulletins showing contracts awarded, classified according to 57 separate and distinct types, based upon the use for which the project is intended. These 57 types are also grouped into 10 general classes.

c. Monthly bulletins showing complete building and engineering statistics—both new construction and new projects contemplated for each of 14 major trading areas applicable to the building field in the 37 Eastern States.

d. Monthly bulletins showing the following for 81 Metropolitan areas: Total construction; Publicly-financed construction and privately financed construction, separately; Residential building, with new projects and alteration projects separated; Non-residential building, with new projects and alteration projects separated; and Public Works and Utilities. Figures are given for the latest month and cumulative for year and for corresponding period previous year.

e. Tri-monthly bulletins give intermediate summary building data, by 14 major trading areas.

SPECIAL SERVICES

Dodge Statistics are being prepared, on special contract, by *Counties* and by *Clients' Sales Territories*. Each contract is "tailored" to client's requirements from our base data—Dodge Reports, and therefore is available in detail comparable to the regular bulletin service.

Dodge Statistics are also sub-divided into "Architect-Planned" and "Planned by Others" which data is published at various times and can be followed currently, if so desired. Another segregation of data records the volume of publicly financed as distinguished from privately financed construction. This data is also published and available at any time upon request.

Special studies of particular interest to factors in the construction industry are made and covered in report form from time to time.

USES

Dodge Statistical Research Bulletins or Special Services are indispensable to those active in any phase of the construction industry.

These services are usable in the following specific manners:

1. To guide the editorial and circulation plans of the *Architectural Record.*
2. To guide the distribution of *Sweet's Catalog* Files.
3. To inform architects of economic trends in the industry that are vital to them.
4. To inform the general public and all factors in the construction industry as to the relative importance of architects in construction enterprises.
5. To furnish bankers, material supply interests, marketing executives, public officials, and all other factors in the construction industry with an accurate and current picture of trends within the industry.
6. To assist in the forecasting of sales and the allocation of quotas by geographical areas, the apportionment of advertising and selling expense in relation to sales potential and the checking of sales performance.
7. To make market and economic studies.

BENEFITS

Dodge Statistics measure the movements in the building industry and through the interpretation of these data, certain functions, outlined in the preceding paragraph, are more efficiently performed.

This improvement in efficiency is extremely significant because it accrues equally to the direct benefit of architect, manufacturer, contractor, trade mechanic, etc., by tending to lower the cost of the product (Buildings) produced and thereby stimulate an increase in that volume. This decrease in distribution costs is of very great importance at this time in offsetting the rising material prices and labor rates.

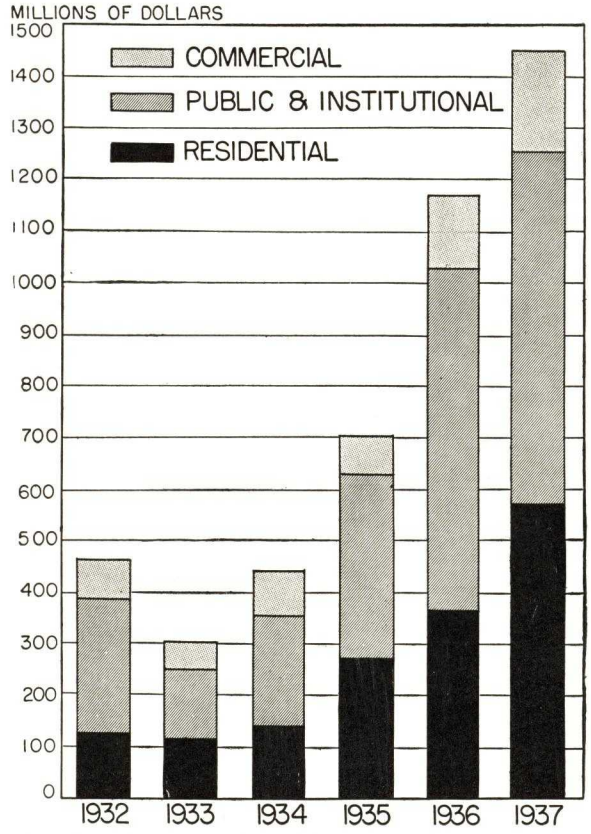
Urge everyone you know in the building field to investigate the Dodge Statistical Research Service for your mutual benefit.

ARCHITECT-PLANNED BUILDING

Since 1933, architect-planned building has experienced a far greater recovery than building constructed without architectural services. While total construction increased 140 per cent from 1933 to 1937, the volume of architect-planned building rose almost 400 per cent.

In the accompanying chart the volume of architect-planned work is shown for the 37 Eastern States beginning with 1932. The effort of the federal government to stimulate business in the early phases of the recovery period resulted in a more rapid expansion of public building. Since 1935, however, residential building again became the most important class requiring architectural services.

The indicated totals for 1937 are based upon the record covering the first eight months. Of the $1,450,000,000 shown for the full year 1937, approximately $340,000,000 was for architect-planned dwellings, $235,000,000 for apartments and hotels, $220,000,000 for industrial buildings, $210,000,000 for educational buildings, $195,000,000 for commercial buildings, $90,000,000 for public buildings, $70,000,000 for hospitals and institutions, $60,00,000 for social and recreational buildings, and $30,000,000 for religious and memorial buildings.



Dollar value of architect-planned building in the 37 Eastern States by major classes. Totals for the year 1937 estimated on the basis of the record for the first eight months.

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ARCHITECTURAL RECORD

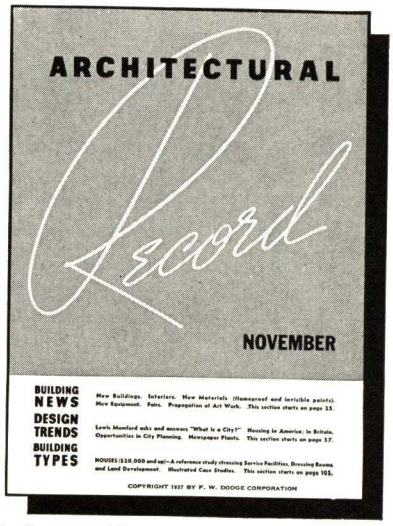
Published By

F. W. DODGE CORPORATION

119 West 40th Street, New York, N. Y.

(For District Offices, see Inside Back Cover)

ARCHITECTURAL RECORD is a professional journal for building designers—those whose business it is to develop plans and formulate specifications for building which will satisfy given sets of requirements.



The broad subject of building design starts with the study of events, in all fields of activity, which indicate either deficiencies in present design or potentialities in design of the future. It proceeds through a review of basic changes in design which are the result partly of changing ways of living and partly of the development of new and improved products. Its final stage, at any given time, is reached in a study of the best specific solutions, to date, of specific design problems.

NEW SECTIONALIZED FORMAT

Approaching the subject of building design from the journalistic standpoint, the RECORD organizes its material in three main departments, or sections, each classified by the factor of *time,* as follows:

(1) BUILDING NEWS reports events of recent occurrence which have apparent significance in the field of building design.

(2) DESIGN TRENDS reviews new tendencies in building design and construction. The material presented in this section is selected on the basis of its probable influence on building design of the future.

(3) BUILDING TYPES recapitulates standards which, up to the date of their publishing, represent the best solutions to basic design problems. Each issue of this section is devoted to one particular type of building.

This sectionalized format, designed to make readers' time yield the greatest possible value, was developed during months of study and consultation with men whose needs the publication must serve.

Comments from many readers indicate that sorting the contents into three parts — Building NEWS, Design TRENDS and Building TYPES—makes the RECORD a more useful professional journal.

BUILDING-TYPE STUDIES AVAILABLE

During 1937, the following building-type studies have been published in ARCHITECTURAL RECORD. They have averaged over 40 pages each of text and illustration. Each type was selected because of its current importance to the building designer.

To those who have or are likely to have work on any of these types of buildings, the RECORD will send reprints of these reference studies, on request, while the supply lasts.

Retail Stores	January
Industrial Architecture	February
Houses (under $10,000)	March
Schools	April
Housing (Land Subdivision)	May
Community Recreation	June
Hospitals	July
Factories	August
Houses ($10,000 to $20,000)	September
Apartment Houses	October
Country and Suburban Houses ($20,000 and up)	November
Office Buildings	December

In 1938, RECORD subscribers will receive twelve more such studies, the subjects to be selected as heretofore, on the basis of their relative importance to the whole field of building design.

* * * * *

ARCHITECTURAL RECORD was established in 1891 and has been published by the same organization since the issuance of Vol. 1, No. 1. Although it has changed with the requirements of the times, its prime function remains the same as it was forty-six years ago. Edited now, as then, exclusively for building designers, its purpose is to serve the needs of building designers—by whatever titles they are known—and to serve them well.

EDITORIAL PERSONNEL

Editorial Director: Thomas S. Holden, vice-president in charge of Statistics and Research, F. W. Dodge Corporation. B.A. and M.A., University of Texas; B.S. in architecture, Massachusetts Institute of Technology. President, New York Building Congress, Inc.; vice-chairman, Committee for Economic and Social Progress, Inc. (formerly, Committee for Economic Recovery, Inc.); chairman, special committee on housing, Merchants' Association of New York. Member, Engineers' Club of N. Y.

Editor: A. Lawrence Kocher. A.I.A., practicing architect. Educated at Stanford University and Massachusetts Institute of Technology. Formerly head of Schools of Architecture, University of Virginia and Pennsylvania State College; university architect of University of Virginia; member, Virginia State Board of Examiners of Architects. Former chairman, State Art Commission (Va.); member and former chairman, A.I.A. Committee on Preservation of Historic Monuments; member, Architectural Advisory Board for Restoration of Williamsburg, Va.

Managing Editor: O. C. Anderson, Newspaper and business paper writer. Formerly: managing editor, Swetland Publications, Inc.; publication director, *The Young Business Man;* editor, *Pacific International Exporter;* and editor, *Building Business* and *Inter-Industry Selling,* publications of Sweet's Catalog Service division of F. W. Dodge Corporation.

Editor, "Building News": James M. Fitch, Jr. Educated at Alabama and Tulane. Architect in private practice four years. Director of Population Statistics of Tennessee State Planning Commission; F.H.A., Low Cost Housing Division.

Editor, "Building Types": R. Stanley Sweeley, registered architect. Educated at Cornell and Columbia Universities, l'Institute de Panthèon, Paris, Corcoran School of Art. Practiced for 10 years, residential and industrial work. Director of Design for Theatre Workshop, New York.

Art Director: Gene Hawley. Educated at Syracuse University. Post-graduate study at Paris Académie Moderne and Académie Delacluse.

Assistant News Editor: Elisabeth Kendall. Educated Institut Libre de Enseñanza, Madrid, Spain; B.A. Tulane University; M.A. University of Wisconsin; studied architecture at Tulane University and University of California. Reporter, New Orleans Times-Picayune for two years.

Desk Editor: Irvin Kuper. Educated at New York University, Harvard Graduate School of Architecture.

Research Consultants: K. Lönberg-Holm. Educated in Denmark and Germany. Practiced architecture in Denmark and the United States. Formerly instructor in architecture at the University of Michigan. Director of Research, Sweet's Catalog Service. Technical News and Research Editor, ARCHITECTURAL RECORD, 1930-32. U. S. A. delegate to International Congress of Modern Architecture. Member, International Industrial Relations Institute.

C. Theodore Larson. A.B. and M., Arch., Harvard University. Nelson Robinson, Jr., Fellowship winner—architectural research in European and Mediterranean countries. Research Staff, Sweet's Catalog Service. Technical News and Research editor of ARCHITECTURAL RECORD, 1932-37. Formerly associated with Boston architectural firm of Smith & Walker. Practiced in New York and Kansas City. Member, International Congress of Modern Architecture and International Industrial Relations Institute.

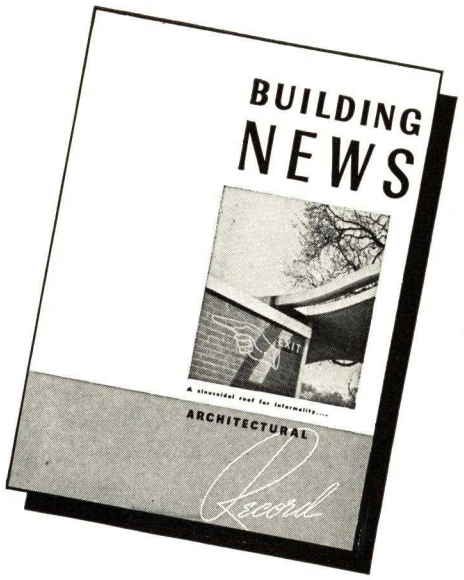
Consulting Editors: Abram Bastow, A.I.A., Sweet's Staff of Consulting Architects. Registered architect in New York and New Jersey. Member, Architectural League of New York.

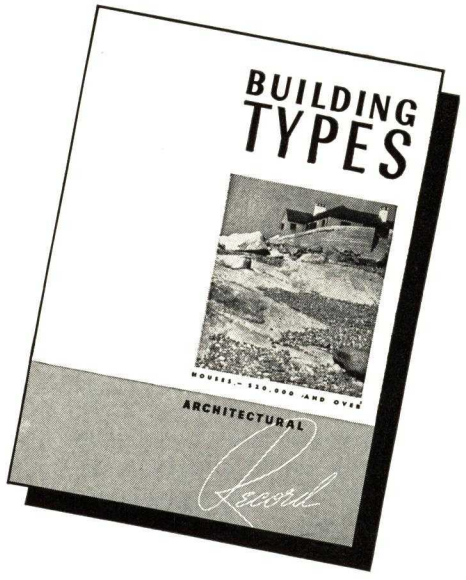
A. Lynwood Ferguson, Sweet's Staff of Consulting Architects. Technical Secretary (1920-26) and managing director (1926-1928), Structural Service Bureau.

George A. Chapman, A.I.A., Sweet's Staff of Consulting Architects. Assisted in the organization of Architects' Small House Service Bureau.

Henry T. Langham, member of Sweet's Consulting Staff. Formerly associated, in an engineering capacity, with the National Biscuit Company, Durium Products, Inc., and other firms during a period of 10 years.

Richard Yates, member of Sweet's Consulting Staff. Formerly with the Leland Engineering Corporation, Wigan, Lancashire, England, and for the past six years engaged in industrial marketing in the United States.





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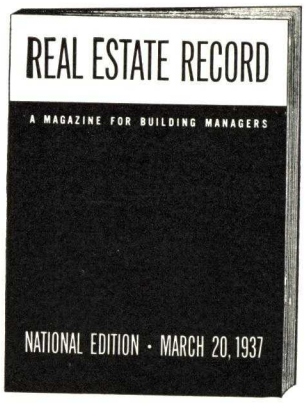
REAL ESTATE RECORD

Published By

F. W. DODGE CORPORATION

119 West 40th Street, New York, N. Y.

(For District Offices, see Inside Back Cover)



Real Estate Record is a National Building Management magazine serving the commercial building market. Rounding out other services of the F. W. Dodge Corporation, it takes in the field of existing office, apartment and loft buildings.

EDITORIAL SCOPE

It has been truly said that a building is never finished until it is torn down. Real Estate Record is designed for those executives confronted with problems relating to the construction, alteration and modernization, operation and maintenance of office buildings and apartment houses. It is concerned with the economics of building investment. Thus it covers a wide field touching at times upon economic and social problems faced by real estate administrators.

Building operation methods, trends, costs—herein lies the field to which editorial attention is directed by analyses from the pens of management executives of real estate companies, savings and commercial banks, government bureaus, mortgage and insurance companies. Its case studies in new construction and maintenance methods form the backlog for a permanent literature on building management.

With the F. W. Dodge news-gathering and statistical resources available to the editors of Real Estate Record its scope and authority are not equalled by any other publication in the field.

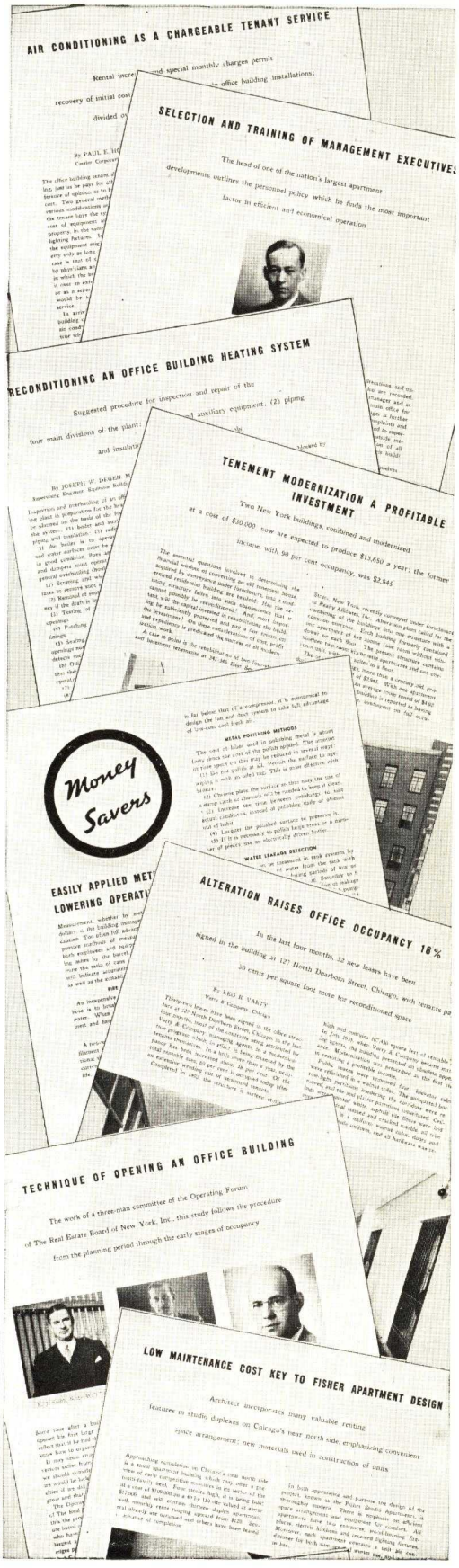
CIRCULATION

Founded in 1868 and published continuously for sixty-seven years as a New York real estate publication, the magazine was made national in scope January 1935. The rapid acceptance of the national edition is substantiated by the fact that in this period Real Estate Record has gained the largest paid circulation of any publication serving the commercial building market.

ACTIVITY IN THE COMMERCIAL BUILDING FIELD

New Construction—During the first seven months of 1937 a total of $170,000,000 went into new apartment, office and loft construction. The building management executive working with the architect enters into the planning of such investment properties through his intimate knowledge of rental conditions, real estate values, and tenant requirements. His experience with building materials and equipment is often a valuable factor in their selection for new buildings.

Alteration and Modernization — To a large extent the alteration and modernization of commercial buildings is originated by the practical building management executive. Since 1933, the amount spent on alteration has increased annually from $58,000,000 to $131,000,000 in 1936. Based on expenditures for the first six months of 1937, and estimates for the last six months, this year will show approximately $175,000,000 spent on the modernization of existing structures.



EDITORIAL ORGANIZATION

Editor

Norbert Brown has been editor of Real Estate Record for eight years. Prior to his connection with this magazine he was engaged in newspaper work in Ohio and New York. Mr. Brown attended the University of Notre Dame and was graduated from Columbia University, where he specialized in economics.

Managing Editor

Robert F. Marshall has been associated with Real Estate Record for three years, coming to this magazine after holding editorship of Skyscraper Management. Mr. Marshall was engaged in advertising and newspaper work in New York and Chicago for several years. He attended Antioch College.

Associate Editor

William R. Owens has been an Associate Editor of Real Estate Record for forty years, during which time he has had complete charge of its real estate records, a principal feature of its metropolitan editions.

Associate Editor

Thomas J. Bradley, Associate Editor, was graduated by the University of Notre Dame and did graduate work at the Pulitzer School of Journalism, Columbia University. He has been associated with Real Estate Record over a period of six years.

Associate Editor

Brendan Sullivan, Associate Editor, was graduated by Columbia College in New York, attended the Pulitzer School of Journalism, and after a short time with "The Catholic Worker," published in New York, joined the staff of Real Estate Record.

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SWEET'S CATALOG SERVICE

Division of

F. W. DODGE CORPORATION

119 West 40th Street, New York, N. Y.

(For District Offices, see Inside Back Cover)

SWEET'S CATALOG FILE

This file, originated, produced, and distributed by Sweet's Catalog Service, is a collection of manufacturers' catalogs, especially designed to meet the requirements of architects, engineers, and contractors. The catalogs therein have been indexed, classified, and *prefiled*—i.e., filed in Sweet's before distribution to users' offices. Prefiling eliminates the waste of time, money, and effort attending the *individual* distribution of manufacturers' catalogs. By means of this procedure, it is possible to review, revise, and bring up to date every catalog and catalog page in the file, assuring the user as no other filing method could, that the latest information has been added and the obsolete information eliminated.

The current (1938) file which you have before you, represents a stage in the development of a plan which has been widely accepted by leading architects, engineers, contractors and manufacturers as the most practical, economical and effective method of meeting the catalog needs of these mutually dependent groups.

Since the first appearance of Sweet's in 1906, great progress has been made, but much remains to be done. It is the purpose of this outline to clarify some points which seem not to have been well understood by those who, in their enthusiasm for the Sweet's file *as it is today,* have not fully considered the benefits which lie in its continued development.

CATALOG FILES—OLD STYLE AND NEW

No architect or contractor needs to be reminded of the time, effort and expense required to maintain even a semblance of a workable file in the days before there was any alternative to building one up, piece by piece, from the catalogs supplied at irregular intervals by the manufacturers. The sorting, classifying, filing, refiling and replacement of individually distributed catalogs necessitated a time-consuming routine which few had the facilities or inclination to follow. The result was highly unsatisfactory both to architects and to manufacturers.

It was hardly surprising that building professionals welcomed the inauguration of a new method of catalog distribution which would give them, instead of the raw materials for a file, a complete file in itself. In spite of its modest beginning, the plan was received with universal favor. At once, it became the custom to "look it up" first in Sweet's—and to resort to the old file only when forced to do so. In the following years, the Sweet's file grew to such proportions that many found it unnecessary to maintain any other, especially in view of the marked trend toward the distribution of more comprehensive and useful catalogs in Sweet's.

CATALOG ECONOMICS

The splendid support of the building profession has been one of the important contributing factors in the successful development of Sweet's. Many users of this file take every opportunity to recommend to manufacturers that they file their catalogs in Sweet's. Some, with commendable conscientiousness, add the qualification, "provided the cost is not prohibitive," their impression being that the Sweet's plan involves great added expense to those on the selling end. This is far from the fact.

Sweet's clients pay on the average only one cent per page per year to send you their catalogs in the Sweet's file. This charge includes printing, filing and delivery to your office and in many cases, preparation of the catalog by Sweet's staff of consulting architects. It is the cost of *individual* catalog distribution which is prohibitive. Only a pitifully small percentage of separate catalogs find their way into a file—so few that a catalog costing 25 cents to print and deliver, on the average, actually costs $1.25 per copy filed.

A manufacturer can place a 24-page catalog in 14,500 offices of architects, engineers and general contractors, via the Sweet's file, at less than 22 cents apiece. Even if he were able to prepare, print and distribute individual copies of the same catalog to the same offices for 18 cents apiece, the net result would be a "saving" of some $500. And for this "economy", he would consign 80 per cent of his catalogs to the scrap heap.

Even in the case of the manufacturer who distributes only a single page bulletin, Sweet's can handle the job at less than the cost of mailing alone!

Bulk buying of paper, bulk printing and bulk distribution permit economies which are shared by all clients of Sweet's service. The small portion of the charge which is applied to the service features of Sweet's is not comparable with anything in existence at the present time. Manufacturers cannot assure the maintenance of their catalogs in recipients' offices, in equally convenient and accessible form, in any other way, *at any price.*

WHEN THE MANUFACTURER ASKS YOU ABOUT CATALOGS

In spite of ample precedent and convincing evidence there are still some manufacturers to whom the idea of distributing a catalog as an integral part of the Sweet's file appears somewhat radical. Aside from the very human tendency to resist change, there is often an honest doubt in their minds that a catalog filed in Sweet's can make for more satisfactory and profitable business relations than if distributed individually. They find it difficult to believe that the catalogs which they have prepared with such care and thoroughness (when that is actually the case) will fail to be rewarded by recipients with interested attention and continued use. Even though they admit the existence of a catalog filing problem in the latter's offices, with its attendant wastes, each believes that *his* catalog is the exception to the rule, and that it will be singled out for preservation and use.

Every so often, one of the less reactionary spirits decides to check up on the situation. The usual procedure is to conduct a questionnaire investigation. Some of these are well designed to elicit the desired information; but others are so lacking in this quality that a busy man might unwittingly convey a wrong impression in his reply.

For instance, a manufacturer with a four-page condensation of his catalog in Sweet's might send you a separate copy of a catalog well designed to meet your needs with the ambiguous question:

"Would you prefer that we send you our catalog individually, or shall we confine our effort to Sweet's?"

Of course you want the most useful information you can get and you tell him so. But unless you make it plain that you prefer to have it sent to you filed in Sweet's he will assume your preference to be for a sperate catalog. He should have stated his case somewhat as follows:

"We are planning the distribution of a new catalog. Would you prefer to receive a loose copy or shall we send it to you in the Sweet's file?"

Then there would be no misunderstanding of the question or of the answer.

Another example of this ambiguity is found in the question:

"Is it your habit to consult the Sweet's file for catalog information on ————?"

Now it may happen that the manufacturer in this case issues an unusually valuable catalog which is retained by more than the average number of offices, not because the separate catalog is preferred, but because the information is not as well presented in the Sweet's file. Under these circumstances, your answer might be misleading—unless you take the trouble to explain that it is your habit to consult the Sweet's file first as a source of catalog information; that in this instance you have been forced to go elsewhere to supplement the information, and that you would prefer to have what you want in Sweet's.

The new user of Sweet's may wonder at our apparent presumption in assuming that replies will be generally favorable to Sweet's. We can only say that the question has been put to the profession in numberless surveys and Sweet's always has been voted the best solution of the catalog problem.

THE CURRENT TREND

The ultimate aim of Sweet's is to furnish you each year with a file of catalogs in which you can find useful, up-to-date information on the products of every reputable manufacturer.

A measure of the progress toward this goal is found in the yearly increase in the number of well-designed catalogs. It should be remarked at this point that the number of pages does not, in every case, indicate the usefulness of information, or lack of it. In addition to the many catalogs in Sweet's whose bulk alone marks them for attention, there are scores of adequate catalogs which do not include more than a few pages. These are just as valuable and useful in connection with the products they describe as the catalogs in which an effective presentation necessitates the use of eighty or a hundred pages. The important point is that Sweet's clients as a whole have come to appreciate the value of this kind of contact and that the present trend is away from the "reference book" form of presentation and toward catalogs containing primary buying information.

Indicative of this trend is the year to year increase in catalogs of 12 pages or more with individual covers. Since cover-catalogs were first accepted for filing in Sweet's in 1928, they have accounted for the following percentages of the total file: 2.4% in 1928; 8.7% in 1929; 25.1% in 1930; 32.7% in 1931; 32.4% in 1932;

29.5% in 1933; 38.7% in 1934; 47.4% in 1935; 50.4% in 1936; 55.7% in 1937; and 59.7% in 1938.

It is also significant that nearly all the ground gained has been retained. In other words, when a manufacturer has learned to take full advantage of Sweet's service, he continues to use it year after year. The few who drop out do so, almost invariably, for reasons which do not concern the quality of the service rendered.

Of 183 manufacturers who filed the largest catalogs in the current Sweet's, 47 have distributed their catalogs in this form for twenty-five years or more; 134 for ten years or more; and 163 for five years or more.

BEHIND THE SCENES

Many architects, writing to acknowledge receipt of a new Sweet's, have commented on the thousands of changes and revisions necessary to bring the hundreds of manufacturers' catalogs up to date each year.

The distribution of a complete Sweet's file is the culmination of twelve months of catalog service rendered continuously to hundreds of manufacturers. Throughout the year, Sweet's is busy preparing the material for clients' catalogs and, whenever new catalogs are needed immediately, printing and distributing advance copies which will be filed and distributed later in the complete file.

Here is the procedure.

Preliminary

Fourteen district managers and their assistants, working out of offices strategically placed from coast to coast, make preliminary arrangements with manufacturers, receive their orders and transmit their detailed instructions to the proper department in the home office in New York.

Catalog Preparation
Architectural and Engineering Consultants

In order that catalogs in Sweet's may contain information of real usefulness to you, the services of a staff of consulting architects, engineers and contractors are placed at the manufacturer's disposal without charge. All members of this staff are men of practical experience. Most of them are members of the A.I.A. and have previously conducted successful private practices. They have compiled scores of the most comprehensive and useful catalogs in Sweet's.

Copy Service

Sweet's maintains, in addition, an experienced copy staff, which operates under instructions from the consulting staff or direct from the manufacturers.

Editorial Service

Catalogs are reviewed and edited from the user's point of view to check any facts, figures, statements or illustrations which might not be understood or might mislead and suggestions for changes are forwarded to manufacturers for approval and incorporation before printing.

Classifying and Indexing

This work proceeds concurrently with the receipt of okayed proofs. Catalogs are first classified into sections according to products cataloged and then alphabetically as far as possible by manufacturers' names within each of these sections. These important operations, which require up-to-date and extensive knowledge of all products and expert supervision, contribute greatly to the usefulness of the Sweet's file.

Printing and Binding

After copy in proof form has been approved by manufacturers it is printed, as fast as forms can be assembled, in one of the largest and best equipped plants in the country. 15 carloads of paper were required for the current file. Finally 80,000 separate volumes of catalogs (five to a file) are permanently bound to withstand the constant handling they receive and to insure each manufacturer's catalog against loss in recipients' offices.

Distribution

Now comes the work of getting upwards of 350 tons of manufacturers' catalogs to their proper destinations, in order that they will be accessible in 14,500 offices of architects, engineers and general contractors. The lists have been kept up-to-date throughout the year through Dodge Reports and other authentic records. Shipping cartons, labels and receipts are ready. For a solid month thousands of sets of Sweet's move by freight, express, parcel post and motor truck—and a new, up-to-date file has reported for duty, to carry on the work of its predecessor. Throughout the year, as important new firms are reported by the 750 reporters and correspondents of F. W. Dodge Corporation, of which Sweet's Catalog Service is a division, these firms are provided with the Sweet's file.

* * * * *

The cycle is endless. As soon as the new Sweet's file is delivered to your office, work commences on the next. Hundreds of people participate directly or indirectly in its compilation and distribution. In addition to those employed by Sweet's clients, by paper producers, engravers, printers and distributing agents, eighty individuals on the Sweet's staff are employed the year 'round to provide you with this service.

DISTRICT OFFICES

F. W. DODGE CORPORATION

ATLANTA	Red Rock Bldg.	Walnut 6516
BALTIMORE	Equitable Bldg.	Plaza 3138
BIRMINGHAM	Farley Bldg.	Birmingham 3-8524
BOSTON	Park Square Bldg.	Hancock 0700
BUFFALO	361 Delaware Avenue	Cleveland 8200
CHICAGO	105 West Adams Street	Dearborn 3500
CINCINNATI	800 Broadway	Parkway 2866
CLEVELAND	1422 Euclid Avenue	Cherry 7256
COLUMBUS	12 North Third Street	Adam 9770
DALLAS	Construction Bldg.	Texas 2-9073
DAYTON	U. B. Building	Fulton 2321
DES MOINES	Securities Bldg.	Des Moines 3-6270
DETROIT	607 Shelby Street	Cadillac 2745
HOUSTON	Merchants & Mfrs. Bldg.	Preston 9341
INDIANAPOLIS	Archts. & Bldrs. Bldg.	Lincoln 6816
JACKSONVILLE	Dyal-Upchurch Bldg.	Jacksonville 5-4432
KANSAS CITY	New York Life Bldg.	Harrison 3800
LOS ANGELES	1031 So. Broadway	Prospect 0565
LOUISVILLE	Heyburn Bldg.	Jackson 3453
MIAMI	507 N. E. First Avenue	Miami 3-6461
MILWAUKEE	125 East Wells Street	Marquette 2922
MINNEAPOLIS	407 South 4th Street	Atlantic 1474
NEW ORLEANS	Balter Bldg.	Raymond 9871
NEW YORK	119 West 40th Street	Pennsylvania 6-1500
OKLAHOMA CITY	Petroleum Bldg.	7-7471
PHILADELPHIA	1321 Arch Street	Locust 4326
PITTSBURGH	Bessemer Bldg.	Atlantic 8220
ST. LOUIS	721 Olive Street	Chestnut 7390
SAN ANTONIO	Builders Exchange Bldg.	Fanning 6873
WASHINGTON	1341 G Street, N. W.	Metropolitan 2017

F.W. DODGE

CORPORATION

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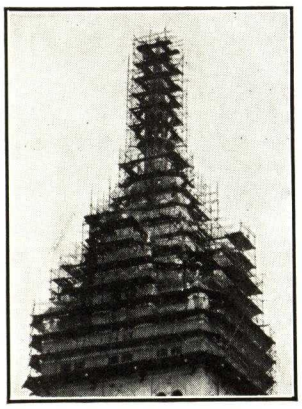
BUILDING TECHNOLOGY HERITAGE LIBRARY
https://archive.org/details/buildingtechnologyheritagelibrary

CHESEBRO-WHITMAN CO., INC.

38-21 12th Street
LONG ISLAND CITY, N. Y.

THE "GOLD MEDAL" SAFETY EQUIPMENT



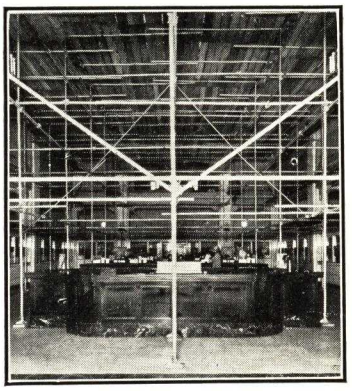
Tubular Scaffolding Used on a Skyscraper

"Tubelox" Steel Scaffolding.
"G.M." Steel Sidewalk Bridges.
Tubular Steel Dirt Chutes.
"Tubelox" Steel Hoist Towers.

"Tubelox" Steel Scaffolding

The latest development in scaffolding—strong, sightly, fireproof, easily and economically erected and dismantled. May be used wherever the built-up form of scaffolding is required, especially for the interior of banks and churches, and for the exterior of skyscrapers, monuments, etc.

This newly developed steel scaffold is rapidly replacing the old unsightly form of wooden scaffolding. Its fireproof qualities alone, should be of first importance to scaffold users, large losses having been caused by burning wooden scaffolding.



Tubular Scaffolding Used in a Bank

"G.M." Steel Sidewalk Bridges

Steel sidewalk bridges provide a substantial protection for the public during building operations. They present a sightly appearance, reduce fire risk, and provide storage space for building materials. The use of this bridge on all types of sidewalk conditions is made possible by the adjustable features illustrated.

This type of bridge has been generally adopted by contractors in the larger cities, as they realize it is of the utmost importance to give the public the greatest possible protection during building operations—steel bends, whereas wood breaks.

"Gold Medal" Steel Sidewalk Bridge with Steel Gridiron Framework Providing Tremendous Resistance

"Tubelox" Steel Hoist Towers

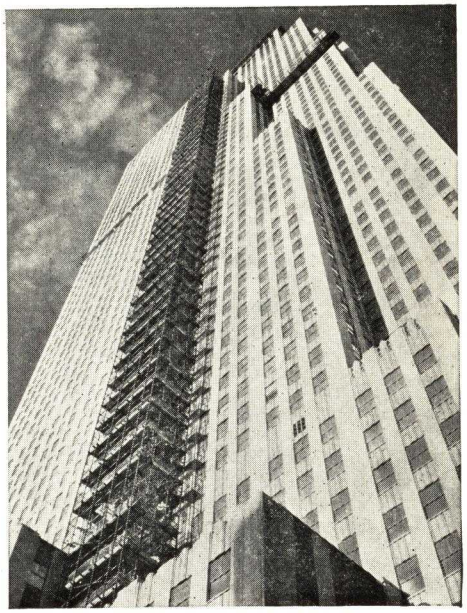
Wooden hoist towers have rightly been called fire flues. Specify against disaster by requiring structural steel *"Tubelox"* Hoist Towers. Designed for use on buildings from one to ninety stories high. Adjustable to meet varying job conditions safely. Platforms of any size for speedy unloading. Erected by our trained crews.

Engineering Service

We should be pleased to have our Engineering Department discuss any special or difficult scaffold problems that you have, and prepare drawings and make recommendations for their proper solution.

Catalogs on any of the above types of "Gold Medal" Safety Equipment will be gladly furnished on request.

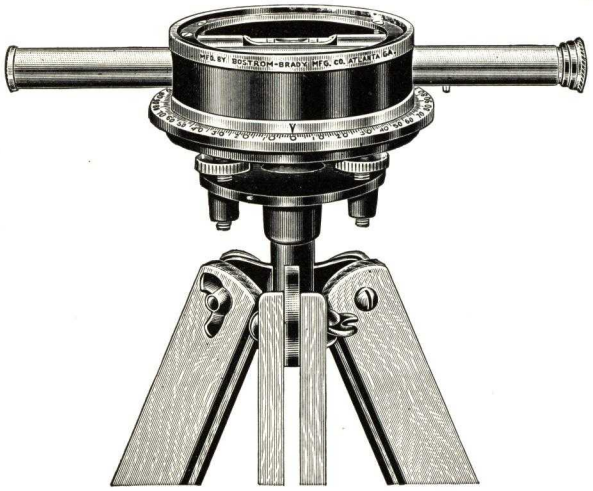
Steel Dirt Chute and Tubular Scaffold



An 880-Ft. "Tubelox" Hoist Tower

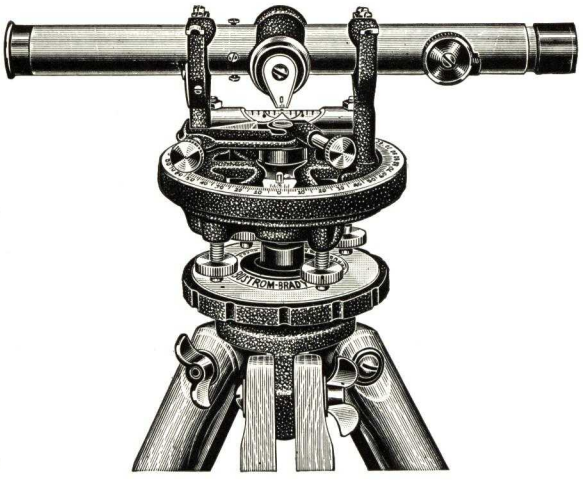
BOSTROM-BRADY MFG. CO.

Manufacturers of Bostrom Levels
533 Stonewall Street, ATLANTA, GA.



No. 2. Bostrom Farm Level

No. 4. Bostrom Contractors Level



No. 5 Bostrom Convertible Level
(In Level Position)

The Product

A Precision Instrument

Bostrom Levels are simple, durable, complete and absolutely accurate instruments. The high quality of material used, combined with the precise workmanship used in their manufacture, have placed the Bostrom products in high favor with Engineers, Architects and Building Contractors.

Design

Every level in the Bostrom line is designed to meet specific requirements in a given field. In the designing of these units, special attention is devoted to making them thoroughly adaptable to every situation which is liable to confront the operator.

Simplicity

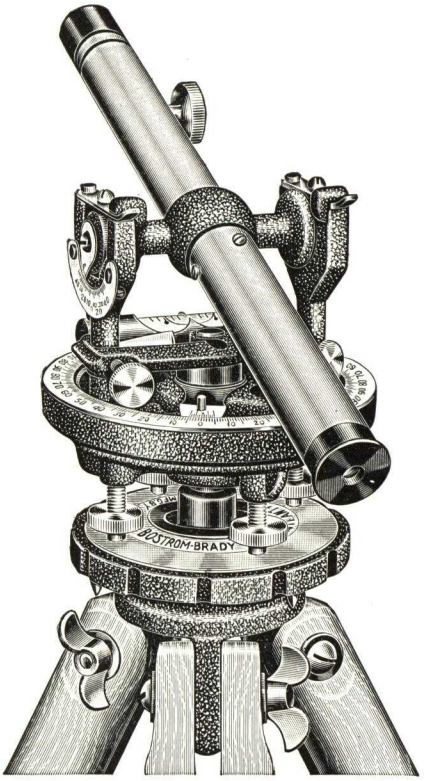
A feature of Bostrom Levels is the ease with which they may be set up in perfect adjustment within a few moments. The compactness of the studied elimination of unnecessary parts provides for good results without "expert manipulation."

Guarantee

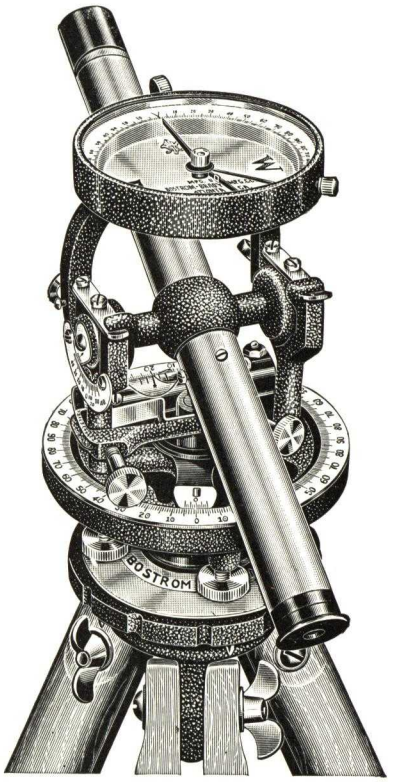
Any Bostrom Level, from the finest to the least expensive is definitely guaranteed for accuracy, durability and workmanship.

Literature

Write for complete literature and list of distributors.



No. 5. Bostrom Convertible Level
(In Transit Position)



No. 5C. Bostrom Convertible
Level with Detachable Compass

MEMORANDA

MEMORANDA

FOUNDATIONS 2
- SECTION -

Section Number 1/5 Catalog Number

CATALOGS 1 to 6

MANUFACTURERS

THIS INDEX INCLUDES ONLY MANUFACTURERS WHOSE CATALOGS ARE FILED IN THIS SECTION

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New England Foundation Co. 2/1
Raymond Concrete Pile Co. 2/3
Spencer White & Prentis, Inc. 2/4
Underpinning & Foundation Co., Inc. 2/5
Western Foundation Co. 2/6

PRODUCTS

THIS INDEX INCLUDES ADDITIONAL INFORMATION WHICH IS FILED IN OTHER SECTIONS

Products described or illustrated in manufacturers' catalogs are indexed by section and catalog numbers. All names are listed alphabetically under each product heading.

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See Contractors—Piling; Contractors—Concrete Construction; Engineers—Concrete Construction; Engineers—Foundation

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Roberts and Schaefer Co. 3/14
Rust Engineering Co. 26/136
Spencer White & Prentis, Inc. . . . 2/4
Western Foundation Co. 2/6

Foundation
See Engineers—Foundation; Contractors—Piling

Mass Construction
See Contractors — Concrete Construction

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Raymond Concrete Pile Co., Inc. 2/3
Spencer White & Prentis, Inc. . . . 2/4
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Shoring
See Engineers

ENGINEERS

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Raymond Concrete Pile Co., Inc. 2/3
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Rust Engineering Co. 26/136
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(See also Contractors—Piling)
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MacArthur Concrete Pile Corp. 2/2
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Spencer White & Prentis, Inc. . . 2/4
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See Contractors Piling; Engineers—General Construction; Engineers Foundation

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New England Foundation Co. . . . 2/1
Raymond Concrete Pile Co., Inc. 2/3
Simplex 2/1
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(Including Precast, Cast-in-place, Pedestal)
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MacArthur Concrete Pile Corp. . . 2/2
New England Foundation Co. . . . 2/1
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PILES—Cont.

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See Piles—Steel Pipe or Sheet Metal Pipe—Concrete Filled

Sheet Metal Pipe — Concrete Filled
See Piles—Steel Pipe or Sheet Metal Pipe—Concrete Filled

Steel Pipe or Sheet Metal Pipe—Concrete Filled
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NEW ENGLAND FOUNDATION COMPANY

38 Chauncy Street

BOSTON, MASSACHUSETTS

Products

Standard Simplex Concrete Piles, Simplex Inserted Shell Concrete Piles, Simplex Composite Piles, Pre-cast Concrete Piles, Steel-Encased Concrete Piles, Open Caissons, Wood Piles, Creosoted Wood Piles.

Services

We are prepared with plant and personnel to execute contracts for foundation work anywhere. We will consult with engineers and architects and submit estimates on proposed work without obligation.

SPECIFIC TYPES OF FOUNDATIONS FOR SPECIFIC CONDITIONS

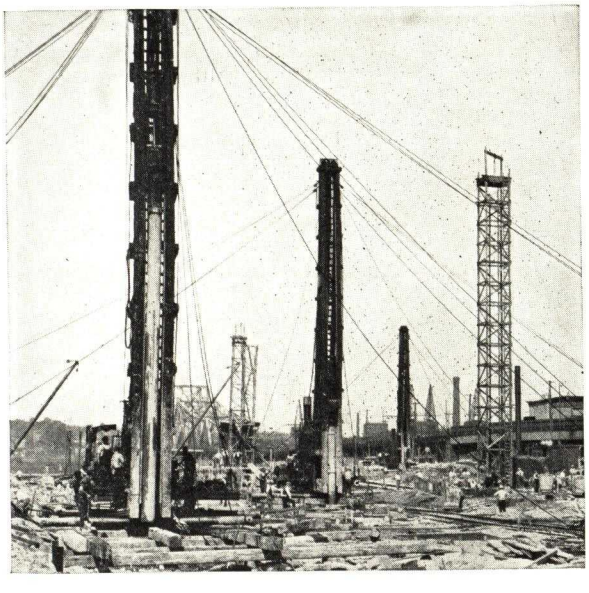
No one type of foundation will economically and successfully meet all conditions of soils and loadings.

The several methods of installing concrete piles and open caissons, together with our facilities for executing other types of work, enable us to meet successfully every condition encountered.

Standard Simplex Concrete Piles

They have been used extensively since 1903, are of proven worth, and are suitable for nearly all conditions met with in unreliable ground.

They are made in place by driving to proper penetration a 16-in. diameter pipe fitted at its lower end with a detachable, pressed-steel base. The pipe is filled with concrete to the proper height and then pulled out of the ground, leaving the pressed-steel base in the ground and a shaft of concrete which completely fills the hole to its compacted walls, resulting in tremendous skin friction, in addition to the end bearing. They have been driven to depths of 75 ft. The working load is usually 30 tons per pile, fully justified by long experience and the results of many tests.



Installing Simplex Concrete Piles for United States Gypsum Plant, Boston, Mass.

Simplex Inserted Shell Concrete Piles

This type of pile may be used in certain soil conditions where it is felt desirable to leave a steel shell in the ground, and are constructed in a similar manner to Standard Simplex Piles, except that a steel shell is inserted in the driving form before the concrete is placed.

Simplex Composite Piles

This type of pile economically meets soil conditions requiring great depth of penetration where the permanent water line is considerably below the surface. A wood pile of required length and diameter is driven to the proper depth, upon which is constructed a Standard Simplex Concrete Pile or a Simplex Inserted Shell Pile.

Pre-cast Concrete Piles

We are equipped to manufacture and drive all types and sizes of pre-cast concrete piles.

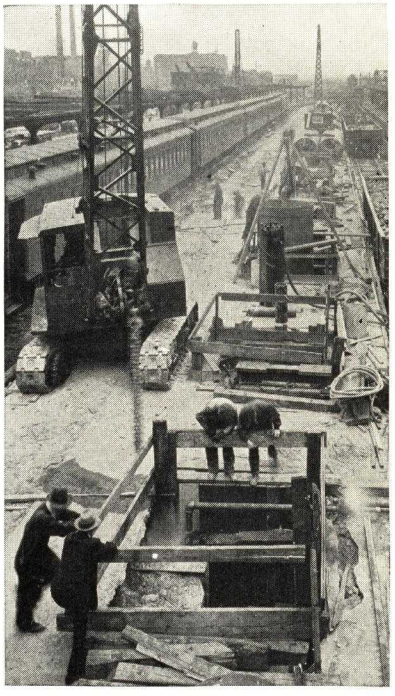
Steel-Encased Concrete Piles

Steel tubes are driven open-ended to the desired bearing. The tubes are then cleaned out by air pressure and filled with concrete. When driven to rock, this type of pile is capable of carrying great loads, which vary with the diameter of the pile and the thickness of the shell.

Open Caissons

In structures in which the loads are concentrated, open caissons, consisting of a shaft of concrete with a belled base carried to bearing material, provide an economical type of foundation construction.

Caissons of large diameter, capable of supporting heavy loads, are constructed by driving continuous steel shells to rock, removing the material within the shells, and filling the shell with concrete. The shell is left in place to act as reinforcement for the concrete caisson.



Plan View of Caissons Being Driven, Parcel Post Building, Boston

U. S. Parcel Post Building

South Station Passenger Track Area, Boston, Mass., 600 ft. long by 175 ft. wide, supported by 69 caissons 6 to 7 ft. in diameter, having steel shells left in place, carried to rock through clay, sand, and hard pan to depths of 115 ft. below the elevation of tracks (90 ft. below tide in Boston Harbor adjacent to the site). Individual caissons carried loads as high as 6,000,000 lbs.

MacARTHUR CONCRETE PILE CORPORATION

ORGANIZED IN 1910

9 Rockefeller Plaza, NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS., 101 Tremont St. NEW ORLEANS, LA., 833 Howard Ave. PITTSBURGH, PA., 323 South Fairmount Ave.

CANADIAN MacARTHUR CONCRETE PILE CO., LTD.

PRODUCTS AND SERVICES

Products

CAST-IN-PLACE CONCRETE PILES
COMPOSITE CONCRETE AND WOOD PILES
STEEL PIPE PILES
COMPOSITE CONCRETE AND PIPE PILES
PRE-CAST CONCRETE PILES

Company and Services

For 28 years the MacARTHUR CONCRETE PILE CORPORATION has devoted itself exclusively to a single purpose—to produce the best possible concrete piles for every conceivable foundation problem in the building field. Its record of installations throughout the United States and Canada is proof that this purpose has been accomplished.

MacArthur maintains a staff of experts who are always ready to serve the architect in preliminary investigation of soil conditions and design and installation of concrete piles to meet all conditions.

MacARTHUR CAST-IN-PLACE PEDESTAL TYPE PILES

The Pedestal Type Concrete Pile is a cast-in-place concrete pile formed under heavy mechanical compression, with an enlarged base or foot. This pile is a distinct and radical improvement in pile construction.

It differs from the ordinary wood or concrete pile in that a large carrying capacity, in addition to that obtained from frictional adhesion, is derived from the direct bearing power of the enlarged base resting on firm and compact subsoil.

The advantage of a pile with a broad base has long been recognized. More than 100 years ago, screw and disc piles were used in England and the United States. Rankine mentions some cast-iron piles from 20 to 45 ft. long, with screws 2 ft. 6 in. in diameter, which carried a working load of 67 tons per pile without settlement. The placing of these screw piles was, however, both laborious and expensive.

It remained for the inventor of the Pedestal Pile to devise a method of mushrooming or bulging out a broad base in so simple a manner that the completed pile, while capable of supporting large loads, is no more costly than piles of the ordinary type.

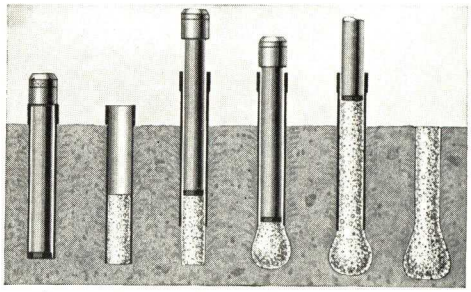
Hundreds of thousands of this type of pile are in service today throughout the United States and Canada, safely supporting every known type of structure.

Typical Installations

COMPANY	LOCATION	PILES
American-Enka Corp.	Enka, N. C.	3900
Brooklyn Union Gas Co.	Brooklyn, N. Y.	15000
Bureau of Yards & Docks	Philadelphia, Pa.	8800
Canadian Pacific Ry.	Toronto, Canada	3000
Illinois Steel Co.	So. Chicago, Ill.	1364
Crown Can Co.	Philadelphia, Pa.	1839
Milwaukee County	Milwaukee, Wis.	6682
National Tube Co.	McKeesport, Pa.	6000
Subway 109—Sec. 3	Brooklyn, N. Y.	1781
8th Street Viaduct	Cincinnati, Ohio	4000
Municipal Stadium	Philadelphia, Pa.	4208
Firestone Tire & Rubber Co.	Akron, Ohio	4502
Harbour Commission	Montreal, P. Q.	2942
Port Alfred Pulp & Paper Co.	Port Alfred, P. Q.	4003
Carbide & Carbon Chemicals Co.	So. Charleston, W. Va.	3852
Willys Overland Co.	Toledo, Ohio	11000
Wendell Phillips High School	Chicago, Ill.	1937
Farr Alpaca Co.	Holyoke, Mass.	1239

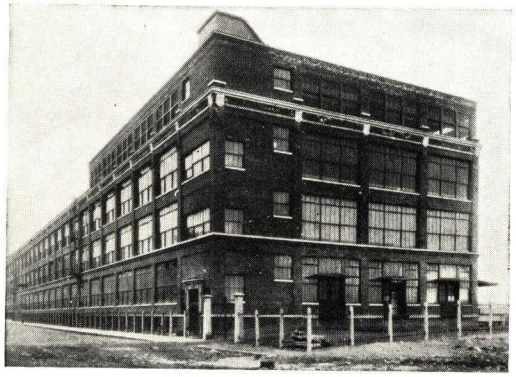
Adaptable to Soil Conditions

Straight shaft uncased compressed concrete piles are adaptable to all ordinary soil conditions. Compression under a weight of 7 tons forces a dense, homogeneous concrete into intimate contact with the surrounding soil and gives maximum skin friction with the earth. This method prevents damage of any kind to pile by ground pressures.



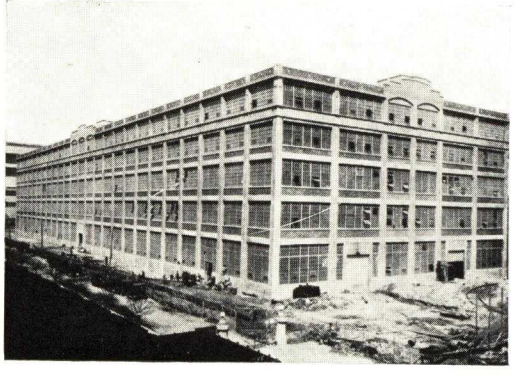
Method of Forming Uncased Piles

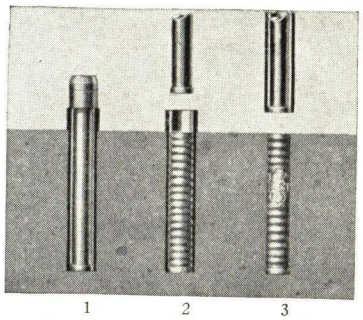
Shown at right: (1) Core and casing driven into ground. (2) Core removed, charge of concrete dropped to bottom of casing. (3) Casing pulled up 18 in. to 3 ft. with 7-ton pressure of core and steam hammer remaining on concrete. (4) Charge of concrete rammed out. (5) Core is removed, casing filled with concrete. Core replaced and casing steadily withdrawn while concrete is under 7-ton pressure. (6) Finished shaft with enlarged base.



Left:
General Electric Company, East Boston, Mass. MacArthur Pedestal Type Piles

Right:
U. S. Navy Yard Machine Shop, Washington, D. C. MacArthur Pedestal Type Pile





1 2 3

Method of Forming Cased Piles

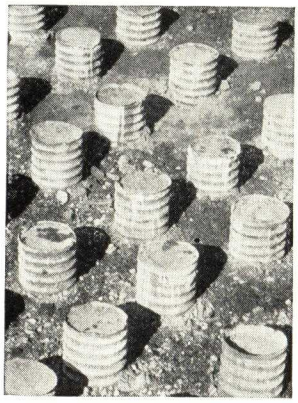
MacARTHUR CASED CONCRETE PILES

Conceding to the demands of many engineers who have a professed leaning toward cast-in-place piles with permanent casings, we developed and added to our other types, a pile with a permanent casing, and, in 1930, actively marketed it.

Since that time, we have installed hundreds of thousands of lineal feet of the cased type of pile in many locations in thirteen states and the District of Columbia. The consistently satisfactory results obtained during our long experience installing uniform diameter or straight-sided uncased cast-in-place concrete piles caused us to make the cased type of pile cylindrical or uniform in diameter.

Method of Forming

(See diamagram at left.) Fig. 1—Core and steel casing driven into the ground. Fig. 2—Core removed, interior of driving casing inspected, and permanent steel shell placed in driving casing. Fig. 3—Permanent shell filled with concrete. Core placed on top of same, and Driving Casing withdrawn, leaving permanent cased concrete pile in place.

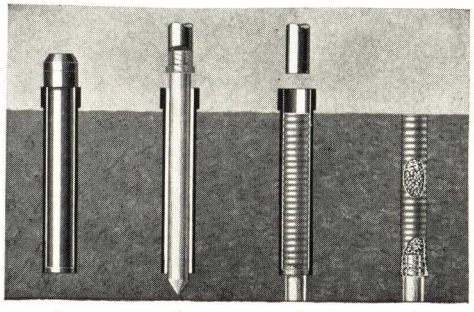


Group of MacArthur Cased Piles

Typical Installations

Company	Location
New York Central Railroad Co.	New York, N. Y.
Standard Oil Co.	Albany, N. Y.
Norton & Co.	So. Washington, Va.
Armour & Co.	Indianapolis, Ind.
Electro Metallurgical Co.	Alloy, W. Va.
Carbide & Carbon Chemicals Corp.	So. Charleston, W. Va.
Procter & Gamble	New York, N. Y.
Niagara Hudson Power Co.	Troy, N. Y.
Union Railroad Terminal	Cincinnati, Ohio
New York, New Haven & Hartford Railroad Co.	New Haven, Conn.
Baltimore & Ohio Railroad	New York, N. Y.
United States Post Office	Tamaqua, Pa.
United States Post Office	Warren, Ohio
United States Post Office	Cincinnati, Ohio
United States Post Office	New Bern, N. C.
Public School No. 234	Brooklyn, N. Y.

This Driving Apparatus Forms the Standard Uncased and Cased Piles



1 2 3 4

MacArthur Composite Type Piles

(Cased Concrete and Wood Pile)

(1) Core and casing driven into ground. (2) Core withdrawn and timber, with boot on shoulder, placed in casing. (3) Timber guided by casing, driven to necessary bearing. Butt of timber below ground water level. Core withdrawn and permanent shell inserted through casing and locked to timber. (4) Concrete deposited in permanent corrugated shell and driving casing withdrawn.

New Post Office, Cincinnati, Ohio

MacArthur Cased Concrete Piles Driven for This Structure

GENERAL RECOMMENDATIONS FOR USE

A Special Pile for Every Condition—Not One Pile for All Conditions

The MacArthur Method employs *"A Pile for Every Condition—Not One Pile for All Conditions"* but the method of forming each type is such that all can be placed with our standard equipment. Therefore, when unexpected subsoil conditions are encountered and a change in plans becomes suddenly necessary, there is no delay incidental to bringing in equipment for special piles, as the equipment is already on the site and all material used is available locally.

MacArthur Concrete Piles are all of the straight shaft type. They include:

Cast-in-place Pedestal Piles—These are MacArthur standard uncased compressed concrete piles. Used for all ordinary soil conditions where piles up to 50 ft. in length are required.

Cased Concrete Piles—Of the straight shaft type, these are uniform in diameter from top to bottom. Permanent shells are left in place. Suitable for all ordinary soil conditions where the cased type is preferred.

Composite Piles of Cased Concrete and Timber—For use where bottom (timber) section of the pile is below permanent water level. More economical than all concrete. Placed in lengths up to 100 ft.

Composite Piles of Concrete and Pipe—The upper section is of uncased compressed concrete or with permanent shell and lower section is closed end pipe —any length. For use in very soft soils where piles have to be driven to great depths.

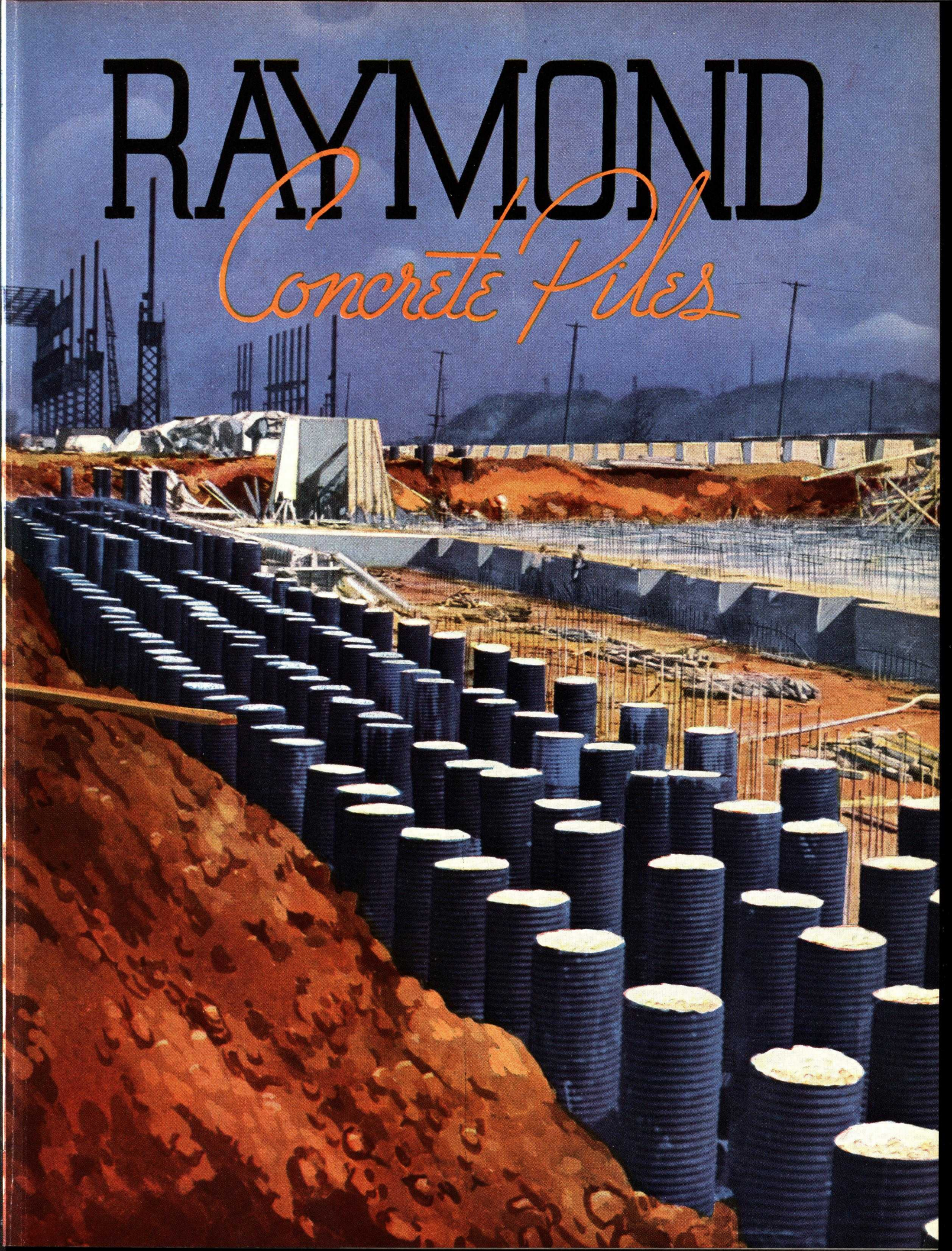
Pipe Piles with Cast Steel Point—This pile is filled with concrete to any length. Economical for driving where headroom is limited, such as for underpinning foundations or making new foundations inside existing buildings.

Pre-cast Concrete—Standard and Special Designs.

MEMORANDA

RAYMOND

Concrete Piles



A form for every pile
A pile for every purpose
STEP · TAPER · PILE SHELL

Raymond

In the early years of this twentieth century, when the Raymond Concrete Pile Company devised and perfected the type of concrete pile which bears its name and proved to the satisfaction of the construction world that concrete was a suitable material of which to construct and install foundation piles, the Company's business was confined exclusively to that specialty. The success which attended these early activities and the widespread acceptance of the standards and methods developed, pointed clearly toward extension into related lines. The experience gained by the organization and facilities acquired in pursuing the original idea naturally led farther and farther afield from the limited line indicated by the Company's corporate name, to include the design and construction of complete projects involving the original Raymond product, plus those resulting from the development and research always necessary in order to acquire and maintain a position in the forefront of any industry.

For the past quarter century, the name Raymond Concrete Pile Company has meant quality and service in the broad segment of the construction industry defined and illustrated in the pages that follow. The wealth of experience of the Company's Engineering and Construction Staff is at the command of Architects, Engineers and Owners. The co-operation of the Staff, from the preliminary stages of a program, will assure recommendations and plans for the most economical solution of the problem under consideration.

A communication to any one of the offices listed will receive prompt attention.

RAYMOND

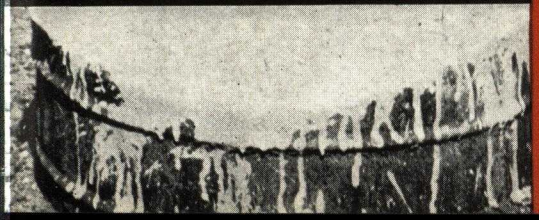
CONCRETE PILE COMPANY

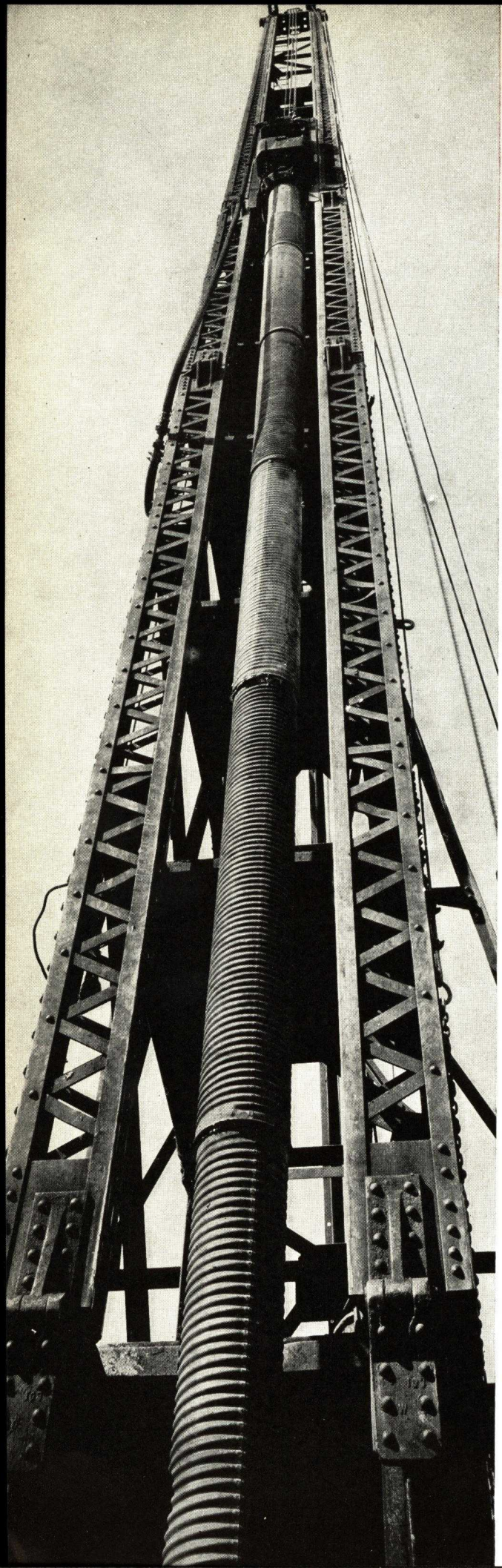
MAIN OFFICE
140 Cedar Street, NEW YORK, N. Y.

BRANCH OFFICES:

ATLANTA, GA. . . . . 49 Forsyth Street
BALTIMORE, MD. . S.E. cor. Fayette & Calvert Sts.
BOSTON, MASS. . . . . 31 St. James Avenue
CHICAGO, ILL. . . . . 111 W. Monroe Street
CLEVELAND, OHIO . . . 1740 East 12th Street
DETROIT, MICH. . . . 417 New Center Bldg.
KANSAS CITY, MO. . . 114 West 10th St. Bldg.
LOS ANGELES, CALIF. . 311 South Spring Street
PHILADELPHIA, PA. . . . 1520 Locust Street
PITTSBURGH, PA. . . Cor. 4th Ave. & Wood St.
ST. LOUIS, MO. . . . . 214 North 6th Street
SAN FRANCISCO, CALIF. . 333 Montgomery Street
WASHINGTON, D. C. . . . 732—15th St. N.W.
CARACAS, VENEZUELA
MARACAIBO, VENEZUELA
BOGOTA, COLOMBIA
BARRANQUILLA, COLOMBIA

Licensees:
Raymond Concrete Pile Co. of Canada, Inc.
Montreal, Canada.
Cimentaciones y Construcciones, S.A.,
Avenida 16 de Septiembre, Num 5,
Despacho 221, Mexico, D.F., Mexico.





RANGE OF ACTIVITIES

RAYMOND

CONCRETE PILE COMPANY

1 RAYMOND TAPERED CONCRETE PILES

Uniformly tapered at the rate of .4″ diameter per foot of length from point diameters of 8″ or 11″ to a maximum of 22.8″ diameter at the head, in lengths up to 37′ 6″—cast in spirally reinforced steel shells driven against the surrounding soil and left in place.

See pages 21, 22, 23

2 RAYMOND STEP TAPERED CONCRETE PILES

Generally taper 1″ to each 8′ of length in a series of steps from point diameters of 8″ or more to top diameters as may be required—cast in spirally corrugated and plain steel shells driven against the surrounding soil and left in place, in lengths up to more than 100′.

See pages 24, 25, 26, 27

3 RAYMOND COMPOSITE PILES

Cast-in-place (in steel shells as in paragraphs 1 and 2 above) Concrete Piles, superimposed upon wood piles of suitable length to reach firm bearing—the concrete and wood sections being firmly joined by one of several methods, as illustrated.

See pages 19, 20

4 PRECAST CONCRETE PILES

For direct bearing or for retaining wall purposes, as illustrated.

See page 18

5 WOOD PILES AND MISCELLANEOUS TYPES

See page 20

6 CAISSONS AND UNDERPINNING

Gow Caisson Pile
Gow Rotary Bucket Process
Wet Process Caissons by Caisson Contracting Co.,—Raymond Company, Consulting & Supervising Engineers.

See pages 29, 30

7 DRILLINGS — BORINGS — SOIL TESTS

Complete service and reports.

See pages 5, 6, 8

8 HARBORS, PIERS, WHARVES, JETTIES, SHORE PROTECTION

Investigations, reports, design and construction in cooperation with owner's engineers.

See pages 29, 30, 34

9 BRIDGES, TUNNELS, TRESTLES, RETAINING WALLS

Representative illustrations.

See pages 31, 32, 34

10 REVETMENTS, DAMS, HYDRO-ELECTRIC PLANTS, AND RIVER IMPROVEMENTS

See pages 31, 32, 34

FOUNDATIONS

Their Importance to the Architect and Engineer

OFFICE BUILDING Houston, Texas
John Eberson, Architect
Supported on
1346 RAYMOND CONCRETE PILES

A BUILDING IS ONLY AS GOOD AS ITS FOUNDATION

No matter how well a building is planned or constructed, it is not a good building unless it rests on the proper foundation. Usually it is inadvisable to design a building before tests of the ground at the site are made. Soil tests disclose conditions below the surface of the ground, and if deficiencies in bearing values exist, they are taken into consideration when designing the structure and fixing its location on the site.

If there is ample land available, it has been found advantageous on many occasions to re-locate the building. Rock ledges, out-croppings, springs, quick-sand, fill, soft deposits, etc., are frequently avoided by slight changes of locations on the same site.

NECESSITY FOR ACCURATE INFORMATION REGARDING BEARINGS FOR FOUNDATIONS

Where the foundation goes to an appreciable depth, or the building is large and of permanent character, information regarding the stratum or material upon which the foundation will rest is essential. Sometimes an examination of the sub-soil conditions may be unnecessary, provided the nature and bearing qualities of the soil in the immediately surrounding area is well known. However, a survey of the load-bearing properties of the soil should be made if there is any doubt or question about the carrying capacity of the ground at the proposed site.

THE ECONOMY OF EARLY TESTS OR BORINGS

Frequently considerable changes have to be made in engineering plans, because accurate information was lacking at the time they were prepared. Load bearing properties of the soil should be studied before plans are drawn or contracts let. This early testing will save money for the owner by minimizing the possibility of unforeseen and exorbitant extras.

TEST PITS AND BORINGS

As soon as the general plan of the building has been established, and the location of deep excavations or concentrated loads determined, the lines of the foundation should be laid out on the property.

The nature of the ground below the surface should then be ascertained. Several methods are available. One is by digging test pits to the depth of the ordinary foundation, or to a solid bottom, at a number of predetermined points. If the bottom is unsatisfactory, it is necessary to ascertain the character of the underlying material.

This can best be determined by borings, or drillings, as fully described on pages 6 and 8.

SOIL TESTS

Soil tests to determine the load-bearing qualities of the soil at different levels are often desirable.

Samples of the sub-soil, or core-drilled rock samples, may be tested in the laboratory to determine their safe load values. Often there are found strata of different natures, some of which would be good for heavy loads. Below these, however, there may be a weaker stratum or a water condition precluding economical excavation. This may necessitate the use of piles driven to solid bearing.

UNDERPINNING

Carrying the foundation of a building below that of the adjoining buildings is the usual object of underpinning. It may be required, also, because of changes in soil conditions due to the digging of subways, construction of deep sewers, lowering of the water level, etc. Such conditions often entail considerable trouble and expense. Competently handled however, underpinning can usually be installed without serious disturbance of adjacent property. This type of service is described in greater detail on later pages.

FOUNDATIONS FOR ENGINEERING PROJECTS

In the engineering field it is vital to have, at an early date, accurate information regarding bearing conditions. It is one of the first requirements in determining the location of a bridge or tunnel or any important structure.

The reports on sub-surface tests may determine the practicability of a proposed location, not only from the engineering standpoint, but from the economic viewpoint as well.

TESTS AND BORINGS FOR BRIDGES, TUNNELS, RETAINING WALLS, DAMS, PIERS, JETTIES, HARBORS, ETC.

The type of information required for such a wide variety of projects demands the broadest experience in this class of work. While it is true that every project presents an individual and a different problem, the company with the widest experience is obviously best qualified to analyze specific conditions and to make sound recommendations.

IMPORTANCE OF EXPERIENCE IN INTERPRETING BORINGS AND SOIL TESTS

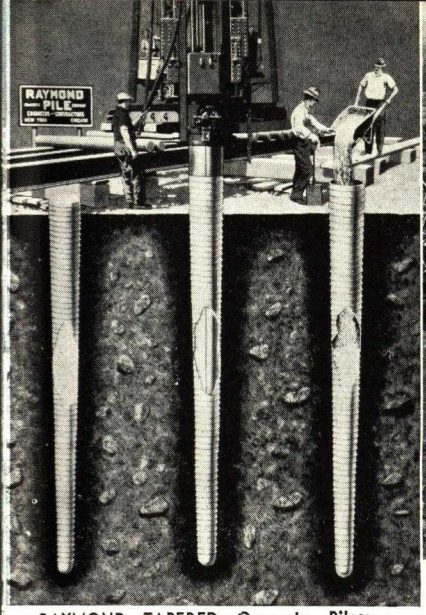
It requires far more than the mere testing of samples in a laboratory, to determine the value of the bearing strata disclosed. For example, in the case of piles driven through various strata, it is necessary to know how the resistance developed by the driving of the pile will react in each stratum. As a matter of fact, accurate deductions and calculations for foundations, with or without piles, can be made only when exact performance records of driving and load tests are analyzed in the light of long and varied experience. In interpreting borings and soil tests there is *no substitute for experience.*

CITY HALL, Atlanta, Georgia
G. Lloyd Preacher & Co., Architects
Supported on 290 RAYMOND CONCRETE PILES

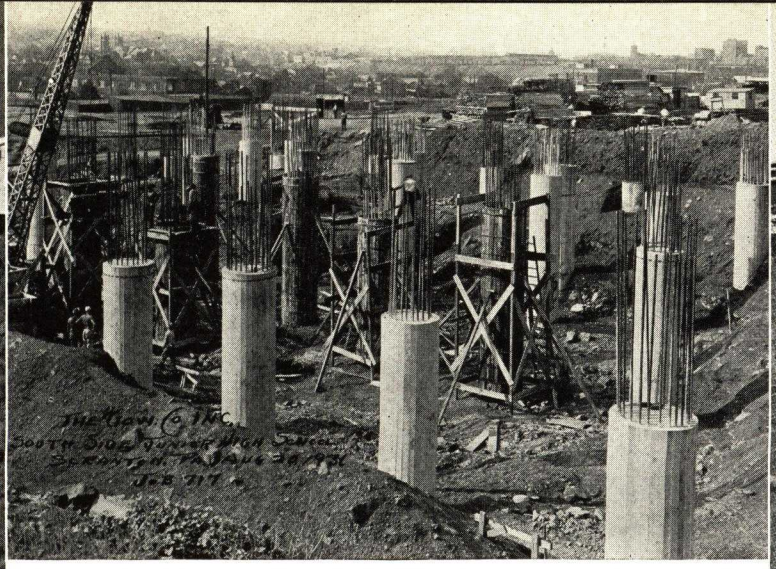
OBTAINING UNBIASED FOUNDATION ENGINEERING SERVICE

The engineering organization making tests such as those described should have three major qualifications. First—long and broad experience; second—a reputation for integrity; and third—an absolutely unbiased attitude regarding the condition under consideration. The Raymond Concrete Pile Company has made tests of every description, and has installed foundations of every kind in every section of this country, and in many foreign countries as well. Raymond representatives are therefore competent to advise with architects, engineers, and owners, and to offer suggestions free from bias. While the Company is interested in the installation of various types of concrete piles, caissons, and poured foundations, it will always endeavor to recommend the *proper* type of foundation, as shown by the test borings, whether piles are required or not.

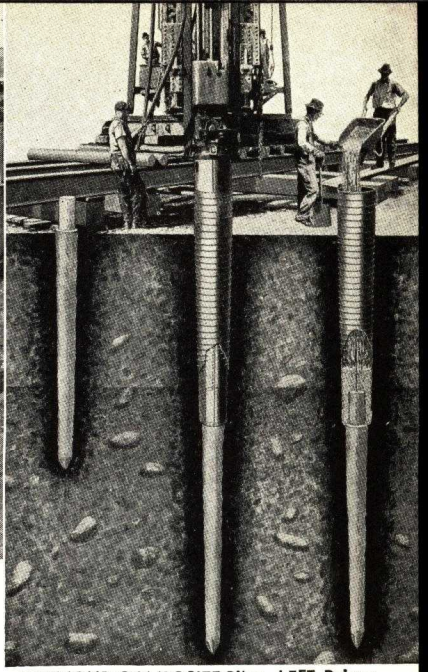
A last word: Whether the Raymond Company, or one of the other reputable engineering testing organizations, makes the tests, or designs the foundation, we urge that accurate data be obtained at an early stage.



RAYMOND TAPERED Concrete Piles:—Center, completely driven—LEFT, Unfilled Shell ready for Inspection—RIGHT, Pouring Concrete.

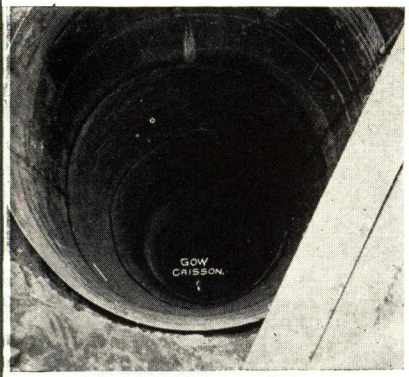


GOW CAISSONS, ready for foundation beams—Caissons belled out in rock approximately 40 feet below surface and built up 20 feet to grade—diameter 4 feet *(Note illustration at left)* Hillside site, later filled to caisson top—Junior High School, Scranton, Pa.

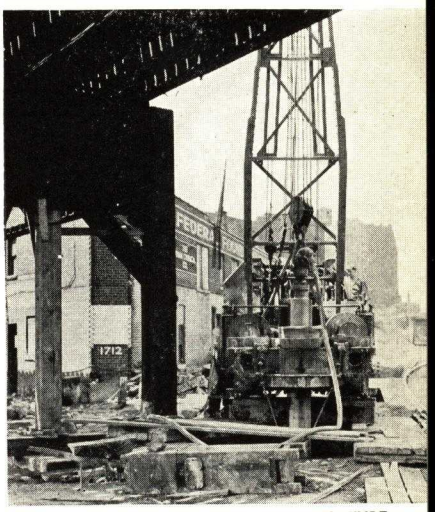


RAYMOND COMPOSITE Piles—LEFT, Driven Wood Section—CENTER, Driving complete—RIGHT, Pouring concrete.

TYPES OF
FOUNDATION SERVICE
OFFERED BY
RAYMOND
CONCRETE PILE COMPANY

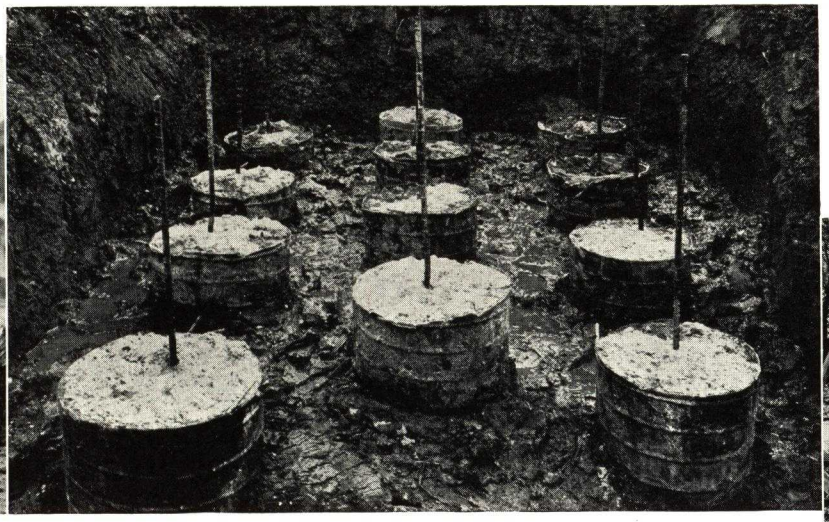


GOW CAISSON PILE, ready for Inspection and Concrete.

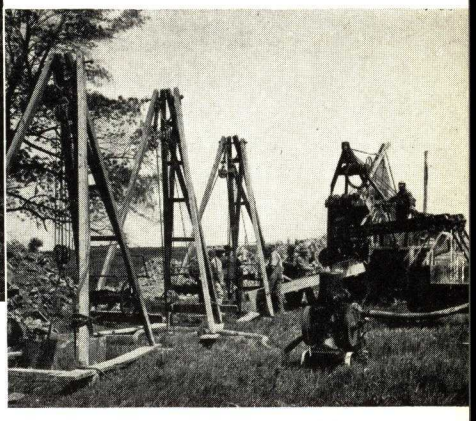


Rotary Drilling for WET PROCESS TYPE CAISSON (Note water connection to drill stem).

GOW ROTARY Excavator bucket emerging from ground with load of excavated material (Note clay overload from reaming knives).



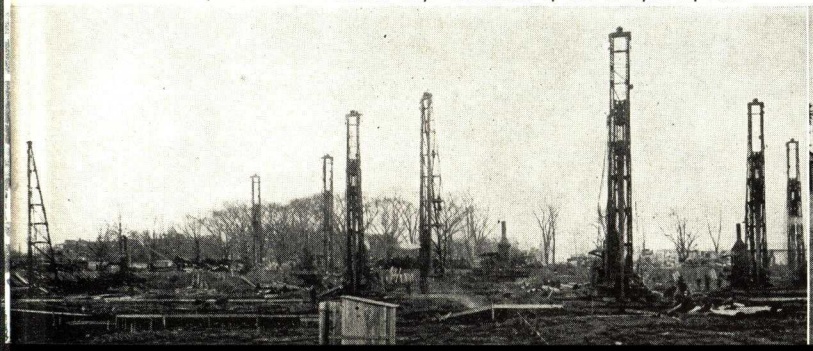
A group of Standard RAYMOND TAPERED Concrete Piles ready for the concrete footing to be poured—Note the spirally reinforced steel shell with reinforcing wires 3 inches on centers, remaining permanently in place.



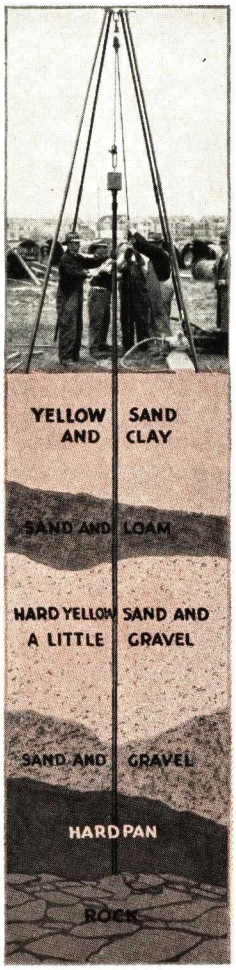
Installing GOW CAISSON PILES.

A fleet of eight RAYMOND Steel Drivers on a job consisting of more than 18,000 RAYMOND TAPERED and STEP TAPERED Piles, totaling in length more than 723,000 lineal feet and completed in 124 calendar days—December 9, 1936 to April 12, 1937.

BELOW — A supply of heavy gauge 24 foot shell sections for RAYMOND STEP TAPERED Piles, ready to be assembled on the driving core—Note screw threads at open end for attachment to upper sections.



TEST BORINGS AND SOIL INVESTIGATION



"Light equipment is used to procure samples of . . . ground"

The Gow Division of the Raymond Company is the successor organization to the Gow Company of Boston, outstanding in soil investigations for more than twenty-five years. This division is well equipped to carry on such investigations.

As explained on preceding pages, dependable soil information is indispensable to the proper design of foundations.

Borings are of two general types:

1st: EARTH BORINGS. Wherein light equipment is used to procure samples of soft ground. The samples are obtained by driving a specially designed sample spoon into the earth thru a guide casing, and reclaiming characteristic samples in as nearly the actual state existing at the various depths as is practicable.

2nd: CORE BORINGS. Which are resorted to when it is necessary to penetrate thru boulders, hard pan, etc., into ledge rock, and to recover cored samples of the ledge.

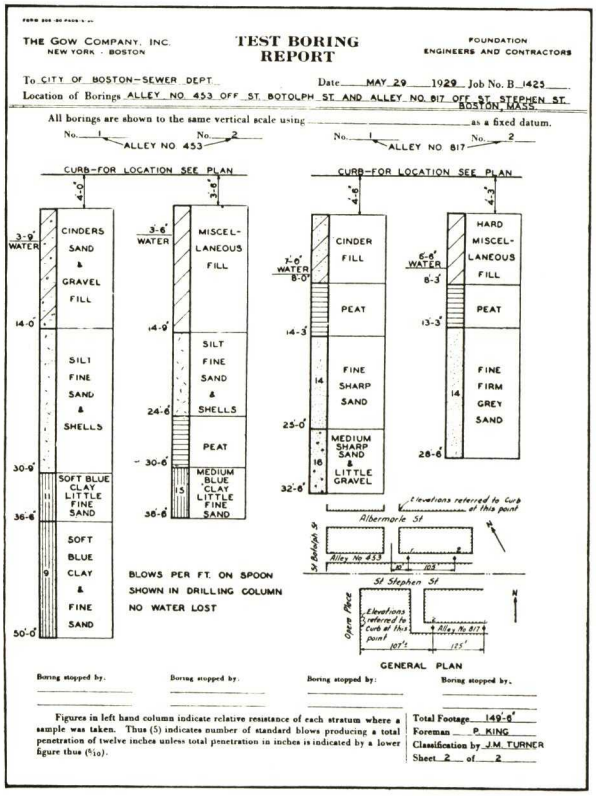
In either case a complete log is kept of the soils encountered, together with their geological classifications and other pertinent information, such as water levels. The log is submitted in the report that accompanies the boring samples.

LABORATORY ANALYSIS OF SOILS

A recent development here and abroad has been the laboratory analysis of soils. For such work large soil samples from 3″ to 5″ in diameter are required. The Gow Division has developed equipment and methods for obtaining these large "undisturbed samples" and has had extensive experience in this recent scientific advance.

TEST PITS AND SOIL BEARING TESTS

The Gow Division is equipped to excavate test pits for shallow soil investigation, and to conduct soil bearing tests. The latter are made by loading pre-determined areas of a proposed bearing stratum in small increments, and recording settlements corresponding to the load increments. An important consideration in soil bearing tests is the proper size of the area to be loaded. It is essential that bearing tests be conducted in the manner that most nearly approximates the actual conditions under which it is proposed to load the stratum of soil under test.


THE GOW COMPANY, INC.
NEW YORK · BOSTON

TEST BORING REPORT

FOUNDATION ENGINEERS AND CONTRACTORS

To CITY OF BOSTON—SEWER DEPT. Date MAY 29 1929 Job No. B-1425

Location of Borings ALLEY NO. 453 OFF ST. BOTOLPH ST. AND ALLEY NO. 817 OFF ST. STEPHEN ST. BOSTON, MASS.

All borings are shown to the same vertical scale using ____ as a fixed datum.

Figures in left hand column indicate relative resistance of each stratum where a sample was taken. Thus (5) indicates number of standard blows producing a total penetration of twelve inches unless total penetration in inches is indicated by a lower figure thus ($_{10}$).

Total Footage 149-6'
Foreman P. KING
Classification by J.M. TURNER
Sheet 2 of 2

WORKING LOADS

THE ALLOWABLE LOAD

The allowable load per pile is naturally one of the first matters to be considered in a pile foundation. No hard and fast rules can be laid down and followed. The character and general purposes of the structure, the nature of the soil to be penetrated, and the bearing strata reached, as well as the size, shape, length, and type of the pile under consideration, are determining factors. The most generally accepted unit loading for concrete piles is 30 tons per pile. Under certain conditions, peculiar to a specific site, unit loads may have to be somewhat reduced, while under others, greater loads may be carried safely. Long experience with every sort of condition is of greater value than theory in determining the allowable load per pile.

COMPREHENSIVE LOAD RECORDS AND TEST DATA

In its more than thirty-five years of pile driving, under the greatest variety of soil conditions and locations, the Raymond Concrete Pile Company has acquired information, records, and test data of inestimable value to clients. Discussions regarding projects in contemplation will be welcomed by our organization, and should prove materially helpful to anyone concerned with a foundation problem.

DETERMINING CARRYING CAPACITY OF CONCRETE PILES

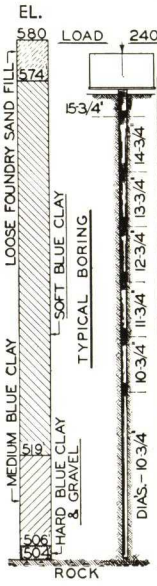
The carrying capacity of concrete piles under given conditions need not, and should not, be a matter of guesswork. Carrying capacity can be safely determined, provided always that correct methods of construction are followed. Well known formulae may be considered as a general guide but must be interpreted in the light of wide experience. The formula generally used is known as the "Engineering News Formula," based upon the use of a single-acting steam hammer, as follows:

$$L = \frac{2WH}{S+0.1}$$

L = Safe load in pounds.
W = Weight of falling parts in pounds.
H = Drop in feet of falling parts.
S = Final penetration per blow in inches.
In a No. 1 steam hammer, W = 5,000 and H = 3
In a No. 2 steam hammer, W = 3,000 and H = 2½

Ordinarily, Raymond piles are driven to four blows to the last inch with a No. 1 steam hammer, for a working load of 30 tons per pile, thus adding 43% to the safety factor of the formula.

QUOTATION FROM ENGINEER'S REPORT "*** loading was continued to a total of 120 tons *** Test was then stopped, as the platform was not designed to take any more load." Final net settlement, after allowing for elastic compression, as evidenced by recovery on removal of load, was 3/16 inch. The lower 24 feet of shell was 10 gauge plain strip steel and the upper sections Standard Raymond STEP TAPERED spirally corrugated shells in gauges from 14 to 20. (Test made at Great Lakes Steel Corporation plant, under supervision of Steel Company Engineers.)

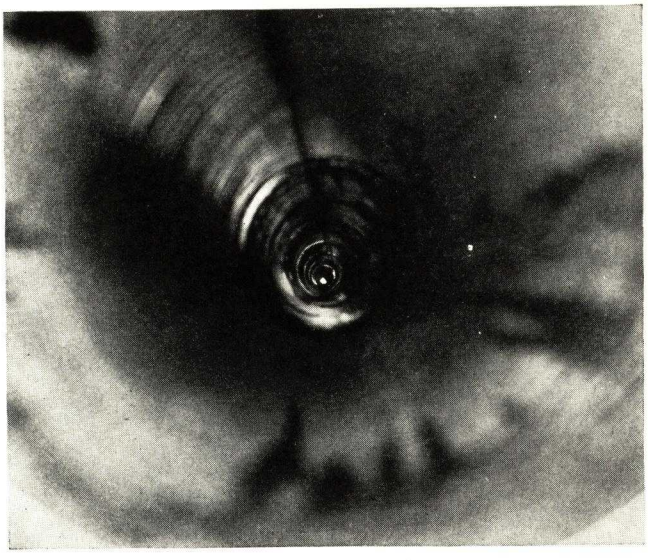


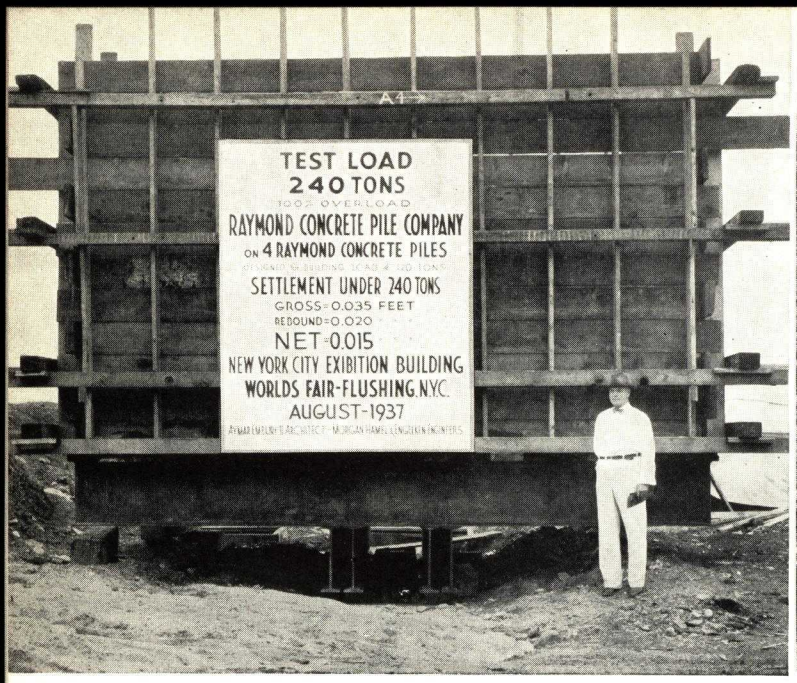
RECORD OF LOAD TEST ON ONE RAYMOND STEP TAPERED CONCRETE PILE

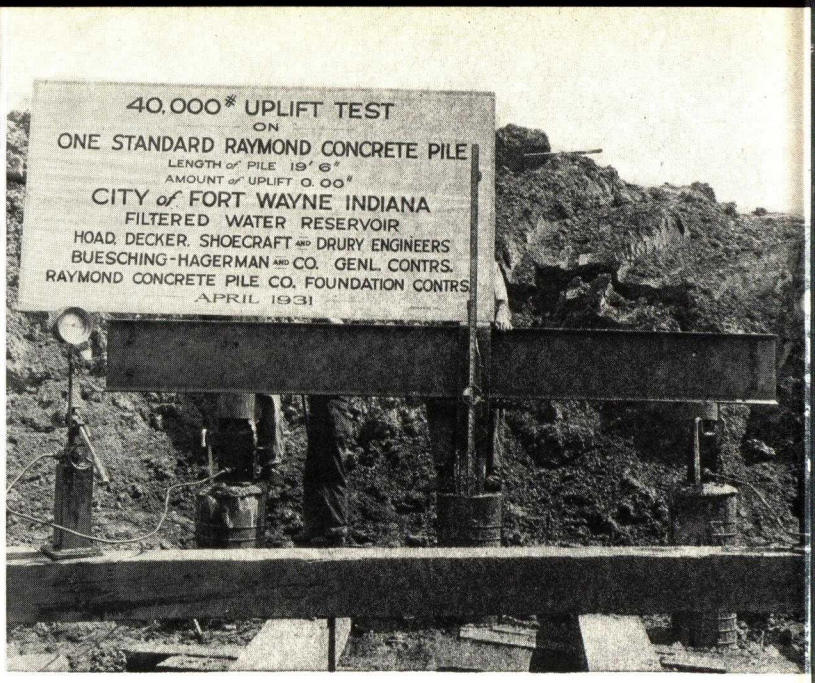
DATE	TIME	ADDED LOAD	TOTAL LOAD	SETTLEMENT INCREMENT	SETTLEMENT TOTAL	TIME INTERVAL HOURS
11/5	8:15AM	0	0	0	0	0
11/5	4:30PM	30000	30000	1/16"	1/16"	8-1/4
11/6	8:15AM	0	30000	0	1/16"	15-3/4
11/6	10:00 "	10000	40000	0	1/16"	1-3/4
11/8	8:15 "	0	40000	1/32"	3/32"	46-1/4
11/8	11:30 "	10000	50000	0	3/32"	3-1/4
11/8	3:15PM	0	50000	0	3/32"	3-3/4
11/8	4:00 "	10000	60000	0	3/32"	3/4
11/9	8:15AM	0	60000	0	3/32"	16-1/4
11/9	10:30 "	10000	70000	0	3/32"	2-1/4
11/9	3:30PM	0	70000	1/32"	1/8"	5
11/9	4:15 "	10000	80000	0	1/8"	3/4
11/10	8:15AM	0	80000	0	1/8"	16
11/10	10:15 "	20000	100,000	1/16"	3/16"	2
11/11	8:15 "	0	100,000	0	3/16"	22
11/11	11:00 "	20000	120,000	1/32"	7/32"	2-3/4
11/12	8:15 "	0	120,000	0	7/32"	21-1/4
11/12	11:00 "	20000	140,000	1/32"	1/4"	2-3/4
11/13	8:15 "	0	140,000	0	1/4"	21-1/4
11/13	10:15 "	20000	160,000	1/32"	9/32"	2
11/15	8:15 "	0	160,000	1/32"	5/16"	46
11/15	10:00 "	20000	180,000	1/16"	3/8"	1-3/4
11/16	8:15 "	0	180,000	0	3/8"	22-1/4
11/16	10:15 "	20000	200,000	1/32"	13/32"	2
11/18	8:15 "	0	200,000	1/32"	7/16"	46
11/18	1:00PM	20000	220,000	1/32"	15/32"	4-3/4
11/19	8:30AM	0	220,000	1/16"	17/32"	19-1/2
11/19	1:00PM	20,000	240,000	1/32"	9/16"	4-1/2
11/22	8:15AM	0	240,000	0	9/16"	67-1/4
11/23	1:00PM	0	240,000	0	9/16"	28-3/4

(Note photograph at right.)

Inspecting driven STEP TAPERED Shell, which when filled with concrete, formed a pile such as loaded and tested per record at left—Bottom of shell showing small white spot, 68 feet down.







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TEST PILES

TEST PILES GENERALLY NOT NECESSARY

Load tests for pile carrying capacity may be very useful and may be advisable under certain conditions but may be unnecessary under others. Any test load should be appraised in connection with the character of material in which the pile finds its bearing.

A test on a single pile sustaining, without more than allowable settlement, a load of 50% to 100% in excess of the designed working load, is usually conclusive if the following questions can be answered affirmatively:

(1) Is the material below the point of the pile of a nature which will not compress or subside under the accumulated load on all the piles to be driven?

(2) Is the piling method such as to insure all piles being driven alike, determinable by inspection after driving?

EXPERIENCE IN DRIVING PILES MAY BE MORE RELIABLE THAN TEST PILES

If the soil in which the pile has its bearing is reasonably uniform or well known, and the underlying soil is free from vegetable matter, and *if the method followed is such that it can be known that no injury is suffered in driving*, it is usually a waste of money to make load tests. Experience has shown that driving to a uniform resistance will serve all practical purposes. Piles of the same bearing value may vary greatly in length. Length flexibility can only be economically obtained by using cast-in-place piles, which provide the required bearing value with a minimum of waste, since the length of cast-in-place piles need not be pre-determined.

On the other hand, if pre-cast piles are used, in lengths indicated by one or more load or driving tests, there is always the possibility that they may not be adaptable to even normal length variations. They may prove to be too short in some places, and too long (and thus partially wasted) in others.

CONCRETE PILE ADVANTAGES

Concrete Piles, *when installed by correct and proven methods*, have many points of advantage as compared with wood piles. Among these are:

1. **ABSOLUTE PERMANENCY**—not being subject to decay or to attacks of wood borers and destroyers.

2. **GREATER CARRYING CAPACITY**—meaning a less number of piles for a given load.

3. **SMALLER AND LIGHTER FOOTINGS**—because of decreased number of piles, with consequent decrease in dead loads to be carried.

4. **DECREASED LENGTH OF PILE**—as a natural consequence of greater size and displacement.

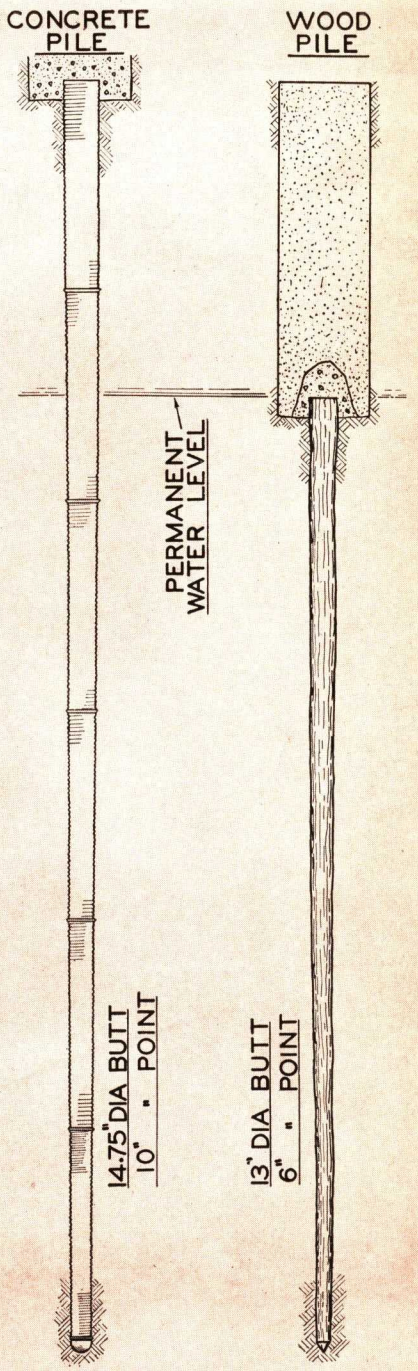
5. **ELIMINATION OF SHORING, UNDERPINNING, SHEETING, PUMPING AND DEEP EXCAVATION** — required to cut the wood piles off at permanent low water.

6. **THE CENTER LINE OF COLUMNS CAN BE BROUGHT NEARER TO THE BUILDING LINE**—due to decreased number of piles, and consequent reduction in width of wall footings.

7. **IMPORTANT SAVING IN TIME.**

PERMANENCY OF CONCRETE PILES

The permanency of concrete piles, regardless of moisture conditions, naturally eliminates the excavation, sheeting, shoring and pumping necessary, in the case of wood piles, to reach a cut-off below permanent water level. The concrete pile heads can be left at an elevation only sufficiently below the floor line to permit of the proper distribution of loads.



LEFT—Rotting Wooden Piles on Site of Cattle Penn Building. Pennsylvania Railroad Philadelphia, Pa.

GREATER CARRYING CAPACITY

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The claim to greater carrying capacity rests upon several points:

a. Greater size, therefore greater displacement.

b. Perfect shape—of uniform size and straightness—thus insuring full ground contact and centering of the load over the point of the pile.

c. Possibility of inspection after driving, hence the ability to load to greater capacity, instead of making allowances for inefficiency as in the case of wood piles, which are subject to injury by overdriving, telescoping, departing from the vertical and like defects, none of which are discernible after driving begins.

CENTERING OF COLUMNS

All designers will appreciate the advantage of keeping their column centers as near as possible to the center of gravity of the pile groups, thus reducing, and in many cases avoiding, expensive cantilevers. This is no small consideration when wide footings and limited property lines result in eccentric loads which cannot be otherwise provided for.

SAVING IN TIME

The principal reasons for the saving in time mentioned under Item 7 are:

a. The smaller number of piles required.

b. The reduction in quantities of excavation, shoring, sheeting and pumping.

c. The reduction in quantities of footings or masonry.

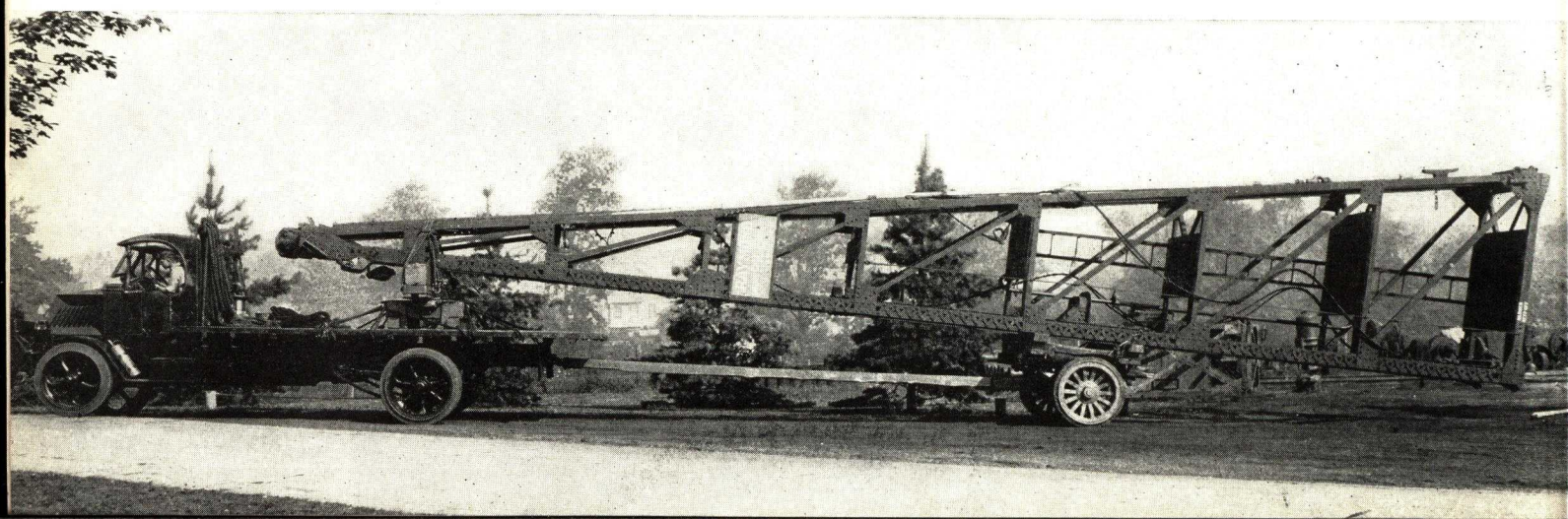
d. The manufacture of the piles in place, from materials readily procurable in all localities, and the limiting of manufacture to the actual number and length of piles required. This obviates delay for cutting and trimming trees, hauling to shipping point, transporting for great distances by rail or water and delivery to the job—perhaps only to find that the piles are too long or too short.

There is no business in which the expression "time is money" more truly applies than in the construction industry. The contractor's daily expenses are high, and the owner frequently gains a day's income for the entire completed structure for each day that can be saved in construction.

It is frequently the case that a concrete pile foundation can be completely installed in less time than would be required for the necessary materials for a wood pile foundation to be delivered to the site.

The Raymond Company, with its organization and equipment so widely distributed over the United States, is in a particularly favorable position to give prompt service and has a reputation for completing its contracts on time.

Rapidity of work is always more or less governed by local conditions, such as the character of the soil to be penetrated and the length and spacing of the piles. It is, therefore, impossible to give accurate figures that will apply to all conditions under which concrete piles are placed.



WOOD PILING AND SHIFTING WATER LEVELS

That wood piling will (unless exposed to the attacks of subaqueous "borers" or other deleterious conditions) be permanent if constantly saturated or submerged, has been shown by specimens exhumed by archeologists and others. However, the difficulty of MAINTAINING SATURATION is a problem that is becoming more and more serious.

Apropos this problem, attention is called to the following excerpts from engineering papers of many years past.

In an editorial entitled "Wood Piling and Ground Water Levels," Engineering-Contracting of April 13, 1910, says:

"A point not so often allowed for **** is the change in water level that is likely to occur, particularly in large cities where sewers, subways, and other structures affecting underground water level are continually being constructed. ***** It cannot be too confidently assumed, however, that piles whose tops are well below water when the foundation is built will still be below water level a few years later.

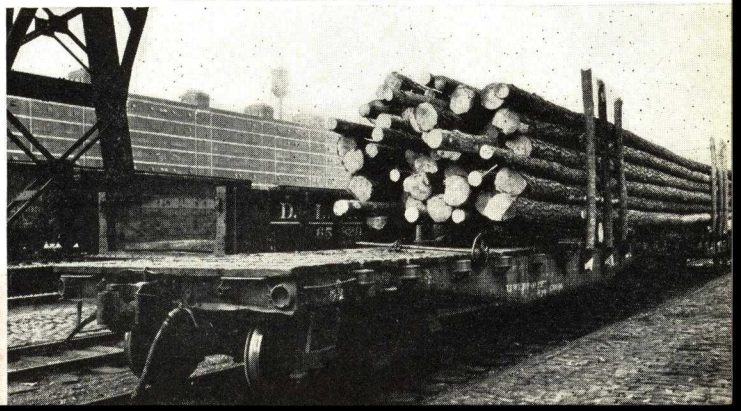
" ***** In tearing down recently a building constructed some ten years ago in Milwaukee on pile foundations, the pile tops were found some 3 feet above the water level, though when the building was constructed they had been placed below it. *****

" ***** Ground water levels depend entirely on drainage conditions, and in cities drainage conditions are seldom the same for any long time. *****

An article published in *Cement Age*, of April, 1910, under the heading of "Prevention and Cure of Weak Foundations," not only reiterates the warning conveyed by *Engineering-Contracting*, but goes further in describing specific instances of buildings settling as a direct result of defective wood piling foundations, impaired by changes in ground water levels. The writer says in part:

"Wood piles form a satisfactory foundation as long as they are below the ground water level, but when the water level lowers and the piles are exposed to the atmosphere, they deteriorate rapidly ***** invariably necessitating extensive repairs. ***** It is most gratifying to know that modern engineering has developed efficient and economical methods of prevention as well as cure for these dangerous and costly troubles.

Right:
Old wood piles in Pier No. 6 and No. 7, Central Harlem Health Center, New York City. Water level 2 ft. below water shown in picture. Note condition of all wood piles.



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"A remarkable instance of the lowering of the water level away from pile foundations because of tunnel construction occured at the old Cambridge Hall Building, Thirty-third Street, directly opposite the Waldorf Building. The Thirty-third Street wall of this building was supported on wooden piles. Settlement took place in the building during the construction of the Thirty-third Street cross-town tunnels, which went directly in front of the building.

"After the tunnel excavation had been completed, and the permanent masonry lining built in place, it was thought that the stream which had been flowing into the tunnel the year before would back up and again submerge the piles. The borings, however, indicated that this was not so, for the tunnel had in some manner effectually and permanently diverted the old stream and lowered the ground water level.

" ***** When the contract was let for the underpinning, the contractor expected to encounter water and to sink the cylinders under the wall by the pneumatic process. When the work was done, however, no water was found *****. The water table had been lowered on account of the tunnel construction about 24 feet.

"***** Modern buildings, especially in New York City, require greater support than can ordinarily be secured by wood piles."

The writer then enumerates the preventive methods available for use in guarding against conditions of the nature described. He continues:

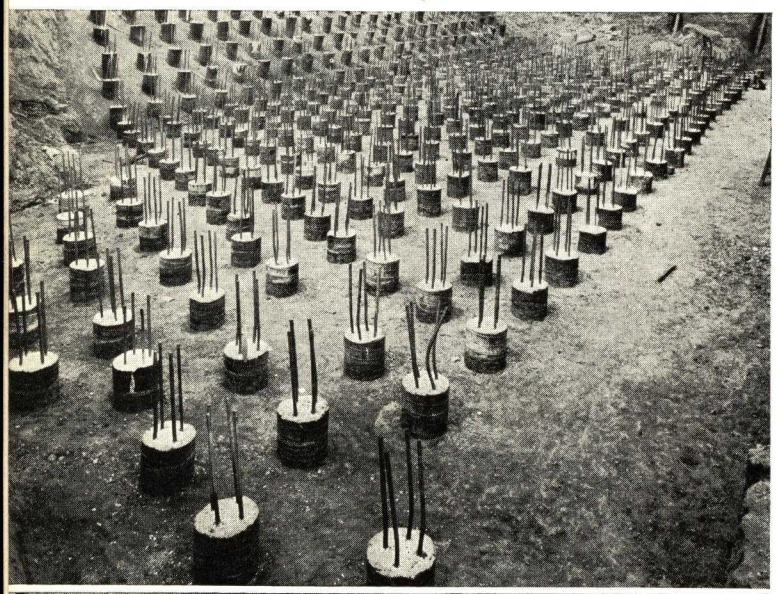
"Prevention of the unsatisfactory conditions resulting from the use of wood piles is found in the substitution of concrete or other artificial supports which are unaffected by changes in water level *****.

"Concrete piles have been coming rapidly to the front as combining the necessary elements to most successfully solve this problem. *****."

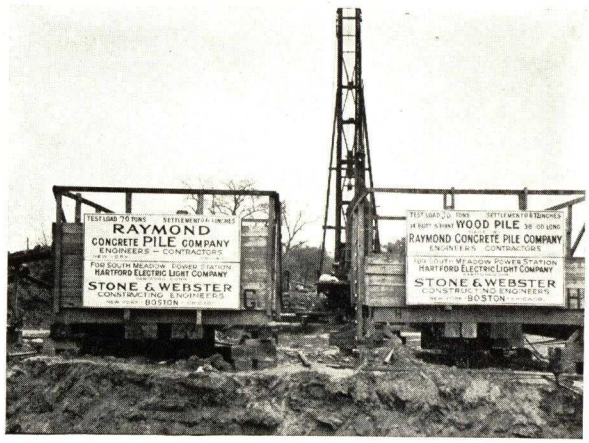
14

RAYMOND TAPERED CONCRETE Piles in abutment of Glendale-Hyperion Viaduct over Los Angeles River—Note five rows of battered piles in background.

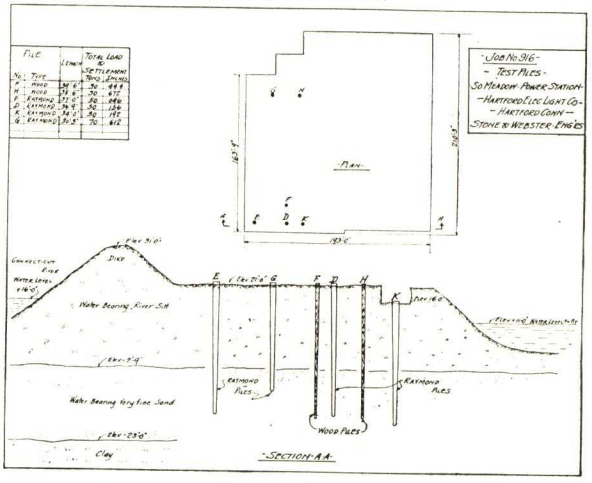
(Below)—A six-pile pier of RAYMOND STEP TAPERED CONCRETE Piles.



CONCRETE PILES vs. WOOD PILES



Comparative Test of Wood and Concrete Piles. Test made by Stone & Webster, Engineers. Hartford Electric Light Company, Meadow Power Station, Hartford, Conn., F. D. Knight, Supt., Stone & Webster Co.

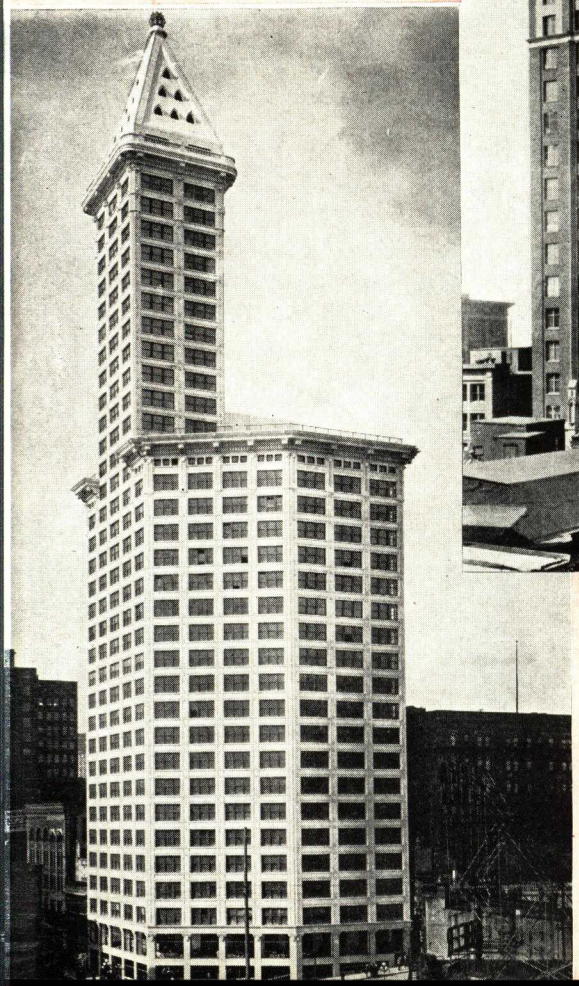


Above: BANK AND OFFICE BUILDING —
Greensboro, N. C.
C. C. Hartman, Engineer
Supported on 1242 RAYMOND CONCRETE PILES

Above: FAIRFAX HOTEL — Pittsburgh, Pa.
Philip M. Julian, Architect
Supported on 716 RAYMOND CONCRETE PILES

Right: MEDICAL ARTS BUILDING —
Omaha, Nebraska
Thomas R. Kimball, John McDonald &
Allen McDonald, Architects
Supported on 981 RAYMOND CONCRETE PILES

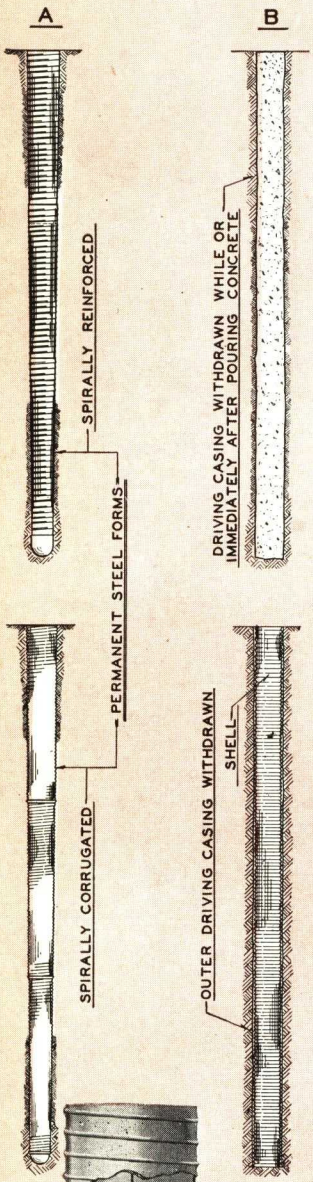
Below: SEARS ROEBUCK BUILDING — Miami, Florida
Nemmons, Carr & Wright, Architects
Supported on 471 RAYMOND CONCRETE PILES



Above:
EQUITABLE LIFE BUILDING
Des Moines, Iowa
Supported on
1478 RAYMOND CONCRETE PILES

Left: L. C. SMITH
OFFICE BUILDING
Seattle, Washington
Supported on
1281 RAYMOND CONCRETE PILES

CONCRETE PILE CLASSIFICATIONS



CONCRETE PILE CLASSIFICATIONS

Concrete piles are of two distinct types:

1. Piles which are poured or cast in forms previously driven into the ground, commonly referred to as "cast-in-place" concrete piles.
2. Piles which are cast in forms, above ground, and then driven like wooden piles, referred to as "pre-cast" concrete piles.

CAST-IN-PLACE PILES

"Cast-in-place" piles are further divided into two classes:

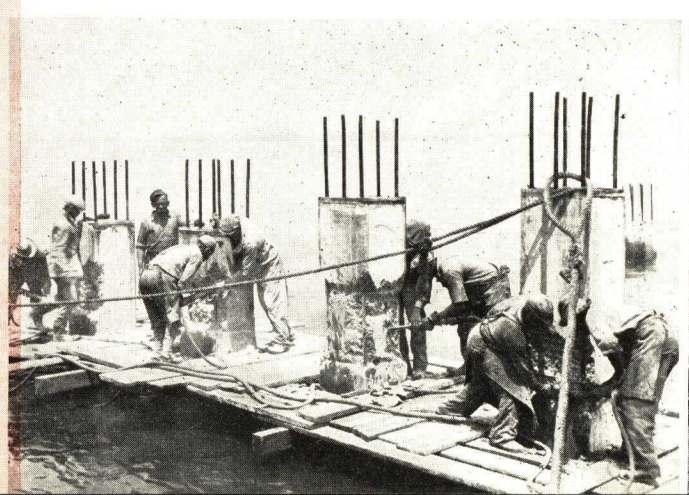
(a) Those in which a form is driven in contact with the soil and left in the ground to preserve driving compression and the integrity of the finished pile, and

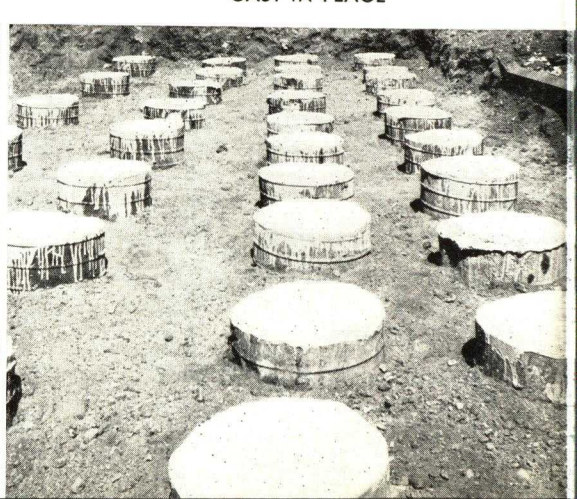
(b) Those in which the concrete is placed by means of a *temporary* driving form which is removed before the concrete hardens and leaves the pile confined *only* by the loose earth. The green concrete is then, obviously, subject to the admixture of foreign materials, excess of water, and distortion due to strains set up by soil pressures and the *driving of adjacent piles.* A modification of this latter type is the insertion, in the temporary driving form, of a smaller form which is filled with concrete prior to the removal of the temporary form. This "smaller form" obviously does not maintain the original driving compression, nor the resistance under the hammer which would otherwise be a dependable measure of the sustaining power of the pile.

THE RAYMOND PILE AND THE PERMANENT FORM

The Raymond pile is the outstanding example of the (a) type involving the use of a permanent form, commonly referred to as a "shell." The *driven* steel shell left *permanently* in place is essential to dependable results, because:

1. It serves as a form for the piles.
2. It prevents the admixture of foreign substances with the concrete, and protects it from excess of ground water during the cement setting period.
3. It retains the original moisture in the concrete until it is thoroughly hardened.
4. It prevents distortion by external pressure, due to the driving of adjacent piles or accumulated pressures from displacement by the pile itself.
5. It retains perfectly the displaced earth forming the walls of the cavity, so that there may be no relaxation of the ground and, therefore, no loss of the original driving compression.
6. It acts as reinforcement of the pile until the concrete shall have attained its maximum strength.





THE NEED FOR THE PERMANENT SHELL FOR PILES

It should only be necessary to point out the functions of the shell, to make clear that, in the cast-in-place type (b) where no shell is used, or where a shell is placed loosely in the ground, vital safeguards are omitted in order to effect a saving in first cost. *All the points raised as to the necessity and value of the shell apply with equal force as arguments against its omission.*

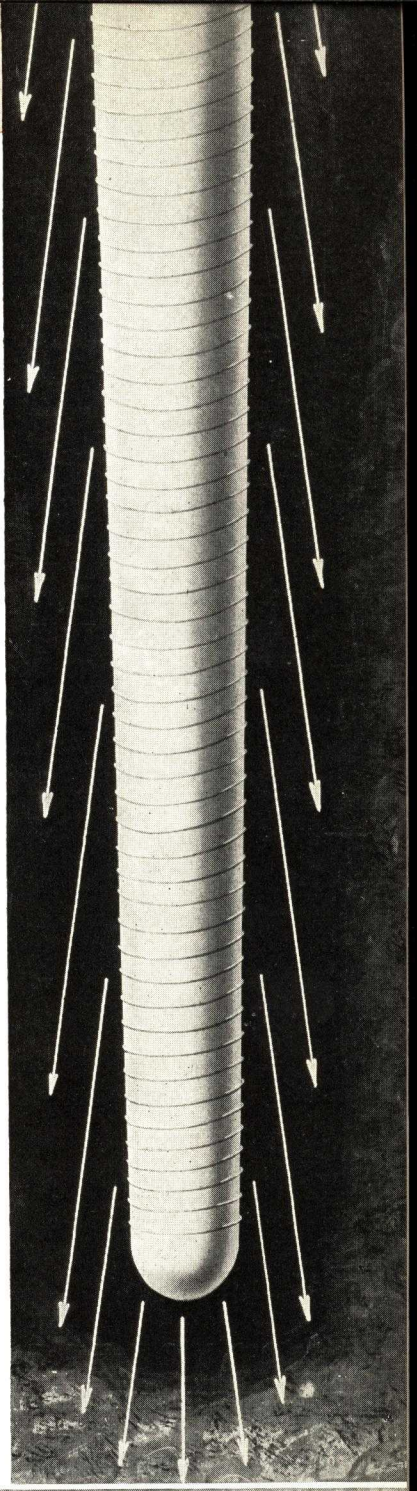
LIABILITY OF DISTORTION

Any one who has ever seen a pile core, or a pile, driven 20 or 30 feet into the ground and immediately withdrawn, will probably have noticed that the earth at once closes in partially. This earth movement is an attempt to return to its former position. Should soft concrete be poured into the opening thus left, the returning earth movement is apt to produce distortion before the concrete sets. This has frequently been demonstrated by the exposure of concrete piles poured without a protecting form. Because of the differences in density and, consequently, in resiliency, of the various soil strata, the distortion is often very unequal. Diametric measurements have varied from 3 or 4 inches to 3 feet from an original diameter of 14 to 16 inches.

The half-way measure of inserting a shell of smaller diameter into the temporary driving form protects the concrete from many of the hazards attending the omission of the permanent shell in contact with the ground. However, it is of uncertain value, due to the resulting void and the unavoidable loss of intimate contact with the ground. There may be instances in which point-bearing without lateral support can be relied upon, but in by far the greater number of pile foundations, the carrying capacity of the piles results from (1) compression developed in driving, and (2) friction from contact with the surrounding soil. The resultant frictional resistance is of questionable value, *unless* the substance opposed to the ground during the driving process remains in place to retain its intimate contact.

CALCULATING DRIVING RESISTANCE

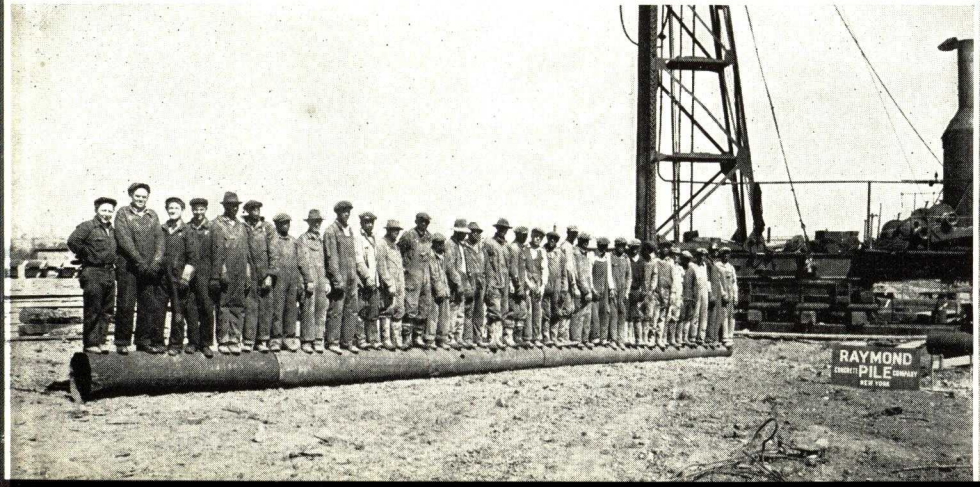
Driving resistance can be accurately measured for any pile and can be analyzed in accordance with well established engineering practice. However, if the compression of the soil on which this resistance depends is released, by withdrawing a temporary outside driving form, the *original* driving resistance cannot be depended upon as an accurate measure of the *final* supporting power of the pile.



Close up of lower end of RAYMOND TAPERED CONCRETE Pile—Note arrows indicating direction of forces due to tapering wedge shape.

What the Inspector sees—Daylight photograph down the interior of driven 30' RAYMOND TAPERED Shell—Note spiral reinforcing — light spot at bottom is film of water poured in for reflection purposes when light is strong enough to make lowered electric inspection light unnecessary.

A striking illustration of the value of "spiral reinforcing" in the shell of a RAYMOND TAPERED CONCRETE Pile—without this reinforcing, the weight of any one or two of the 30 full grown men would have collapsed the thin sheet metal tube.



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PRECAST PILES

Pre-cast piles have a large and useful field in the construction of docks, bulkheads and other marine structures, and less frequently are used in foundation work. Generally a water jet is used to assist in securing the desired penetration, and to minimize damage from repeated shocks of the hammer.

With piles of this type it is necessary to determine from four to six weeks in advance of driving, just what length of pile to cast, and experience shows that this pre-determination can seldom be made accurately. This naturally results in either excessive expense in providing longer piles or great waste in cutting them off. It is sometimes possible, by means of excessive jetting and driving, to secure sufficient penetration to avoid cutting off a pile cast longer than necessary, notwithstanding the fact that a shorter pile might well have served the purpose if wholly driven to necessary resistance. In such cases, the waste of money is obvious.

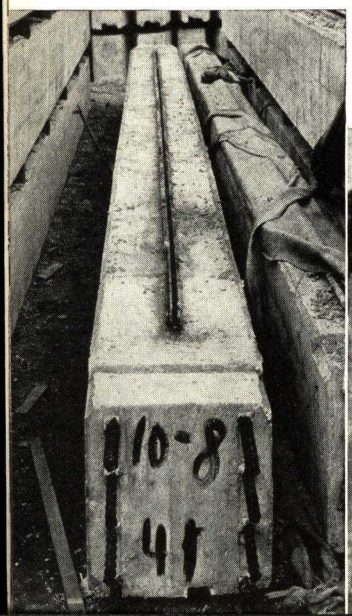
If pre-cast piles are driven without the use of the jet, it is necessary to cushion and protect the head to avoid damage from the driving impact. This cushion, or protection, naturally absorbs an appreciable part of the energy of the hammer blow and consequently prevents accurate calculation of the carrying power of the pile from a record of the penetration under each blow.

DRIVING PRECAST PILES

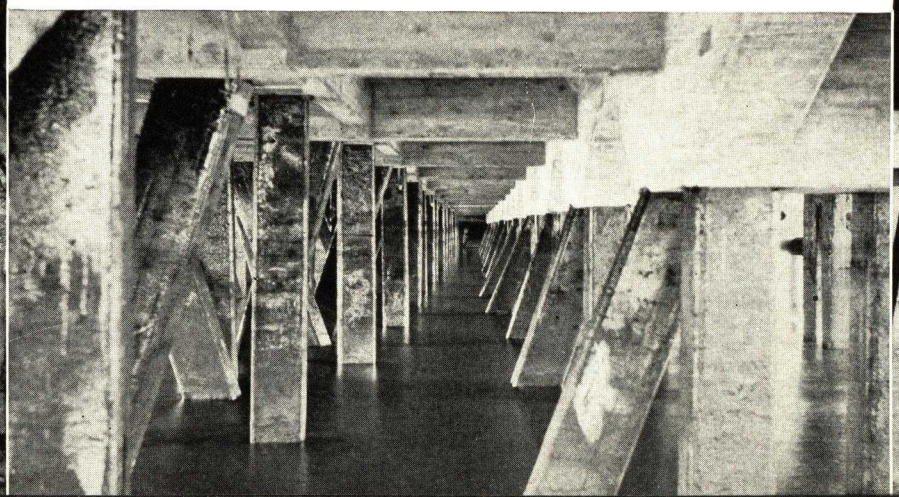
Since it is impracticable to subject the pre-cast pile to the same solid driving shock as the cast-in-place pile, it follows that it is impossible to safely develop the same resistance to static load. It therefore seems logical that calculable bearing values are less easily established than with the cast-in-place pile where the concrete is not subject to impact.

Disregarding the items of waste referred to above and the possibility of injury to piles in transporting, driving and handling, cast-in-place piles are generally economical by comparison, even though their price per lineal foot may be greater than that estimated for pre-cast piles.

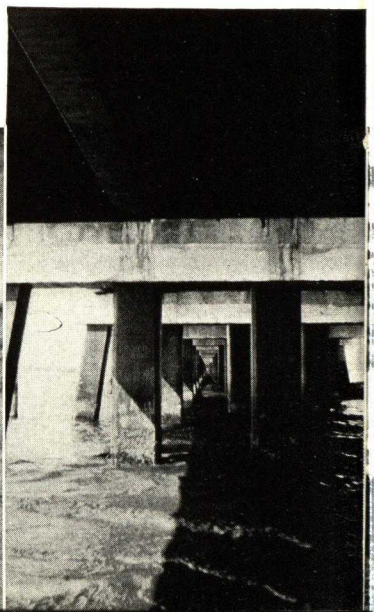
Reinforced Concrete Sheet pile with steel interlock, for cut-off wall — Note heavy projecting reinforcing rods for embedment in bulkhead beam which surmounts line of sheet piles after driving is completed.



Under view, reinforced concrete pier at Charleston, S. C. Navy Yard — Note excellent alignment of precast concrete vertical and spur piles.



Under view of 4375' Reinforced Concrete Bridge, Punta Gorda, Florida—Note perfect alignment of precast piles and girders.



COMPOSITE PILES

This type of pile, as its designation implies, comprises a concrete pile superimposed upon a wood pile. The respective lengths of the concrete and wood sections depend on the elevation of permanent water level in relation to the ground surface, and the depth at which firm bearing may be reached. In general, the load is carried by the wood pile, the concrete section acting as a column through that portion of the soil not continuously saturated.

Piles of this type came into general use after 1917, when the Raymond Company placed several thousand, ranging up to 100 feet in length, in the foundations of blast furnaces, ore bins, trestles, power house, repair shops, etc., in a large industrial plant. The site was underlain by hardpan and rock at depths varying from 75 to more than 100 feet below the surface. From the surface down to the hardpan stratum, the soil was of soft yellow and blue clay, practically incompressible, flowing under heavy pressures, and heaving under the displacement of the piles to practically the extent of their volume. Under these conditions, composite piles seemed, at the time, to furnish the only economical solution and proved entirely adequate. (Note: An all-concrete pile would have been desirable but would have been prohibitive in cost if of any type then in commercial use. Since that time, however, a type of pile known as the Raymond Step Taper Pile has been developed and is fully described on subsequent pages.

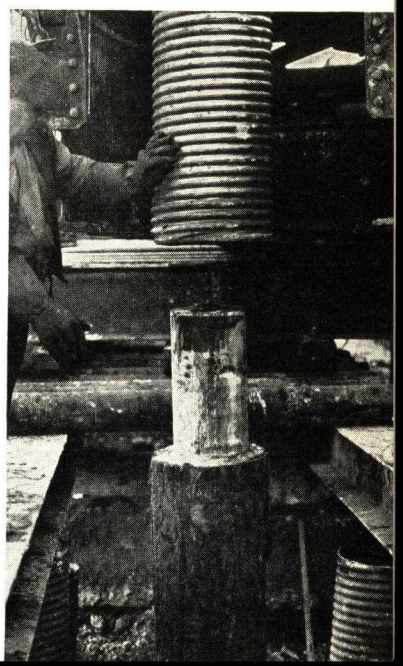
The concrete section of the composite pile may be either cast-in-place or pre-cast, and may be straight-sided or tapered. There are soils whose characteristics are such that friction and compression are of a certain value and in which it is practicable to develop that value by means of a tapered concrete section, thus justifying a greater load per pile than that ordinarily allowable on the wood pile alone.

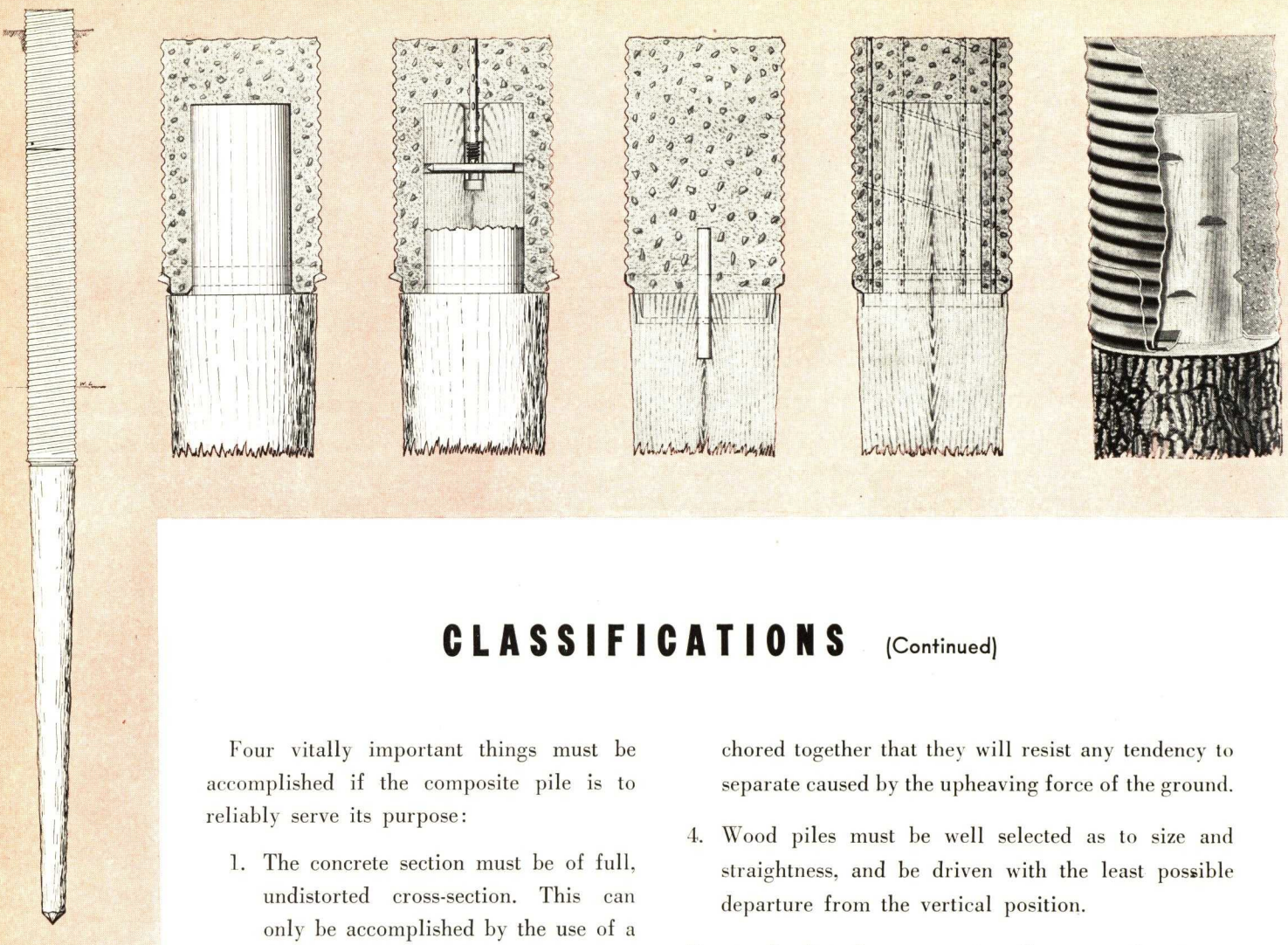
ECONOMY OF CAST-IN-PLACE UPPER SECTIONS

Pre-cast upper sections are seldom economical and seldom used because they are expensive to construct and handle, and because lengths must be predetermined. The cast-in-place upper section is therefore preferable, since its length can be varied as required. Should the wood pile section fail to reach firm bearing at the expected length, the concrete section, if cast-in-place, may be correspondingly increased in length.

Below: Wood sections of composite piles, with machine cut tenons, ready to be handed to driver and driven.

Right: Driven wood section of composite pile and shell enveloped core being lowered over joint tenon for final driving to elevation at which wood section is entirely below permanent water level.





CLASSIFICATIONS (Continued)

Four vitally important things must be accomplished if the composite pile is to reliably serve its purpose:

1. The concrete section must be of full, undistorted cross-section. This can only be accomplished by the use of a shell left permanently in place.
2. The joint between the concrete and the wood sections must be clean and free from water, mud, sand, or other foreign substances.
3. The two sections must be so anchored together that they will resist any tendency to separate caused by the upheaving force of the ground.
4. Wood piles must be well selected as to size and straightness, and be driven with the least possible departure from the vertical position.

Due to the fact that composite piles carry the greater part, and frequently all, of their load on the wood section, it is customary to limit the working load to that allowed on the wood pile, except in such cases as a portion of the carrying capacity can be developed in the upper soil. This is sometimes accomplished by the use of a heavily-tapered concrete section.

OTHER TYPES OF PILE FOUNDATIONS

The Raymond organization with its large equipment and personnel is in position to and does execute foundation contracts involving practically all recognized and accepted types of piles, including wood piles, steel pipe piles—both closed and open end, reinforced concrete bearing and sheet piles, and steel and wood sheet piles. In a catalog of this nature, particular comment as to the various types seems unnecessary since the character of such work is not unusual and seems to be generally known.

RAYMOND STANDARD TAPERED PILES

From the standpoint of general use and acceptance, the tapered type of pile has led all others in the concrete pile field for the past thirty-five years. Its successful experience, its record of usefulness, and its sterling performance have been the dominant factors in the development of the concrete pile industry in the United States and in many places abroad.

The value of the taper has been proved in literally thousands of structures of infinite variety, ranging from small dwellings to mammoth industrial buildings and towering skyscrapers. Structures resting on tapered concrete piles dot the United States, are found in the Philippines, China and Sumatra, and from Newfoundland to the Argentine Republic.

THE RECOGNIZED VIRTUES OF THE TAPER

1. The maximum of bearing value is developed in every square inch of soil in contact throughout the pile's entire length.

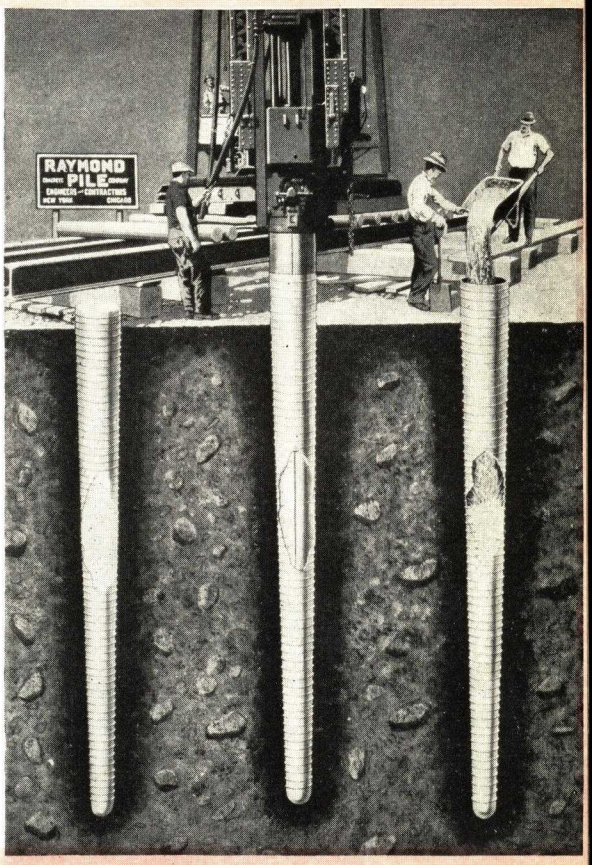
2. Due to the tapering wedge shape, the *pile cannot settle the smallest fraction of an inch without forcing lateral movement* of every square inch of soil in contact with its surface.

3. It follows that, except for point bearing conditions, *tapered piles assure the desired load carrying capacity with shorter lengths* than would be required if parallel-sided piles were used—or conversely, should tapered and parallel-sided piles be driven to the same length, *the tapered pile will carry the greater load.* (*See curve on page* 22.)

COMPARATIVE BEARING TEST OF TAPERED AND STRAIGHT PILES:

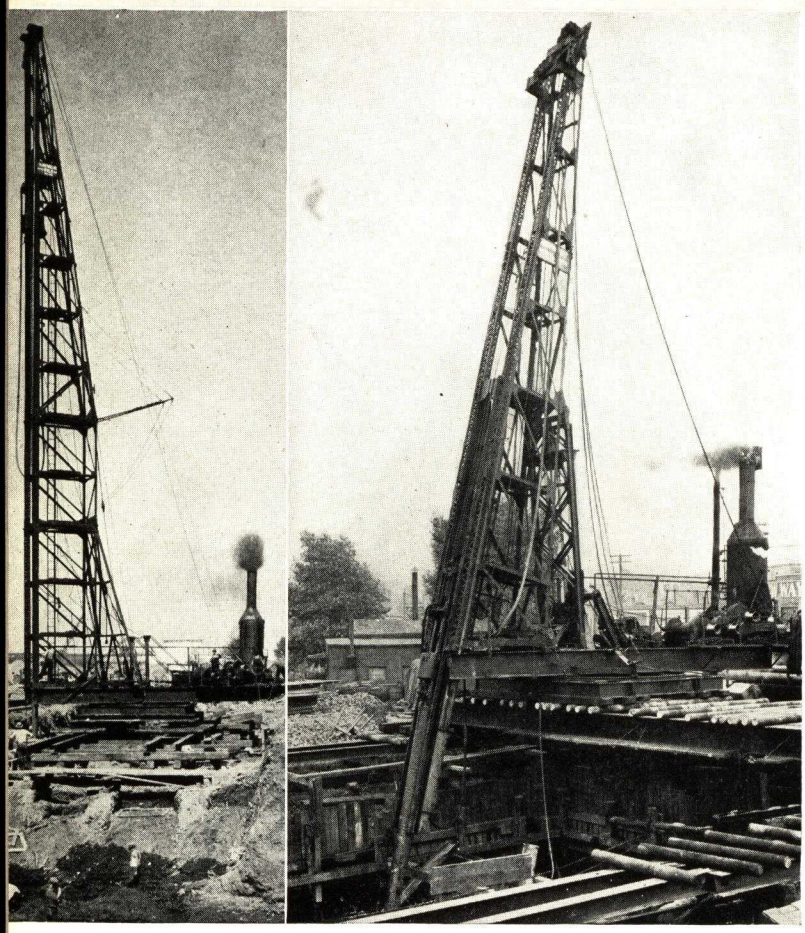
The record of a test conducted to ascertain the relative carrying capacity of straight and tapered piling is given on the following page.

This test was made under the supervision of a prominent engineer, who contended that, for the soil in question, a parallel-sided pile possessed certain advantages over a tapered pile. This engineer's attitude was based on the belief that increased surface area was the principal factor increasing carrying capacity.



Cut-a-way views of RAYMOND TAPERED CONCRETE Piles at successive stages of installation—CENTER, pile driven to grade — LEFT, ready for inspection — RIGHT, concrete being poured.

A large group of RAYMOND TAPERED CONCRETE Piles complete and ready for footings — Note spacing, alignment and uniform grades.

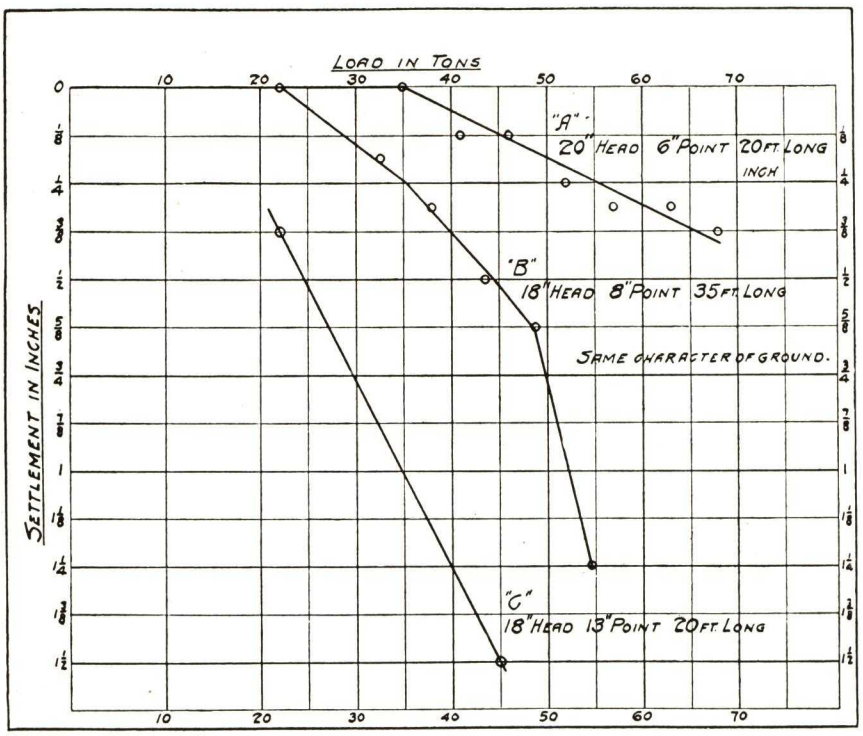


Above left: 96' Steel Driver, driving STEP TAPERED CONCRETE Piles up to 88 feet in length—New York City Exhibition Building at New York World's Fair.
Above right: 50-ton Raymond Driver running on gantry with clear span of 55 feet—driving RAYMOND CONCRETE Piles on 1-to-4 batter—Foundation piers Gen. Pulaski Skyway, Jersey City to Newark, N. J.

To make sure on this point, two piles, each twenty feet long, were driven within a few feet of each other. "Pile A," was six inches in diameter at the point and twenty inches in diameter at the top, while the other, "Pile C," was thirteen inches in diameter at the point and eighteen inches in diameter at the top. "Pile C," with the large point, drove fairly hard from the start, and required nine hundred and forty-four blows of the steam hammer to secure a penetration of twenty feet. "Pile A," with the smaller point, started easily and required only eight hundred and seventy-five blows to secure twenty feet of penetration.

RESULT OF TEST

At the expiration of a month, both piles were loaded and carefully tested. The test showed that "Pile A," the pile with the greater taper, carried a proportionately greater load, showing no appreciable settlement up to sixty-five tons, whereas "Pile C," the less tapered pile, showed the same settlement with a load slightly more than twenty tons. The result is particularly interesting in view of the fact that the engineer who made the tests did so for the specific purpose of showing that a pile of large surface area had greater carrying capacity than a pile which, even tho smaller, was more heavily tapered. The results of these tests have been confirmed time and time again in the course of our experience.



OBSERVATION OF PENETRATION DURING DRIVING

Since in placing a Raymond pile the weights of the driving core and hammer are constant, and since the method of installation is such that one pile must be like another, it is possible to determine the safe load each pile can be relied upon to support. This is done by observing the penetration under each blow of the hammer, and by noting the final resistance as measured in terms of average penetration per blow for the last inch.

Analyzed in the light of experience with soils of the same general character, records thus taken constitute a method of measuring resistance with practically as much certainty as testing the pile with an actual load. Furthermore, each individual pile is in actual practice submitted to this test,

so that definitely known bearing values are established at each point where loads are concentrated. Load tests are sometimes made, but in the majority of instances the driving test described above is of more value, since it is applied to each pile, and does not entail the delay nor the expense incident to loading for test purposes only.

COMPARATIVE COST OF TAPERED VS. NON-TAPERED PILES

The failure to appreciate the greater carrying capacity of the tapered pile has unexpectedly increased the cost of many concrete pile foundations, contracts for which were awarded solely on the basis of the lowest price per lineal foot.

It is well known that the "per foot price" of piling, whether wood or concrete, is in a measure inversely proportional to the number of lineal feet involved in the contract. It is, therefore, obvious that the bidder who bases his price per foot on the use of a pile of uniform diameter throughout its length may realize that, unless the site overlies hardpan or rock, he will obtain a very much greater average length of pile than will his competitor who bids on a tapered pile.

The curve on opposite page showing the carrying capacities of piles of unequal taper is interesting as indicating the economy of tapered piles from the standpoint of relative length. The thirty-five foot pile shown measured eight inches in diameter at the point and eighteen inches at the top. On account of its less taper, however, it was possible to secure a penetration some fifteen feet deeper than with the twenty foot pile having a greater taper. Notwithstanding the increased length, the test showed the carrying capacity of a thirty-five foot pile to be less than that of the short pile.

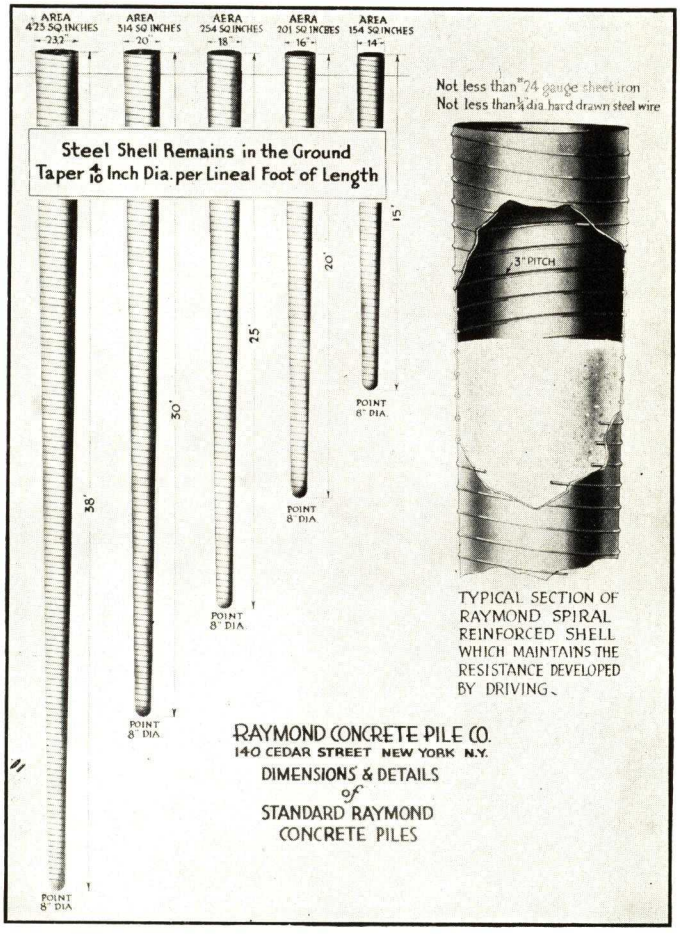
CONSTANT INSPECTION:

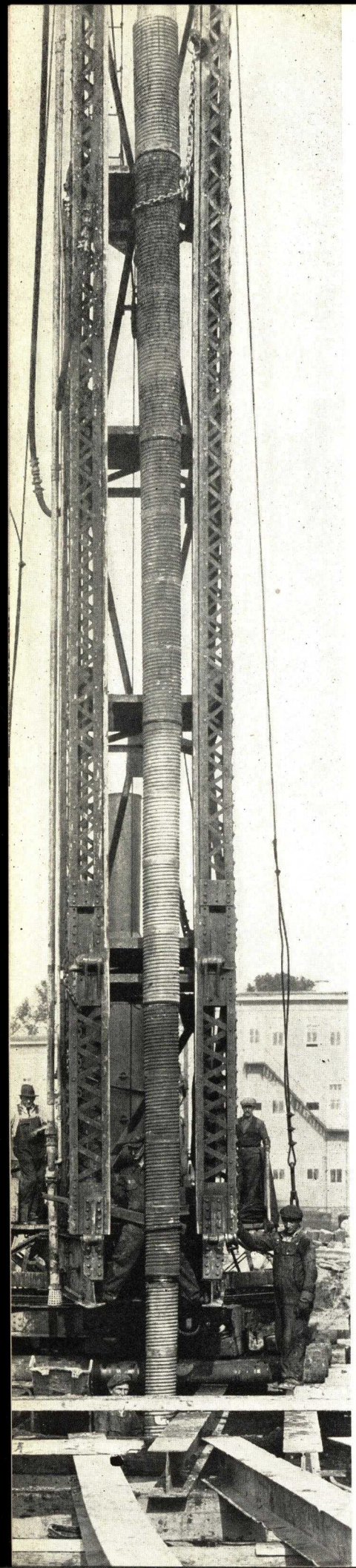
Attention is directed to illustrations showing the construction of the "left-in-place" shell made of steel of the proper gauge, and spirally reinforced to the degree which examination of each pile, after driving, shows to be adequate. This means inspection after every operation is complete, except the pouring of the concrete. Thus the hazards of distortion and loss of resistance are eliminated. Full cross-section is assured, and the size, shape, and value of the pile become, and remain, known quantities.

OVERCOMING ANY DEFECTS

Should it appear, upon inspection, that a shell has been torn or otherwise injured in driving, or should unsuspected and unusual pressures develop at some point, resulting in the entrance of water or other foreign substance, the defect can be immediately remedied by the insertion of another shell and driving it to resistance before the concrete is poured. Any distortion that may occur in a pile made without a form, or with only a temporary form—any fracture that may occur in the driving of a pre-cast pile—must of necessity remain hidden. Subsequent settlement, perhaps, may call attention to the existence, though not to the extent nor the nature, of the concealed fault.

The Raymond Pile is the only economical concrete pile which offers opportunity for timely inspection.





RAYMOND

STEP TAPERED CONCRETE PILES

Early in the year 1931, the Raymond Company developed the Step Tapered Concrete Pile, embodying the fundamentals of the original Raymond Standard Pile, but permitting of increased lengths up to 100 feet and more.

It is, of course, impossible to mention all of the various soil conditions encountered where Step Tapered piles have provided an economical solution, but the following are typical:

A Unstable soil of doubtful or indeterminate supporting value to a depth of 30′ or more below the surface, and underlain by stable materials such as rock or hardpan or perhaps sand, gravel or stiff clay, into which the pile points may be driven (a greater or less distance, according to character and density of the material itself) to firm calculable bearing.

B Hard soil, difficult of penetration though unreliable for bearing on account of yielding strata below, which must be penetrated by the piles.

C Alternate strata of hard and soft materials necessary to be penetrated before firm bearing can be reached.

The step tapered pile has, to a remarkable degree, received universal acceptance on the part of the engineering, architectural and construction world. Illustrative of this, it may be of interest to note that since the first commercial use of this type of pile in 1931, the Raymond Company has, on the average, completed every week, a step tapered pile contract of 280 piles, involving more than 11,000 lineal feet each. The clientele making use of this type of pile to meet its special requirements classifies roughly as follows:

	No. of Projects	*No. of Piles Exceeding*	*No. of Lin. Ft. Exceeding*
U. S. Government projects	15	24,000	697,000
Oil Companies	6	6,900	253,000
States, Counties and Municipalities	38	14,000	496,000
Railroads, Viaducts, Grade Separations, Terminals, etc.	6	2,100	74,000
Automobile Plants	6	6,200	315,000
Steel Plants	7	15,600	800,000
Miscellaneous Industrial Structures	27	8,400	280,000
Other Miscellaneous Structures, such as Office Buildings, Schools, Churches, etc.		8,000	650,000

Raymond Steel Pile Driver with STEP TAPERED Core and Shell—Shell, screwed together into single unit, has been lowered into adjacent open driven shell and is being drawn up over the core, ready to be driven.

FOR PILES UP TO 100 FEET LONG AND OVER

Geographically the projects above described have been located in the various States ranging from coast to coast and from the Canadian border to the Gulf. Individual projects have involved as many as 12,000 piles and as few as 8. Lengths have varied from 16 to 115 feet and underlying soil conditions have in many cases been peculiarly difficult. The piles in some instances have been driven through fill and silt to rock bearing; some through layers of hardpan, heavy gravel and sand overlying silt and other yielding soils; others have been drilled, blasted, jetted and driven through slag layers and soft clay, and still others have been jetted through fine sand for their full length, demonstrating the tightness of the shell against the intrusion of water and the finest running sand.

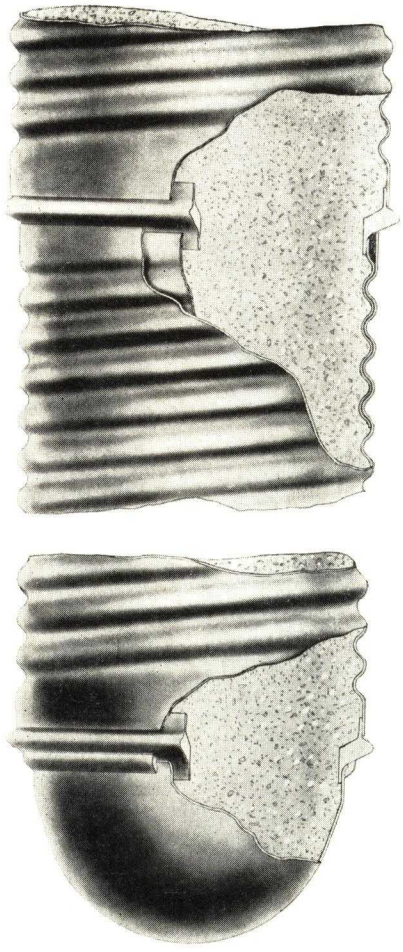
As in the Raymond Tapered Pile heretofore described, the step tapered pile is installed by driving an inner core completely encased in a strong steel shell. After proper penetration and resistance is secured, the core is withdrawn and the shell, which is left permanently in the ground, is filled with concrete. Again, retaining the most essential feature of the Raymond system, this shell remains in intimate contact with the ground, thus maintaining the original driving resistance in the completed pile.

This method provides assurance that the pressures and soil contacts generated in driving will not be released and the carrying capacity of the pile thereby impaired; thus removing a hazard always present if an exterior driving pipe or casing is withdrawn.

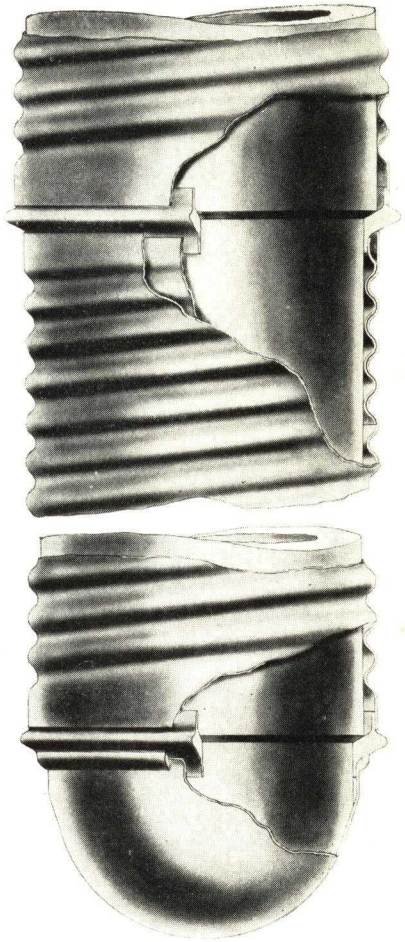
The shell of a step tapered pile is usually corrugated and is of such substantial construction that it protects the recently filled shell from distortion during the driving of adjacent piles, at the same time providing a watertight form to prevent the admixture of ground water or other foreign materials with the concrete.

These features completely eliminate the hazards of imperfect concrete construction, since the shell (the form into which the concrete is poured) is visible for inspection before being filled.

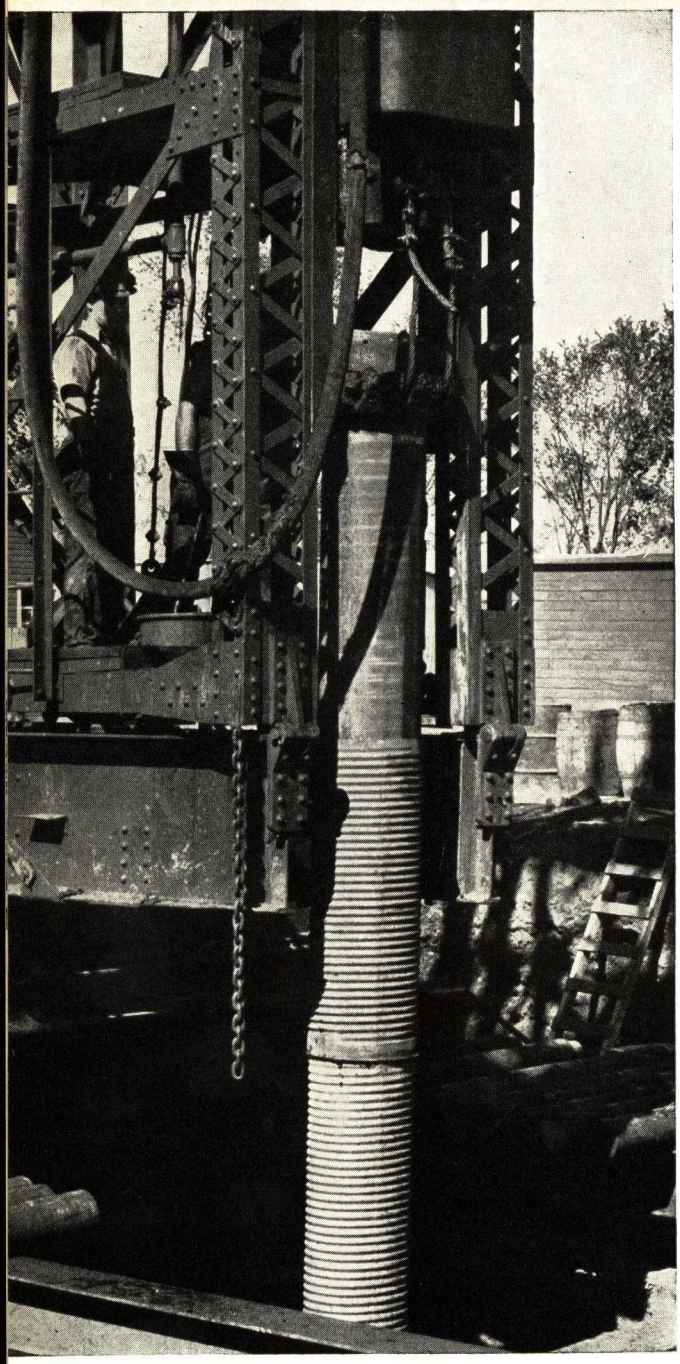
Attention is directed to the illustrations below. From this cutaway photograph, it will be seen that the heavy hollow-walled core has a "stepped" outer surface and that the steps which are beveled as shown bear directly on the beveled surface of the plow ring welded to the lower end of each 8′ shell section.



Cut-a-way of lower section RAYMOND STEP TAPERED Pile.



Cut-a-way showing STEP TAPERED SHELL and CORE shoulder bearing on shell.



STEP TAPERED Pile partially driven.

To the lower projecting fin of this plow ring it will be observed that a short spirally corrugated inner sleeve has been welded, thus permitting the lower section to be screw-connected to the upper. It will also be noted that the lower end of the core is rounded and is covered by a heavy gauge pressed metal "boot" which is welded to the lowest plow ring.

The core is "solid" since the construction of the shells makes it unnecessary to use a collapsible core as is required for Raymond Standard piles. Various lengths and sizes of cores are built to fit the shells required for the particular jobs. Illustrations herein show the core completely enveloped in the several sections of shell which are all screw-connected and usually assembled before being placed on the core.

The usual dimensions of step tapered piles are as follows:

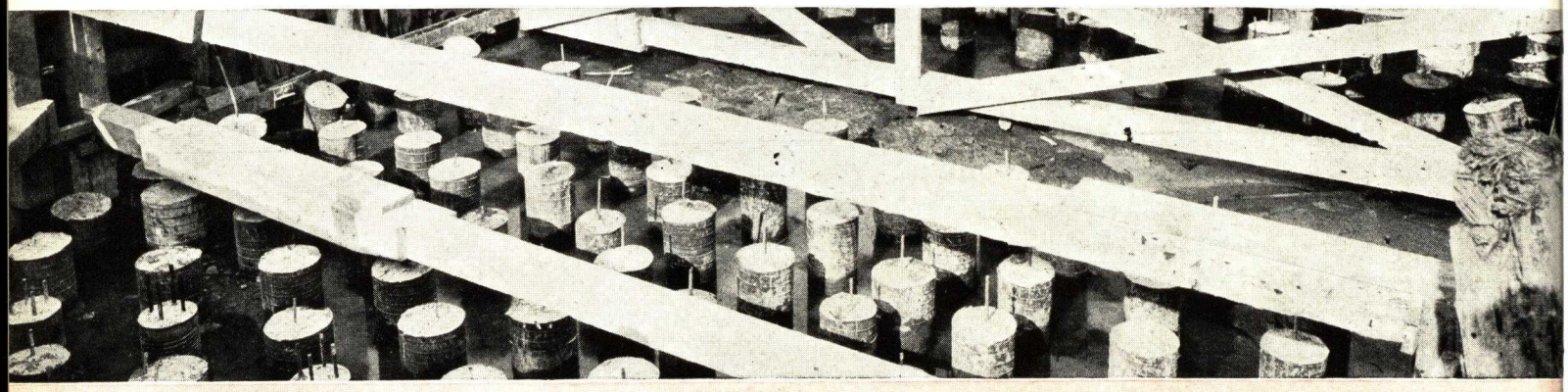
Length	*Top Diameter*	*Point Diameter*
56 feet	15⅞"	9¾"
48 "	15⅞"	10⅝"
40 "	14⅞"	10⅝"
* 32 "	13⅞"	10⅝"
* 24 "	12⅞"	10⅝"
* 16 "	11⅞"	10⅝"

* When for any reason a greater cross-section appears to be desirable, it is possible to accomplish this by removing the lower sections of the core and using two or more of the upper sections with driving points of corresponding size adapted thereto, thus:

A pile 32′ in length might have a top diameter of 15⅞" and a point diameter of 12⅞", or

A pile 24′ in length might have a top diameter of 15⅞" and a point diameter of 13⅞", or

Other combinations may be used to suit the requirements of a particular situation.



The appearance and general characteristics of the step tapered shell are fairly well shown in the illustration to which attention has been directed above, but it may be added that the gauges of metal used generally vary from 20 to 14 but are, in some instances, as heavy as 10 and as light as 22 and 24, depending altogether upon the nature of the soil to be penetrated and the pressures to be retained, the lighter weight section naturally being used nearer the surface of the ground. All seams of the shell sections are electrically welded watertight.

Each of the heavy beveled plow rings as shown on the sketch contacts the corresponding shoulder on the core. The hammer blow is in this manner transmitted through the core to the shell and, by reason of the sturdiness of this beveled ring, without injury to the shell.

On several jobs where the step tapered pile has been used, driving conditions have been so severe that it has been necessary to continue the driving to a degree of hammer resistance heretofore unknown. For instance, on one pile we have a record of driving with a 5000 lb. hammer falling 3′ and operating sixty blows to the minute for a period of 63 minutes and, in another instance, a total on one pile of more than 5200 blows with a No. 1 hammer to secure a penetration of about 31 feet in order to reach rock. In both instances, upon withdrawal of the driving core, the shell was found to be undamaged and a perfect form for the concrete.

STEP TAPERED Shell ends — showing plow ring and screw collars for joining into full length shell unit.

Right: Pier of RAYMOND STEP TAPERED Piles ready for the footings.

Below: STOCK Pile of STEP TAPERED Shells nested as shipped.

CONCRETE PILE SPECIFICATIONS

2/3

The following specifications for cast-in-place piles and an alternative specification for precast piles conform with the general requirements of all the principal cities in the United States, for piles up to 60 ft. in length. For piles in excess of 60 ft. in length, these specifications should be modified slightly. The Raymond Concrete Pile Company's representative will be glad to discuss these modifications in detail.

CONCRETE PILES:

Where indicated on the drawings, furnish and place the required number of concrete piles as specified, to support the foundations. Excavation shall be made to the pile cut-off before any piles are driven. Concrete piles shall be either cast-in-place or precast piles.

CAST-IN-PLACE PILES:

Cast-in-place piles shall have steel shells driven to the required bearing, the shells being left permanently in place and filled with concrete. All shells shall be of sufficient strength and rigidity to permit of their driving, and to prevent distortion caused by soil pressures or the driving of adjacent piles. The shells shall also be sufficiently water-tight to exclude water during the placing of the concrete.

Piles shall be cylindrical or tapered. If tapered, they may be either of a constant increase in diameter or uniformly stepped. The minimum diameter of cylindrical piles shall be 14", and the minimum diameter of tapered piles shall be 8" at the point and 14" at the head. The average diameter shall be not less than 11".

Concrete shall be composed of one part approved Portland cement to three parts clean, sharp sand, and five parts of gravel or crushed stone of suitable quality, thoroughly mixed and properly proportioned as to water content. All coarse aggregate to pass a ¾" ring.

The use of piles in which fresh or unset concrete is placed against the soil will not be permitted.

PRECAST PILES:

Precast piles shall be of uniform cross-section or tapered, and shall have at least an average cross-section area of 196 square inches up to 20' in length and 225 square inches if in excess of 20'. They shall be reinforced with longitudinal reinforcing steel not less than 2% of the average gross cross sectional area of the pile and any additional reinforcing steel necessary to take care of the stresses due to handling or driving. Lateral reinforcing shall consist of ¼" diameter hoops spaced 12" on center for the full length of the pile, excepting for 3' at the head and point where the hooping shall be not over 3" on center. There shall be at least 2" of concrete protection outside the reinforcing steel.

Forms shall be tight and rigid to prevent leakage or distortion. All piles shall be plainly marked with the casting date and shall be cured for a period of 30 days and shall not be handled or removed from the casting platform prior to this time without the approval of the Engineer. Piles must be cured at an even temperature in order that they may get a proper set; therefore, in warm weather they should be kept moist for a time, while in cold weather they shall be heated until they have properly set and cured. If cast in tiers, the lower piles shall be at least 14 days old before any superimposed load is placed upon them.

If precast piles are used, the Contractor shall drive enough test piles to predetermine the length of pile required to secure the specified bearing and required penetrations in the various areas of the work. These tests shall be made sufficiently in advance of the pile driving to prevent delay in the progress of the work, and to enable the Contractor to have on hand at all times, piles of proper length to meet any condition that may arise.

Concrete shall be composed of one part approved Portland cement to two parts of clean, sharp sand and four parts clean gravel or crushed stone, thoroughly mixed and properly proportioned as to water content.

DRIVING:

All piles shall be driven to a resistance satisfactory to the Engineer, by such methods as will not impair their strength and as will insure the retention of that resistance.

Jetting shall only be done when permitted by the Engineer. When piles are jetted, they shall be driven to the required resistance after jetting has ceased.

The driving of all piles shall be continuous, without intermission, until the pile has been driven to its final resistance.

All cushions must be approved by the Engineer. No free swinging leads will be permitted, and the equipment shall provide adequate support to firmly hold the pile in correct position while being driven.

The pile shall be driven to a sufficient depth to carry the imposed loads, and the Engineering News formula shall be considered to indicate the load that can be safely supported by a pile. The pile driving hammer shall develop an energy per blow of at least 12,000 foot pounds.

PAYMENT:

All piles shall be measured from the point to the cut-off elevation shown on the plans. No payment will be made for withdrawn, broken or rejected piles, nor for portions of piles remaining above the cut-off.

The following is a suggested specification for use when conditions indicate the desirability of composite piles.

COMPOSITE PILES:

Composite piles shall consist of a concrete section from the bottom of the footing to 1' below water level, superimposed upon a wood pile of suitable size and length. The concrete portion of the pile shall be of such cross-section that the load placed upon it shall not exceed 350 lbs. per square inch of area. The wood pile shall have a minimum diameter of not less than 13" two feet from the head and a minimum diameter of 6" at the point, except that where piles exceed 60' in length point diameters may be not less than 5".

Wood Pile Section:

All piles shall be sound and free from sharp crooks or bends and sufficiently straight so that a line drawn from the center of the head to the center of the point will lie wholly within the pile. The joint between the concrete and wood sections shall be so constructed as to exclude water or other foreign materials and shall be of sufficient strength so as to provide against an uplift of 10 tons without separation.

Concrete Pile Section:

Concrete shall consist of one part approved Portland cement, two parts clean, sharp sand, and four parts clean gravel or crushed stone, thoroughly mixed and properly proportioned as to water content; all coarse aggregate to pass a ¾" ring. In no case shall fresh or unset concrete be placed in contact with the surrounding soil.

UNDERPINNING

UNDERPINNING is generally incidental to:

(a) The protection of structures already in place from settlement damage due to nearby operations, such as adjacent basement, sewer, or other excavations being carried to or below the elevation of the original footing.

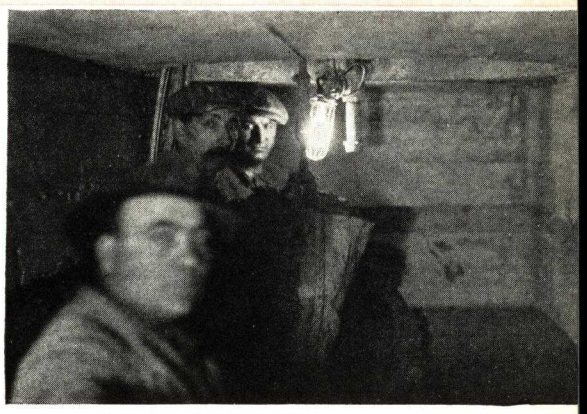
(b) The necessity of correcting original foundation errors where settlement has developed due to compression of the soil or its escape horizontally under pressure.

(c) The necessity of reinforcement of the foundation in order to provide for additional stories or other increased loadings, sometimes because of changes in the uses of the building itself.

The particular type of underpinning most suitable will depend largely upon the character of the original foundation, the design of the substructure, and the conditions under which the underpinning must be carried on with the least disturbance to current normal operations.

VARIETY IN TYPE OF UNDERPINNING

Under certain conditions, sectional piles jacked down to suitable bearing, and using the original walls and footings for reaction, are the most practical and economical. In other cases, caissons are preferable. Under still other circumstances, it is desirable to carry the original footings deeper to a better subsoil bearing. *In any case* under consideration, it will be the part of wisdom to seek experienced counsel and to write specifications which will permit of the most intelligent handling of all existing problems.



Excavation for Underpinning

CAISSONS

Caisson foundations are of four general types:

1. OPEN CAISSONS –Where soil conditions are such that excavation can be carried to suitable bearing material without passing thru "quick" or running sand strata or strata bearing water in greater quantity than can be handled by moderate pumping operations.

2. GOW CAISSON PILES—Caissons of this type are installed by the Gow Division of the Raymond Company, and, when ground conditions are suitable, are probably the least expensive type of caissons.

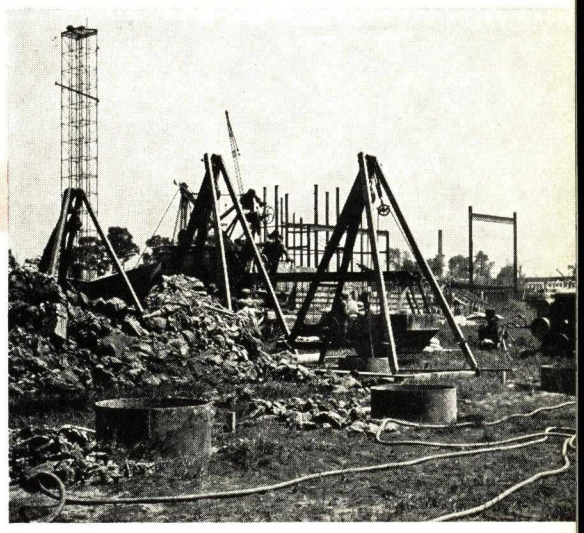
Excavation is usually done by hand inside of steel cylinders, each cylinder being approximately 8′ long. A shallow starting pit is excavated first and the top cylinder is driven down in this pit. The soil inside this cylinder is then excavated. A second cylinder about 2″ smaller in diameter is then placed inside the first one and is driven down. The soil in the second cylinder is excavated and the entire process is repeated until the caisson reaches its full depth. Each cylinder is about 2″ smaller in diameter than the one next above it and the lowest cylinder must be of the specified shaft diameter. This lowest cylinder is driven into the final bearing stratum to seal off. Where necessary the soil below the bottom cylinder is "belled" out to provide the bearing area required for the specified unit soil pressure.

The lower section is then filled with concrete and the lower cylinder withdrawn thru the larger section immediately above. The next cylinder is then filled and withdrawn, and the process repeated until all are refilled and all withdrawn, leaving the completed caisson in place, belled out from shaft diameter at the bottom and increasing in diameter by 2″ steps in each eight feet up to the elevation of the footing or column base.

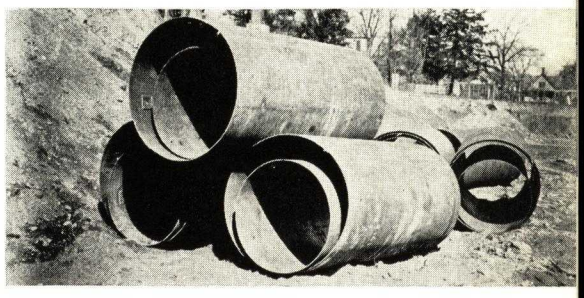
Machine excavations—where soil conditions and other factors are suitable, the excavation of the shaft is accomplished by means of a rotary excavating machine developed by the Gow Division. When machine excavation is practicable, a substantial saving in time can be effected with consequent economy.

The economy of this type of caisson is due to re-use, and salvage, of the cylinders which only temporarily line the excavation, and also to the lack of heavy equipment and overhead requirements.

3. PNEUMATIC CAISSONS –In which operations are carried on under compressed air at pressures up to 48 lbs. per square inch, necessitating air locks thru which workmen and materials enter and are removed. The process, involving, as it does, heavy and costly plant, short shift hours for the workers and relatively slow progress, is necessarily expensive and is seldom employed where any other method appears feasible. There are, however, certain conditions under which the pneumatic caisson seems to furnish the only solution;—such, for instance, as installing the caissons for a new building while the structure it is to replace is still in use and where soil conditions are such as to preclude the adoption of any open caisson method.

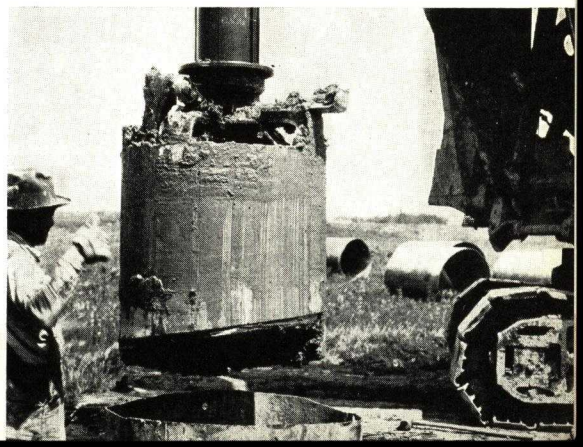


Installation of GOW CAISSON Piles—Note 3 steel cylinders partially exposed in foreground.



Steel Cylinders (nested for transportation) used in GOW CAISSON Pile Process.

Below: Excavating Bucket at end of telescoping shaft of Gow Rotary Excavating machine—Note reaming knives at top of bucket.



4. THE WET PROCESS CAISSON—Installed by the Caisson Contracting Company, whose operations are under the supervision of the Raymond Company as consultants. This process is applicable to practically every condition which, prior to its development, necessitated the use of the more expensive pneumatic type.

METHOD OF INSTALLING—The Wet Process caisson is installed by methods similar in some respects to the drilling of oil wells. Excavation, down to the level of hardpan or boulders, is done by what is known as "spud drilling," which means that the drill itself—a spider-like member with arms radiating from the center to the full caisson diameter—is attached to the lower end of a hollow drill stem 10″ to 12″ in diameter. On the arms of the "spider" are mounted cutting or scarifying teeth.

The drill stem is rotated from the top end and water under heavy pressure forced down thru it, emerging at the point to assist the cutting action and partially emulsify the material scraped and broken up by the drill. A considerable portion of such material will remain in suspension, rising to the top under the continuing water pressure and overflowing into nearby conducting trenches, or pipe, into an adjacent sump. The heavier solids settle to the bottom of the sump, and the light, mud-laden fluid is recirculated thru the drill stem instead of clear water.

The final result of these operations is, that down to the level of material impenetrable by the spud drill, the full size caisson excavation is filled with a fluid of considerably greater specific gravity than water. Loss of drilling fluid into the soil is prevented by the "mudding up" action of the drill, which plasters the walls of the hole with clay which, when not encountered in the soil, is added to the drilling fluid for this purpose. As long as this liquid remains in place, and hydrostatic pressure is not unbalanced by its removal, the walls of the excavation will remain intact without material caving.

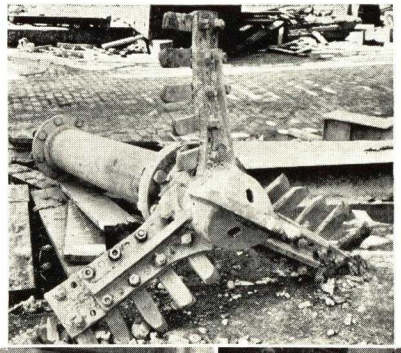
INSTALLING THE STEEL CYLINDER—The next step in the process follows—the first step, of course, being the removal of the drill. If by the spud drilling process above described, the final bearing strata has been reached, a steel cylinder of finished caisson diameter and length is lowered into the mud-laden hole and driven to final seal in the bottom material. The fluid and residue of settled solids inside the cylinder are then removed by pumping, clam shell or orange peel bucket, or other methods, and the bottom cleaned and inspected, after which the concrete is poured in the ordinary manner.

In some instances, the cylinder (or casing) is withdrawn immediately upon the pouring of the concrete and is re-used. This may be safely done under certain conditions, and is, of course, economical.

DRILLING AGAINST OBSTRUCTIONS—If before final bearing elevation is reached, the spud drill ceases to penetrate satisfactorily, due to obstructions or material which will not readily yield to that type of drilling, the spud drill is withdrawn and a "core barrel" drill is lowered to the bottom then reached. Sufficient casing is connected to the core barrel to reach to the surface. The core barrel, usually has a double wall with an annular space of about ⅜″ between walls, with inner projecting lugs having drilled water leads to the annular inner wall space.

The drill stem is then lowered to connect with the core barrel by means of a spider, in the drilled arms of which are holes connecting with the water leads in the lugs. The drill stem is then rotated. It turns the core barrel and casing clockwise by contact with the core barrel lugs, with water under heavy pressure feeding thru the drill stem, the spider arms and the core barrel lugs, to the walls of the core barrel, and out thru its extreme end. This entire assembly constitutes a core drill cutting a circular channel thru all obstructions to a seal in the rock below.

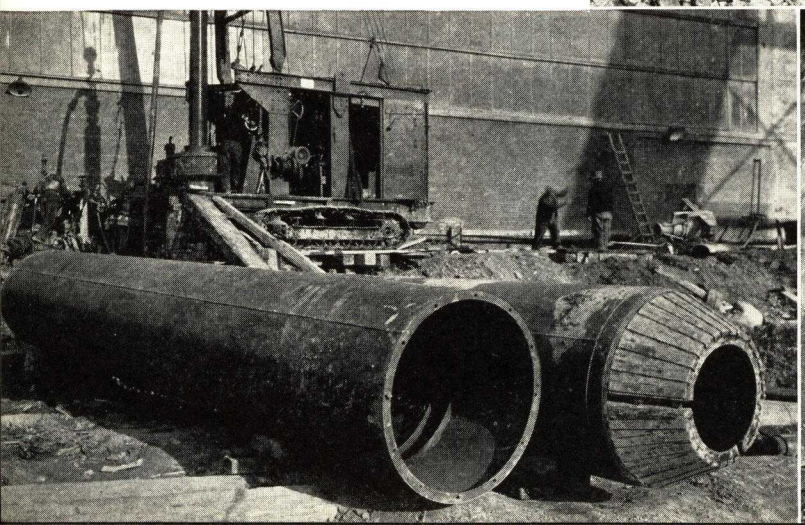
The cutting action is usually assisted by feeding into the water system, hardened steel shot. This shot finds its way down thru the drill stem spider arms, lugs, and core barrel walls, and finally out thru slots in the cutting edge where it serves as the abrasive between the bottom surface of the core barrel and the rock. In some instances, shot is not required, there being sufficient natural abrasive material encountered to enable the core barrel edge to grind its way into the rock, usually penetrating 6″ to 1′, thus forming a seal which is adequate to permit of the caisson being unwatered and the concrete placed substantially in the dry. The operations of unwatering, removing the settled solids and placing the concrete are as hereinbefore described in connection with wholly spud drilled caissons.



Center: SPUD DRILL used in WET PROCESS TYPE CAISSON—Note apertures for water emergence at point and attached section of drill pipe — also cutting teeth attached to drill arms.

Below: Lowering steel casing into spud drilled hole thru mud fluid which balances hydro-static head and prevents caving—Two sections of drill pipe in foreground — Rotary drilling machine in right background — WET PROCESS TYPE CAISSON.

Below: Cylinder Sections used in WET PROCESS TYPE CAISSON.



HARBORS - PIERS - WHARVES and TERMINALS

SHORE PROTECTION •

JETTIES • BRIDGES •

TUNNELS • TRESTLES •

RETAINING WALLS •

DAMS •

HYDRO-ELECTRIC PLANTS •

RIVER IMPROVEMENTS

Highway Bridge over Peace River at Punta Gorda, Florida — Reinforced concrete structure 4375 feet long, 34' 10" wide, on 756 RAYMOND PRECAST CONCRETE PILES 65' to 75' long.

The illustrations following will serve to show partially the character and scope of the Raymond Company's activities in other fields than foundation work. As to many of these projects, the Company's connection has been continuous from the stages of preliminary survey and reports, thru the processes of planning and design, on to complete construction and, in some instances, operation subsequent to completion.

Each separate project has had its own problems, and, naturally, each has required its own special treatment. Each successive accomplishment has added to the knowledge and experience of the organization . . . broadened its equipment for the next problem. The process of education seems never to be complete, and valuable lessons learned in the development and carrying out of nearly every contract, are remembered, and applied, to the benefit of succeeding ones.

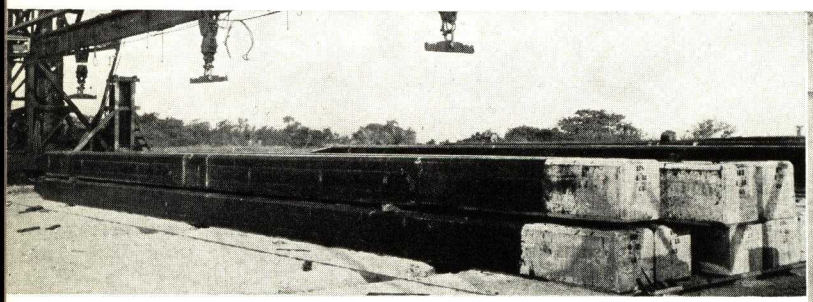
All of which further emphasizes the importance of seeking experienced counsel and early co-operation.

May we be of service to you?

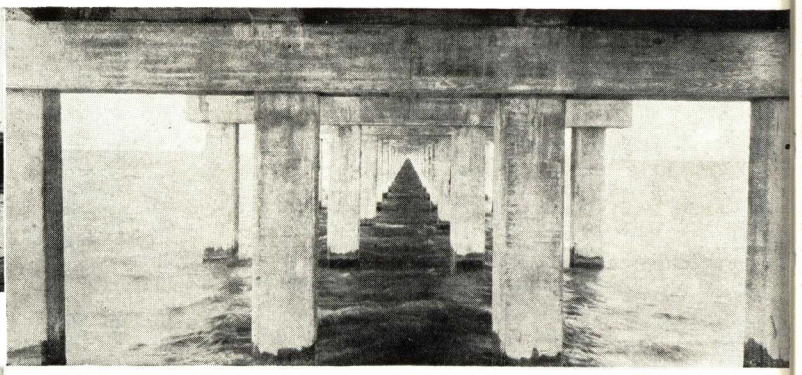
HARBORS, PIERS, WHARVES, TERMINALS, JETTIES, ETC.

Section, during construction, of reinforced concrete sea wall on Lake Pontchartrain (La.) —over five miles long—for Orleans Levee Board. Supported on reinforced concrete bearing and batter piles and a cut-off wall of tongue and groove reinforced Concrete Sheet Piles.

Concrete Wharf and Cold Storage Warehouse for City of Mobile J. B. Convrese & Co., Engineers. Raymond Concrete Pile Co., Contractors.



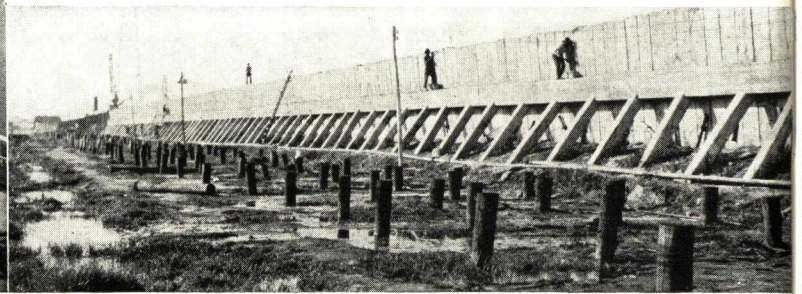
Gantry handling 65 ft. Precast Piles from casting yard—Bridge over Peace River at Punta Gorda, Florida.



Under view of 4½ mile reinforced concrete bridge across Lake Pontchartrain, near New Orleans, Louisiana—Note perfect alignment to vanishing point.

Boca Ciega Causeway near St. Petersburg, Florida—length 2800 ft., width 30 ft. This was one of three similar structures built by the Raymond Company under the same contract.

Retaining the waters of Lake Maracaibo, Venezuela, S. A.—Reinforced concrete sheet pile water-tight dyke, 2.73 miles long.



Rear view, showing 80 ft. composite spur piles—Temporary falsework wood piles in foreground.

Raymond Concrete Pile Company

THE SCOPE OF RAYMOND ACTIVITIES

On the theory that past performance is the best indication of what may be expected in the future, previous Raymond catalogs have presented fairly complete lists of contracts executed by the Company and its licensees. These lists have shown geographical locations and the names of Owners, Engineers and Architects concerned.

The years that have elapsed since we began this practice have witnessed such a large number of additional contracts completed that publication of anything approximating a complete list has become impracticable. We are therefore presenting the following tabulation of contracts classified as to number and general location. This will enable prospective builders and designers, when interested in some particular project, to communicate with us and learn what if any experience we have had in that particular locality, as well as the names of projects and personnel concerned. If at the time of the inquiry some definite project is under consideration, the information we may be able to supply will be of maximum value and pertinence.

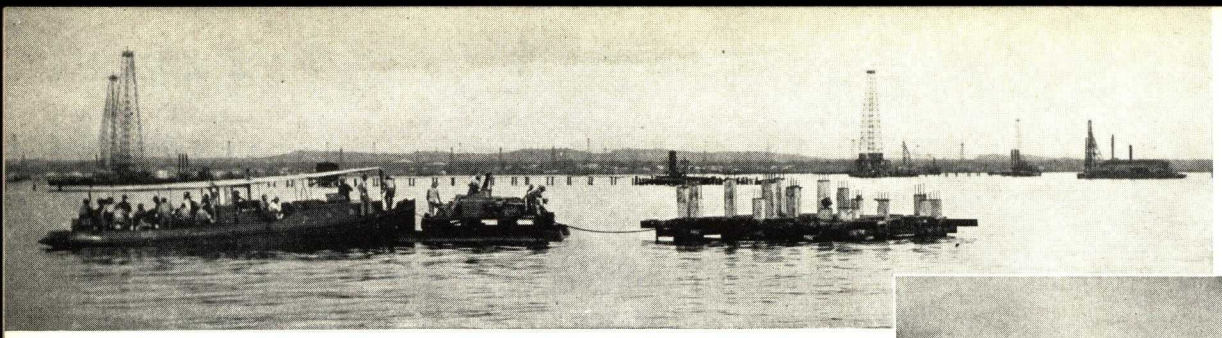
The tabulation presented will show not only the breadth and magnitude of our past operations but the particular locations in which we have had experience. We invite inquiry from those interested. Of the forty-eight states in the United States, we have placed piles or made borings or built caissons or other types of foundation work in forty, located in 931 cities or towns, as follows:

TABULATION OF CONTRACTS

State	*Locations*	*Contracts*	*State*	*Locations*	*Contracts*	*State*	*Locations*	*Contracts*
Alabama	4	6	Louisiana	7	27	Ohio	41	303
Arkansas	12	14	Maine	13	36	Oklahoma	6	18
California	50	222	Maryland	27	433	Oregon	3	17
Colorado	4	6	Massachusetts	173	1999	Pennsylvania	89	613
Connecticut	30	120	Michigan	25	211	Rhode Island	8	48
Delaware	4	10	Minnesota	8	34	South Carolina	5	14
Dist. of Col.	6	151	Mississippi	5	20	Tennessee	8	22
Florida	19	84	Missouri	13	140	Texas	16	52
Georgia	13	52	Nebraska	3	32	Vermont	11	16
Illinois	35	228	New Hampshire	27	113	Virginia	14	77
Indiana	16	40	New Jersey	72	362	Washington	4	11
Iowa	10	35	New York	91	981	West Virginia	21	53
Kansas	8	37	North Carolina	17	32	Wisconsin	9	45
Kentucky	4	9						

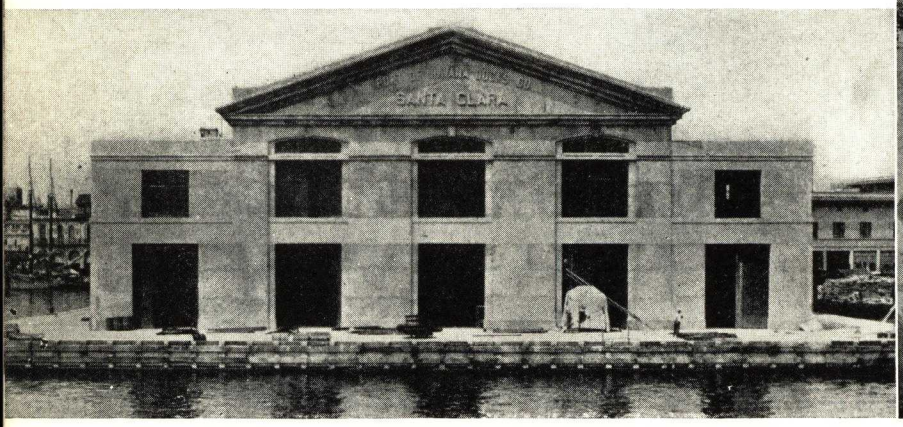
And in the following countries outside of the UnitedStates:

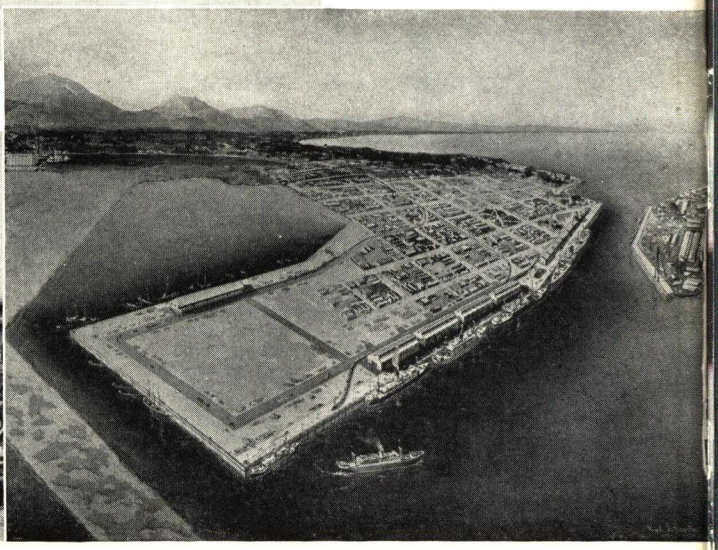
Country	*Locations*	*Contracts*	*Country*	*Locations*	*Contracts*	*Country*	*Locations*	*Contracts*
Argentina, S.A.	1	4	Cuba	1	1	Mexico	2	4
Canada	27	113	Dutch West Indies	1	2	Panama, C.Z.	2	3
China	2	4	England	1	10	Sumatra	1	3
Colombia, S.A.	5	19	Japan	3	5	Venezuela, S.A.	13	32



Left: One of a large number of OIL WELL DERRICK BASES for Lago Petroleum Company in Lake Maracaibo, Venezuela.

Below: PIER for Port of Havana Docks Company, Havana, Cuba—2406 PRECAST CONCRETE PILES from 55' to 85' long.





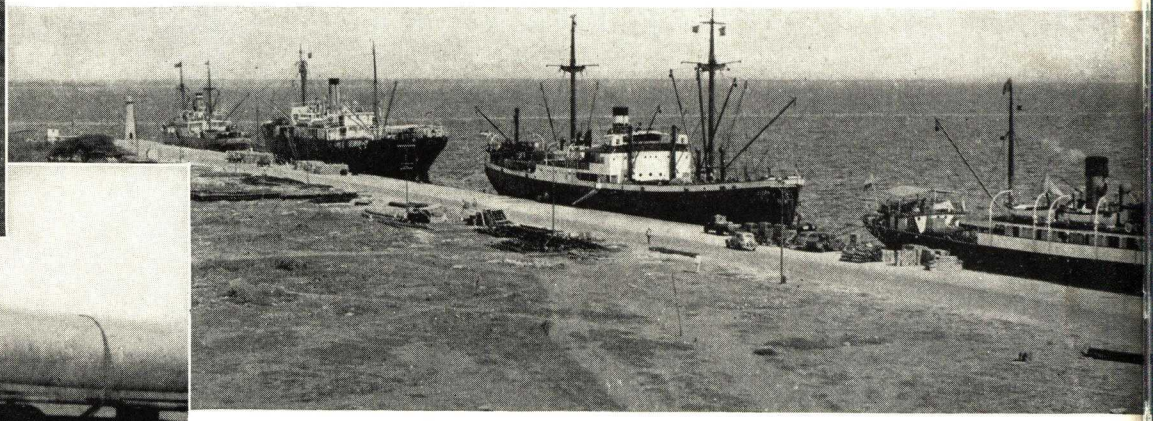
Below Right: PORT OF BUENAVENTURA, Republic of Colombia, S.A., showing reinforced concrete bulkhead 2376' long—four warehouses 150' x 292'—and newly made land comprising 47.6 acres. Depth of water alongside 32.8 at mean low tide—3412 PRECAST CONCRETE PILES ranging from 35 to 71' in length—work done for Colombian Government.

Above: COMPLETE HARBOR DEVELOPMENT at Puerto Cabello, Venezuela for Venezuelan Government.

SCADTA Copyright No. 11211

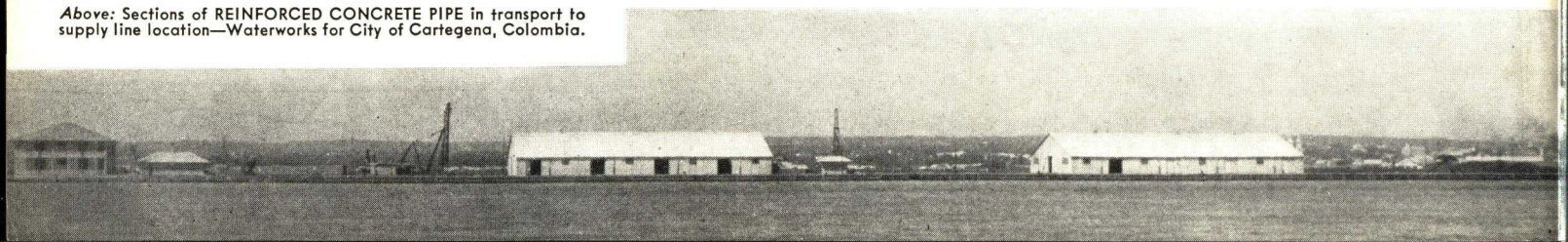
Below: Sections of 34" diameter REINFORCED CONCRETE PIPE used for supply line 45,500 ft. long, in connection with water works for the City of Maracaibo, Venezuela — Constructed by Lock Joint Pipe Company and Raymond Concrete Pile Company.

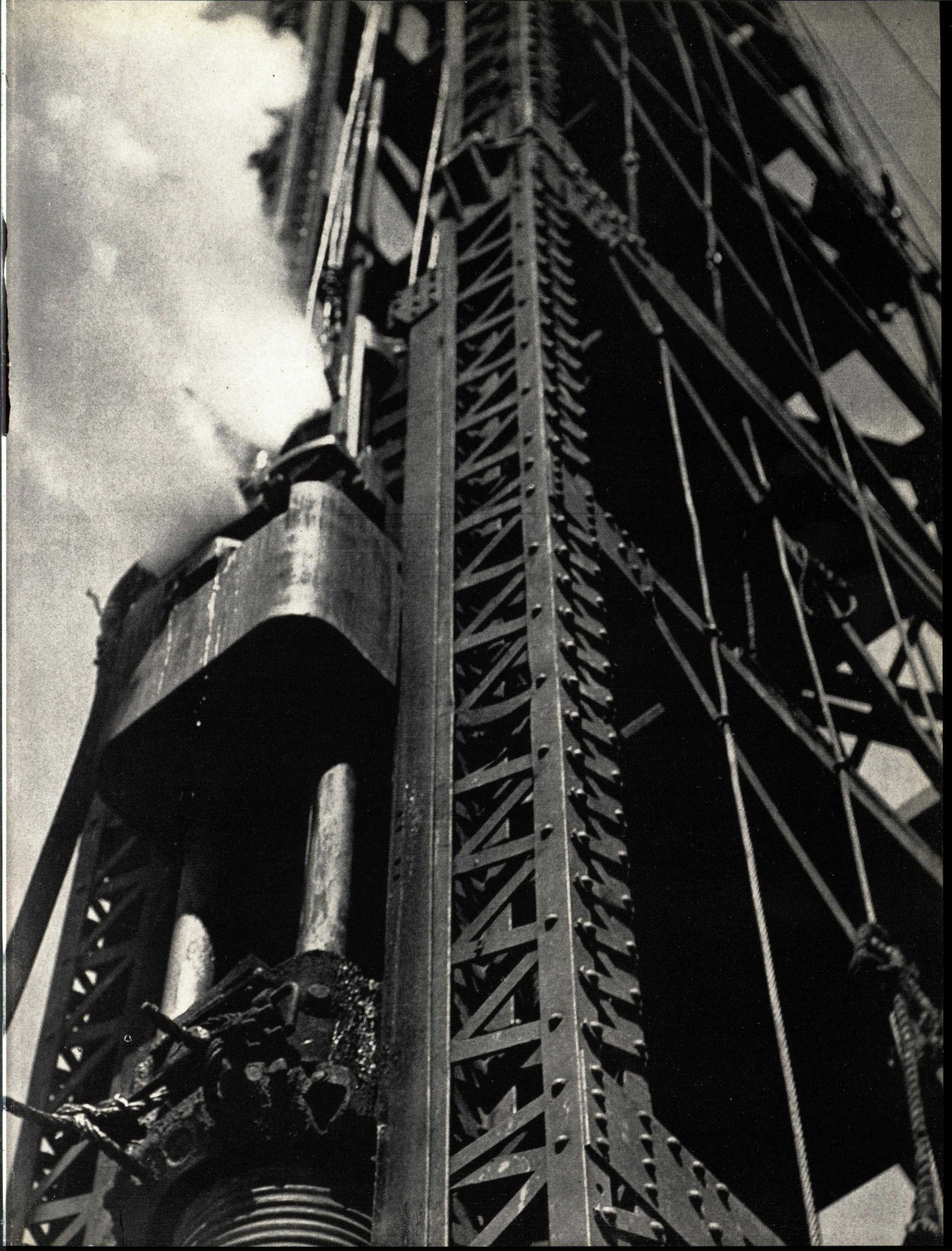
Below: DOCK AND BULKHEAD for Government of Venezuela at Maracaibo, comprising two legs at right angles, one leg 1680 feet and the other 1800 feet long. Forty-five acres of land thus reclaimed for warehouses and public buildings —Note Lighthouse at apex of triangle.



Above: Sections of REINFORCED CONCRETE PIPE in transport to supply line location—Waterworks for City of Cartegena, Colombia.

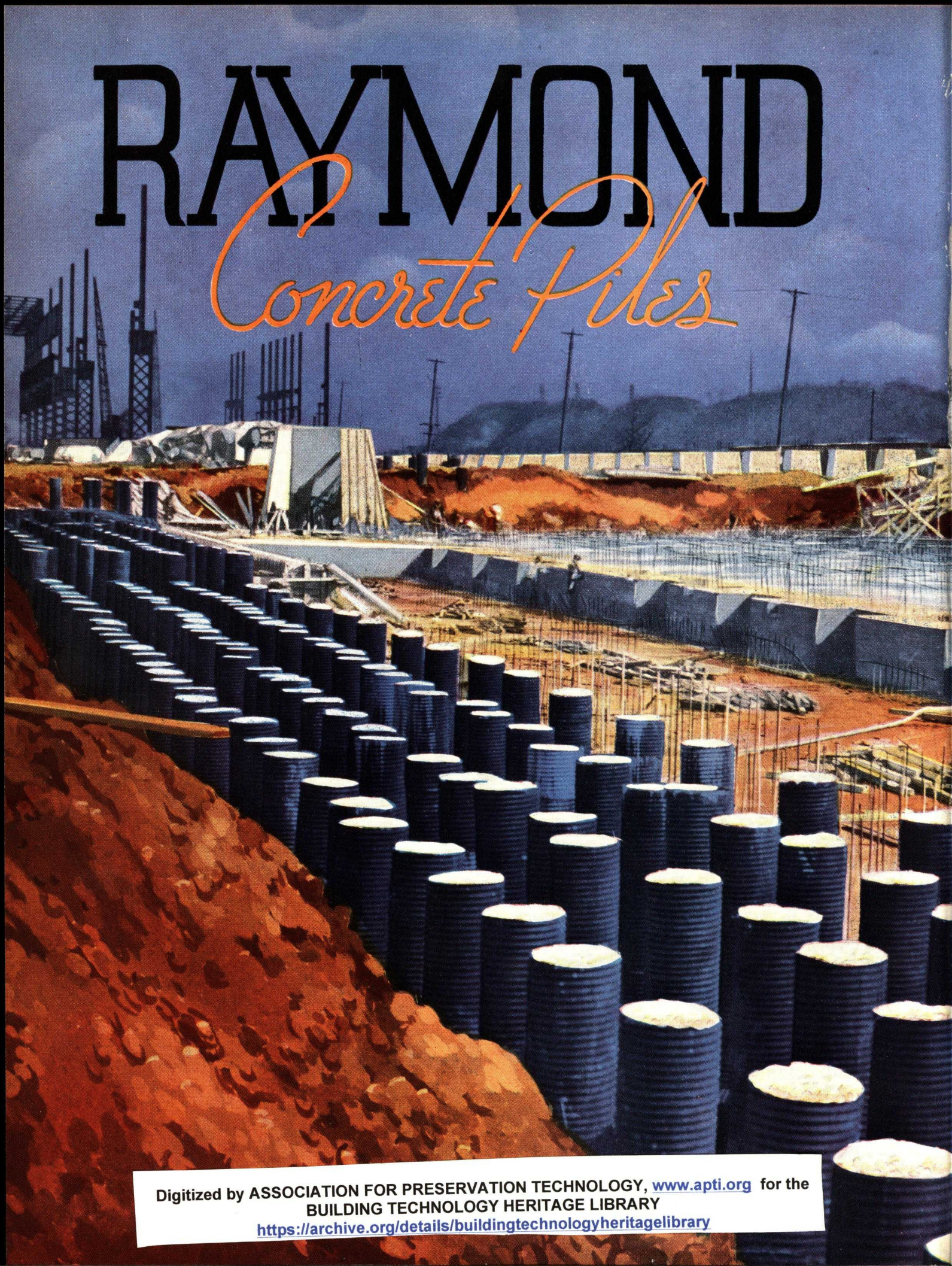
Below: REINFORCED CONCRETE PIER 984' long with warehouses and administration building, for City of Barranquilla, Colombia, 11 miles up Magdalena River from Caribbean Sea—Depth of water 32.8'—Work done for Colombian Government.





RAYMOND

Concrete Piles



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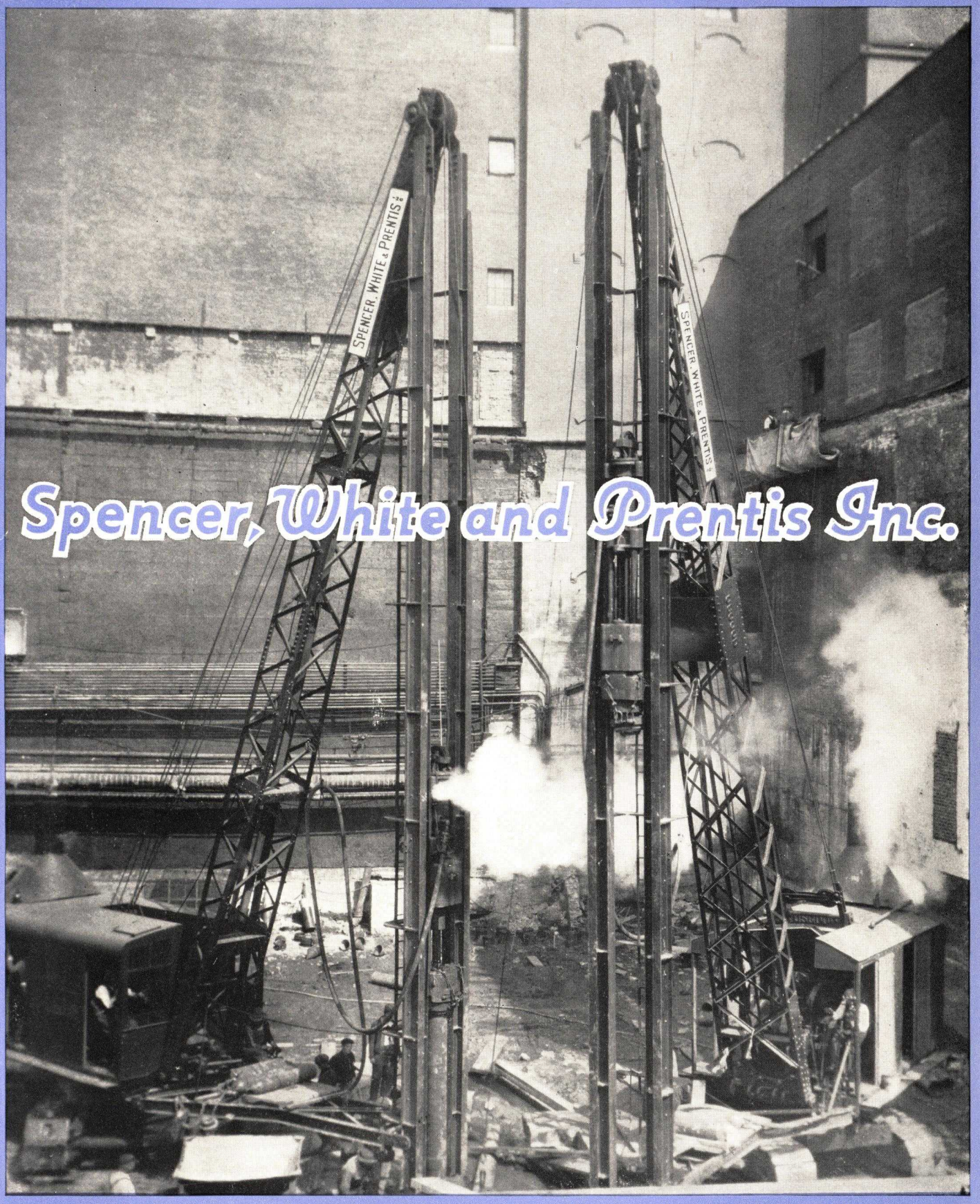
FOUNDATIONS



UNDERPINNING

SPENCER, WHITE AND PRENTIS, INC.

ENGINEERS AND CONTRACTORS

LAZARUS WHITE, PRESIDENT
CHARLES B. SPENCER, VICE PRESIDENT
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10 EAST 40TH STREET

NEW YORK

TELEPHONE: ASHLAND 4-0650

PILES
SHAFTS
TUNNELS
FOUNDATIONS
UNDERPINNING
STEEL AND CONCRETE CONSTRUCTION

A LETTER TO ARCHITECTS, ENGINEERS & CONTRACTORS CONCERNING FOUNDATIONS & UNDERPINNING

Gentlemen:

In presenting this catalog to you, we take great pride in quoting the late William A. Starrett, one of the world's great builders, in his introduction to "UNDERPINNING", by Prentis and White.

"Foundations have ever been the concern of mankind in the erection of its permanent structures. No structure has ever survived the destruction of its foundations unless they were replaced or strengthened. Such of them as have survived through the ages have done so primarily because of their foundations. It is interesting to reflect that this all-important subject received little attention as a science until the beginning of the present generation; men still living and active in engineering may be counted among the pioneers . . .

"Perhaps no group has done more to bring this refractory and baffling subject under scientific discipline than Charles B. Spencer, Edmund A. Prentis and Lazarus White. Skillful engineers that they are, they have put their knowledge to the most practical of tests by actually undertaking the projects then desired and contracting for their successful completion.

"Spencer, White and Prentis is a firm name that must be included in any category of the leaders in scientific design and construction of difficult foundations of our time. Their sound engineering knowledge is coupled with a practical ingenuity that commands the admiration of engineers everywhere."

If your problem is as special as reinforcing an existing foundation or as general as a subway, irrespective of the amount involved, you have the experience of a thousand installations at your service.

Yours very truly
SPENCER, WHITE & PRENTIS, INC.

By: Charles B. Spencer
Vice-President

Note: You will Find the Following S. W. & P. Products in this Catalog as Shown Below.

	PAGE
TUBA STEEL CYLINDER FOUNDATIONS	3-4
PRETEST UNDERPINNING	5-6
PRETEST FOUNDATIONS	7
PRETEST SOIL EVALUATION	7
CAISSON FOUNDATIONS	8
FOUNDATIONS UNDER EXISTING BUILDINGS	8
PRETEST METHOD APPLIED TO OTHER THAN FOUNDATION CONSTRUCTION	9
MASS CONCRETE CONSTRUCTION	10

SECTION OF THE NEW YORK CITY BUILDING CODE—*Covering Requirements for Concrete Filled Steel Piles* WILL BE FOUND ON PAGE 11

Tuba
STEEL CYLINDER FOUNDATIONS

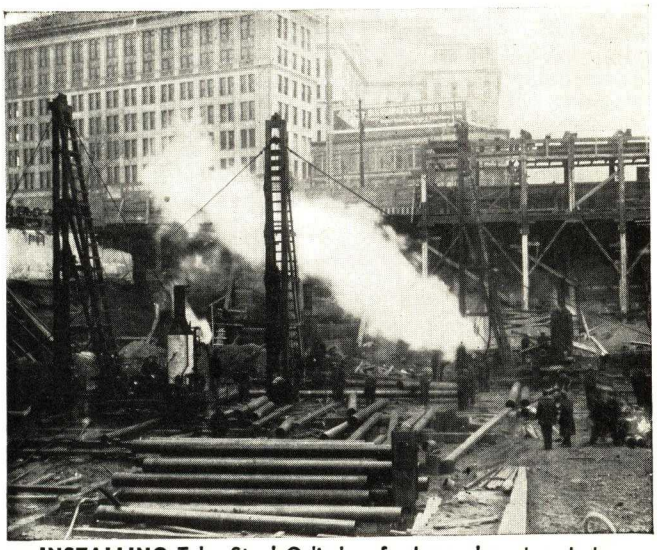
CONCRETE FILLED STEEL TUBES

Driven to Rock

TUBA STEEL CYLINDER FOUNDATIONS are composed of groups of concrete filled steel cylinders. Each cylinder consists of sections of lap-welded or seamless steel tubing driven to rock, excavated, filled with concrete, and cut off at the required elevation.

The tubing is driven through the overlying material to rock by means of steam or pneumatic hammers. Standard lengths of tubing are approximately twenty feet, and where the depth of rock necessitates the use of more than one length, the sections are joined together by tight fitting internal sleeve couplings.

A group of cylinders is installed for the support of each column or concentration of loading; or they may be uniformly spaced under a bearing wall.



INSTALLING Tuba Steel Cylinders for large department store at Newark, New Jersey

SAFETY, SPEED & ECONOMY

SAFETY.

TUBA STEEL CYLINDERS are concrete steel columns bearing on rock. The carrying capacity of the cylinders is derived almost entirely from end bearing, and not from "skin-friction". They are not therefore dependent upon the quality of overlying strata nor are they affected by future adjoining operations.

TUBA STEEL CYLINDER FOUNDATIONS are universally accepted as the equivalent in every respect of the usual open or pneumatic caissons.

Over a period of many years, many loading tests of TUBA STEEL CYLINDERS have been made. No appreciable settlements have ever been obtained, even though these tests were performed with loadings greatly in excess of those for which the cylinders are designed, and were invariably made on the empty shell before filling with concrete.

EXCAVATING Tuba Steel Cylinders by means of compressed air

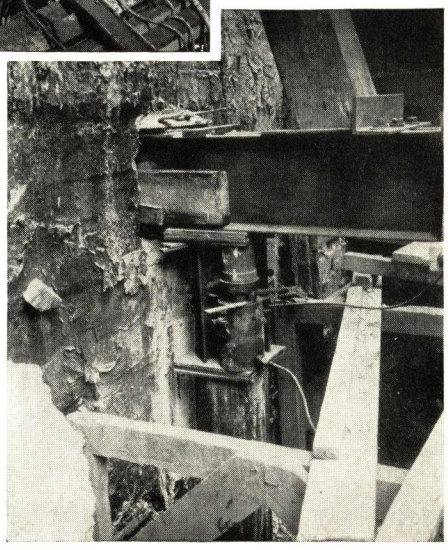
SPEED.

For depths of twenty to thirty feet, TUBA STEEL CYLINDERS afford a time saving over open caissons of approximately fifty per cent. For greater depths and adverse soil conditions the time saving is still greater.

ECONOMY.

Generally, TUBA STEEL CYLINDERS can be installed at much lower cost than piers to rock. For great depths and water conditions, the saving is considerable. As TUBA STEEL CYLINDERS can be driven close to adjacent structures, they eliminate the costly cantilever construction of exterior columns inherent to other types of foundations.

In the case of open piers, an extra depth of a few feet may as much as double the cost of the pier. The same extra depth in the case of a TUBA STEEL CYLINDER pier will increase the cost only in proportion to the depth, and in some cases even less. The use of TUBA STEEL CYLINDER FOUNDATIONS may, therefore, be regarded as insurance against greatly increased cost due to inaccurate or insufficient information as to the depth of rock.



TEST of Tuba Steel Cylinder using adjoining wall as reaction

TECHNICAL DATA, PERFORMANCE, INSTALLATIONS

DIAMETERS & THICKNESS OF TUBES. TUBA STEEL CYLINDERS are of steel tubing $10\frac{3}{4}$" to 20" outside diameter, $\frac{5}{16}$" to $\frac{5}{8}$" thick.

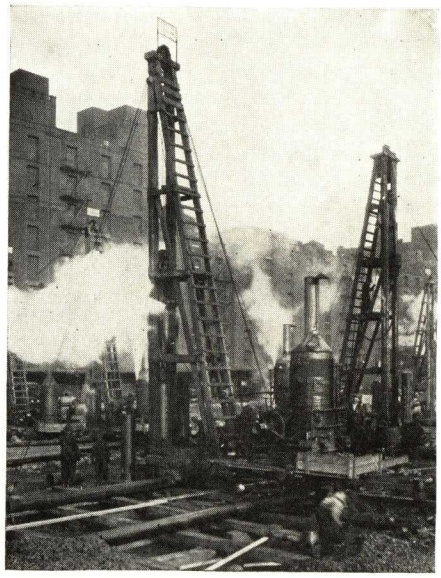
METHOD OF DRIVING. Cylinders are driven in one of three ways. They may be placed upright in wood frames which serve as guides, and driven by hammers placed upon them by derricks or cranes. They may be driven in "leads", portable self-contained units comprising guides, hammer and hoisting engine. Or they may be driven in "swinging leads", in which the guides and hammer are suspended from the boom of a crane.

Hammers are actuated by steam or compressed air, and are of the single-acting or double-acting type. In the former the steam or air raises the striking part of the hammer and the latter falls through the action of gravity alone. In the double-acting hammer the steam or air raises the striking part and is introduced into the cylinder on the down stroke as well, supplementing the action of gravity.

METHOD OF CLEANING. The material through which the cylinder is driven remains within the tube, and is removed to permit of inspection of the rock, and the filling of the tube with concrete. The material may be removed by hand tools or by the use of water or compressed air jets. The latter method is the most common, and consists of introducing within the cylinder a smaller pipe through the lower end of which compressed air is expelled. The air expands and rises rapidly, carrying with it the material within the cylinder. The smaller, or "blow" pipe is usually $2\frac{1}{2}$ inches in diameter, and the air pressure employed varies between 85 and 100 pounds.

DESIGN. A group of TUBA STEEL CYLINDERS is placed for the support of each concentration of loading. The size and number of cylinders in a group depend upon the load to be supported.

Installing Tuba Steel Cylinders inside of building for support of new floor, American Brass Co., Hastings, N. Y.



Tuba Steel Cylinders being installed for Starrett Lehigh Building, N. Y. C. Cylinders driven to rock at depths as great as 155 ft. below grade

COMPUTATION OF LOADS. (See New York City Building Code, page 11.) TUBA STEEL CYLINDERS are figured as unsupported columns. For convenience the old New York City Building Code provided a unit load of 500 pounds per square inch on the concrete, and 7500 pounds per square inch on the steel shell, the outside $\frac{1}{16}$" being discounted for corrosion. In the present Code, the values so obtained are slightly modified so as to give figures more convenient for use.

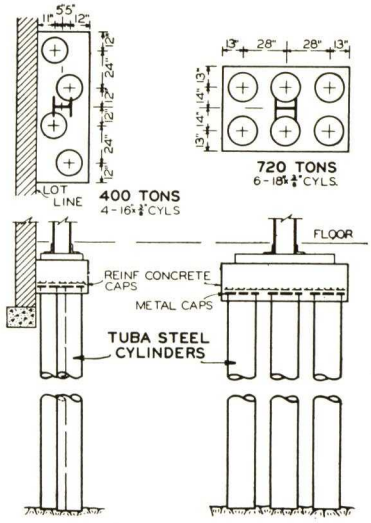
CORROSION. The deduction of the outside $\frac{1}{16}$" as stated above is to provide for possible loss of metal through rust or deterioration. Steel cylinders in the ground will rust to some extent, but the amount is negligible. The first rusting, or oxidation, produces iron oxide which permeates the ground immediately surrounding the cylinder to a distance of several inches. Ground so permeated, however, is impervious to water. Iron oxide, in fact, is the basis of a well known system of water-proofing, and is a base for paint used on metals to prevent corrosion. The first rusting creates a protective coating which prevents further deterioration of the metal. This has been proven by exposing cylinders which have been in the ground for over twenty-five years, carefully cleaning and calipering them. In no case has any cylinder shown a loss of more than $\frac{1}{64}$" of metal.

EFFECT OF TUBA STEEL CYLINDERS ON ADJOINING BUILDINGS. Due to uniform section, smooth surface, and the fact that no material is displaced, vibration is reduced to an absolute minimum. The underpinning and shoring of adjoining buildings necessitated by the use of open piers for exterior columns may be entirely eliminated by the use of TUBA STEEL CYLINDERS. The vibration caused by the driving of such cylinders is less than that resulting from the driving of sheeting for open piers, and far less than for any other type of pile.

FLEXIBILITY. There is no limit to the length of TUBA STEEL CYLINDERS, as is the case of concrete piles. They have been driven to depths as great as 155 feet. TUBA STEEL CYLINDERS can be installed inside of existing buildings, and in limited headroom conditions where other types of foundations cannot be used. For such installations shorter sections of tubing are used, and connected together by internal sleeve couplings. Numerous machinery foundations have been so installed, and under similar conditions TUBA STEEL CYLINDERS have been driven to depths as great as 90 feet for the support of floors in manufacturing buildings.

WHEN NOT DRIVEN TO ROCK. Desirable as it is to carry foundations to rock, it is often the case that the depth to rock is so great as to render rock bearing piles impracticable. In such cases, piles similar to the above may be driven into a stratum of sand, gravel or other firm bearing material. Such piles are driven with their ends closed by means of cast steel or cast iron points. The shell is filled with concrete and the resulting pile, though ordinarily figured at the usual concrete pile load of 30 tons, has many advantages over ordinary concrete piles. Their carrying capacity is derived almost entirely from end-bearing so that they are not affected by movements in the upper strata, nor by adjoining operations in the future. The use of the heavy steel shells which are left in place permits penetration through heavy obstructions and provides a factor of safety not present in other types of piling.

STRUCTURES SUPPORTED ON TUBA STEEL CYLINDERS. More than five hundred structures throughout this country, from two to forty-five stories in height, are supported on TUBA STEEL CYLINDERS. Some of these are listed on Page 10.



Typical Designs
Tuba Steel Cylinder Foundations

Pretest UNDERPINNING

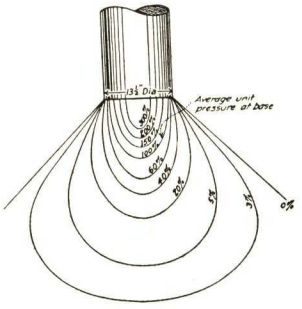
PRETEST UNDERPINNING is the highest development of the underpinning art, and is based upon recently established principles of Soil Mechanics. As it alone employes these principles, it is the system of underpinning which reduces settlement to an absolute minimum.

PRETEST UNDERPINNING is employed to provide new and deeper foundations for existing structures; to arrest the settlement of structures whose foundations have proven inadequate; and to increase the capacity of existing foundations to which loads are to be added. PRETEST UNDERPINNING is applicable to every type of structure and to nearly every ground condition. It entails the least interference with full use of the structure, and the least obstruction to adjoining property and streets during installation.

PRINCIPLES underlying the PRETEST METHOD. When jacked down under a test load, an underpinning cylinder (or other footing) builds up beneath it a resistance which prevents further penetration. Investigations have shown that this resistance is created by the interlocking and compacting of the grains of the bearing material. This distribution of pressure takes the form of the so-called "Bulb of Pressure".

As long as the load is maintained on the cylinder, the "Bulb of Pressure" is maintained. If the load is released, however, the "bulb" is partly, if not wholly destroyed. If the load is reapplied, and the cylinder again forced down, an equivalent "bulb" or resistance will again be created, but at some depth below that at which the original bulb occurred. That is, the cylinder must be forced to some greater depth in order to re-compact the material sufficiently to obtain the original carrying capacity. Results of repeated tests confirm that rebound follows each release of load, and that equal resistance under reloading is found only at greater depth.

If the jacks are removed after the cylinder has been tested to the required loading, rebound will occur. It is not possible through the medium of a wedging beam and steel wedges to re-apply to the cylinder the test load. This can only be obtained when the cylinder has penetrated to some depth greater than that at which it was originally tested. As such penetration is caused by the load of the structure being applied to the cylinder by the wedging beam, it must be accompanied by a settlement of the structure equal in amount to that of the additional penetration required.

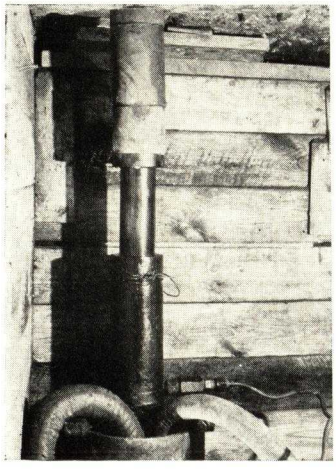


Distribution of pressures through soil beneath a footing as determined experimentally — known the "Bulb of Pressure."

THE PRETEST METHOD. Sectional steel cylinders are jacked down beneath the foundations of a structure to a satisfactory bearing material, after which they are cleaned out, and filled with concrete. Each cylinder is then tested to an overload capacity, usually 50% in excess of the permanent load. While the full test pressure is maintained on the jacks, a short steel column is placed on top of the cylinder, and the load of the footing is permanently transferred to the underpinning cylinder by means of steel wedges. The cylinder is prevented from rebounding and destroying the "bulb-of-pressure" which has been created beneath it.

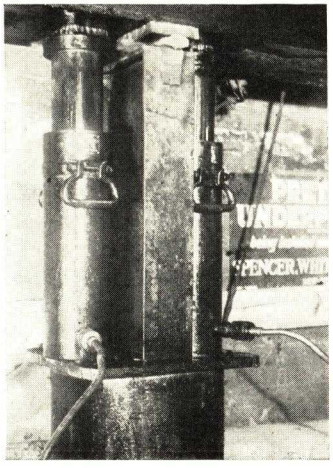
The essential difference between PRETEST UNDERPINNING and other methods is that in PRETEST UNDERPINNING the transfer of the load from the foundation to the underpinning cylinder is done with the full test load maintained on the cylinder by the jacks. There is no release of load while the wedging is being done. This method of transferring the load is the PRETEST feature which eliminates the damaging settlement inherent to other methods.

GROUP TESTING (Patented). When Pretest Cylinders are, of necessity, installed so close together that their "Bulbs-of-Pressure" overlap, it is customary to test and wedge them in groups in addition to testing them singly. This GROUP TESTING removes the possibility of overloading the cylinders and of releasing a portion of the load on any cylinder by subsequent installation of an adjacent one.

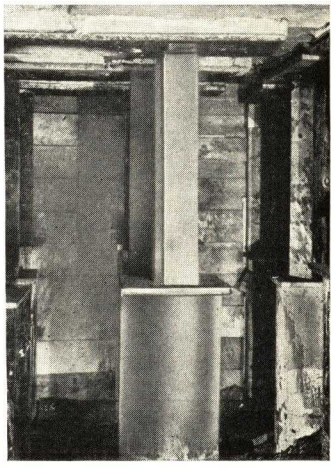


1 Jacking a sectional steel cylinder in a pit beneath a foundation. In this case a water jet and a pump suction remove the material from within the cylinder.

2 Testing the bearing capacity of a cylinder after it has been jacked to firm bearing, excavated, and filled with concrete.



3 With the full test pressure maintained on the jacks, a steel "wedging-beam" is inserted, and steel wedges driven between the beam and the steel plate under the foundation.

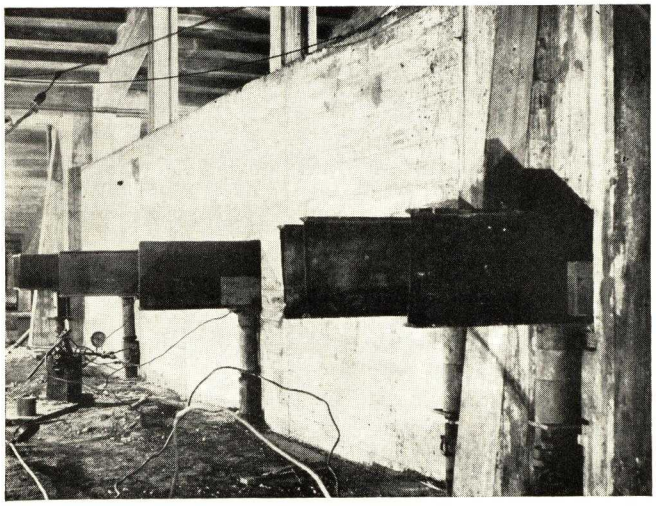


4 The jacks are removed, leaving a completed Pretest cylinder.

PRETESTING SPREAD FOOTINGS. The PRETEST principle is also employed to increase the carrying capacity of spread footings. It is the most economical method of arresting the settlement of structures whose spread footings have proven inadequate, and of providing for increased loadings on footings which already carry full loads.

In order to PRETEST a spread footing, the wall or column which it supports is needled, and hydraulic jacks are set between the needles and the footing. If the footing supports a wall, the needles consist of beams placed through the wall; if the footing supports a steel column, the needles consist of structural steel brackets bolted or riveted to the column section.

With the wall or column above serving as a reaction, the footing is jacked down until there is obtained a resistance sufficient to support the permanent load. If the necessary reaction can be obtained without damage to the structure, it is customary to jack to a

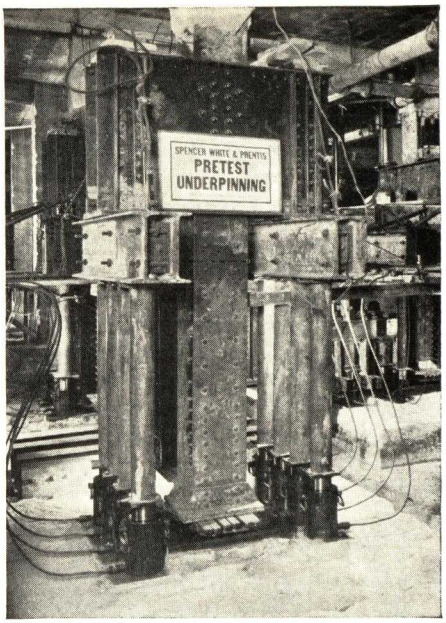


Pretesting spread footing beneath wall of Yankee Stadium, N. Y. C.

loading in excess of the permanent load. The jacking pressure is maintained for a sufficient time to insure against further depression of the footing. While the full test pressure is maintained on the jacks, steel wedges and shims are driven between the base of the wall or column, and the footing, by the PRETEST METHOD. It is essential that the wedging between the footing and the load it supports be done by the PRETEST METHOD. Only by this method is the "bulb-of-pressure" maintained, and the success of the operation assured.

When the footings occupy almost the entire area of the site, or are at water level, the conditions may be such that PRETESTING the spread footings themselves is not sufficient. In such cases it is possible to secure greater bearing capacity by a combination of PRETEST UNDERPINNING and PRETESTING of the footings. The practice then is to install permanent needles, riveted to steel columns or passed through walls; beneath these needles underpinning cylinders are placed in sufficient numbers to provide the additional carrying capacity, and tested and wedged by the PRETEST METHOD; the spread footings are then PRETESTED in the usual manner.

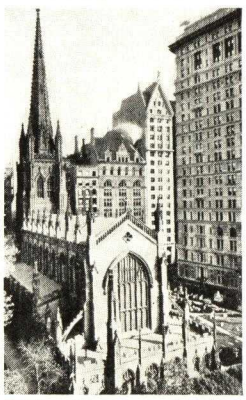
In some instances such as where boulder fill deposited in soft ground, or similar conditions make spread footings the only economical foundations, but with the probability of unequal settlements, the foundations are designed in advance for future PRETESTING. Brackets are provided on columns or niches are left in concrete walls for the installation of beams, so that they can be needled at minimum cost. Where settlement occurs, the footings are jacked down against the needles, and wedged by the PRETEST METHOD. This construction has proven to be very economical, and has saved considerable time in construction.



Pretesting a spread footing under a column loading of 400 tons.

U. S. Sub-Treasury Building, Wall St., N. Y. C.

National Bank of Commerce, N. Y. C.



Trinity Church, Broadway, N. Y. C.

INSTALLATIONS. PRETEST underpinning has been installed under hundreds of structures, including buildings up to 28 stories in height, bridge piers, retaining walls, chimneys, elevated railway columns, etc. Single column loads have run as high as 1300 tons. Bearing materials have included sand and clay mixtures, sand, gravel, hardpan and rock. In some cases cylinders have penetrated to depths as great as 90 feet. They have frequently penetrated through quicksand and other unstable materials, and in most cases through water bearing ground.

UNDERPINNING of STRUCTURES on WOOD PILES. Settlements of structures founded on wood piles are usually due to (1) Deterioration of the upper portions of the piles due to a recession of the permanent ground water level, (2) Reduction of the cross-sectional area of the piles due to the action of marine borers, (3) Failure to drive piles to a proper penetration when originally installed. For the first condition stated above

the pile is cut off at the permanent ground water level or a short distance below same, PRETESTED against the footing above, and the upper portion replaced by a steel I beam section. For the second condition the affected portion of the pile is removed, and the pile PRETESTED and finished as above. For the third condition, the top of the pile is removed for a length sufficient to permit the installation of the jacks, and the pile driven hydraulically by using the footing above as a reaction; when proper penetration has been obtained the top of the pile is replaced by a steel I beam section PRETESTED in place.

Installations of this type:

Jackson Laboratory, E. I. du Pont de Nemours & Co., Deep Water Point, N. J.

Beards Erie Basin, Brooklyn, N. Y.

The PRETEST principle, first developed for underpinning, has been adapted to the construction of new foundations. Where ground conditions are suitable, PRETEST FOUNDATIONS will result in a saving in both cost and time.

PRETEST FOUNDATIONS are installed by setting up short sections of cylinders in pits or trenches at the locations of the designed foundations. The cylinders are concreted and temporary short wood posts placed upon them. Concrete footings are then constructed, bearing on the blocking and on the earth at either side of the pits. The erection of the building is then begun.

When the erection of the building has proceeded to a height sufficient to provide a reaction equal to the designed load on a single cylinder, one of the cylinders in each group is jacked to firm bearing, tested, and permanently wedged against the footing.

As additional building load is applied Pretesting keeps pace with erection, until at completion the building is supported on a foundation, each unit of which has been tested to an overload capacity.

One of the distinct advantages of PRETEST FOUNDATIONS over foundations of other types is in the saving in time effected. The erection of the building itself begins practically at the same time as that of the foundations, thus saving the time usually spent in foundation work. Another advantage of this system is the fact that every unit of the foundation is actually tested for the load it is designed to support, a condition that obtains in no other type of foundation. Since the carrying capacity of each cylinder is demonstrated by actual test, the cylinders are forced down only to the depth required to secure the necessary support, instead of being driven to a predetermined depth which may be greater or less than that actually required.

PRETEST FOUNDATIONS are the only foundations in which every unit is completely tested before being used to support the structure. Spread footing and friction pile foundations are designed on the assumption that the material throughout the site is of uniform bearing value, and this bearing value is usually assumed arbitrarily. In PRETEST FOUNDATIONS whatever the assumption as to soil values, the cylinders will penetrate to whatever depth may be required to secure the test load.

PRETEST FOUNDATIONS have the full approval of the building departments of New York and other prominent cities, as well as that of leading engineers and architects.

Some notable PRETEST FOUNDATIONS:

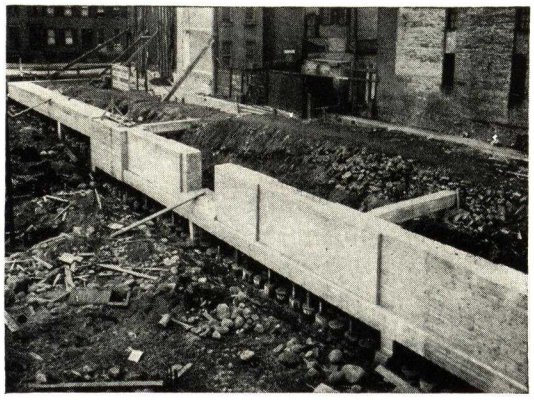
Office Building (22 stories) 110 William St., New York City.

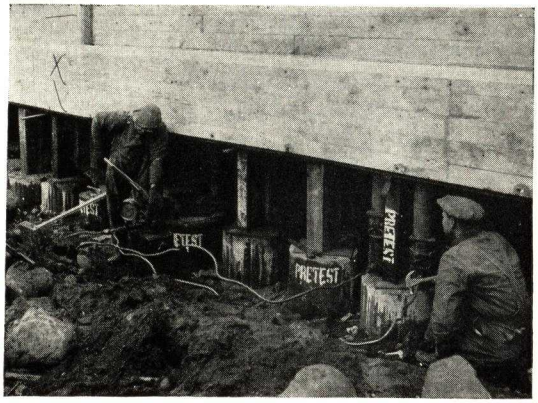
Hide & Leather Building (18 stories) Gold & Frankfort Sts., New York City.

N. Y. Edison Company Station, East 6th St., New York City.

American News Co. (12 stories) Varick St., New York City.

PRETEST SOIL EVALUATION. A PRETEST Soil Evaluation is the most accurate and economical means of determining the bearing value of a soil. A reaction is obtained, whenever possible, under an existing wall, or under beams placed between footings, walls or columns of an existing adjacent structure. When this cannot be done, reaction is obtained against the sides of a sheeted pit or trench, or a loaded platform. A steel plate of the required area placed beneath concrete or wood blocking is forced down by hydraulic jacks against this reaction.





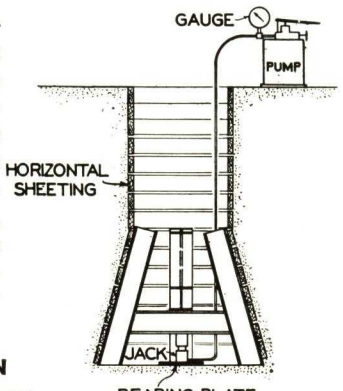
AT FARTHEST LEFT
Pretest Foundation, American News Building, N.Y.C.

AT LEFT
Installing Pretest Foundations.

By applying successively increasing loads and noting the settlement at each increment, a settlement curve can be plotted; this curve will indicate clearly the supporting power of the soil. By the use of a power pump and hydraulic accumulator an absolutely uniform pressure can be maintained for as long a period of time as desired. Tests have been run for several weeks with continuing settlement.

At any time a desired loading can be maintained for 24 or 48 hours or longer, by wedging between the test blocks and the reaction. Such wedging is performed by the PRETEST METHOD.

In a Pretest Soil Evaluation the loads are known exactly, successively increasing loads can be applied in a few minutes, the complete test performed in the presence of all interested parties in a short time, and any specified load can be left in place for any desired period of time at very low cost.



PRETEST SOIL EVALUATION
Test made at level of proposed new footings

CAISSON FOUNDATIONS

Spencer, White & Prentis and affiliated companies have installed many caisson foundations, including one of the deepest building foundations in the world, and are equipped to do both pneumatic and open caisson work.

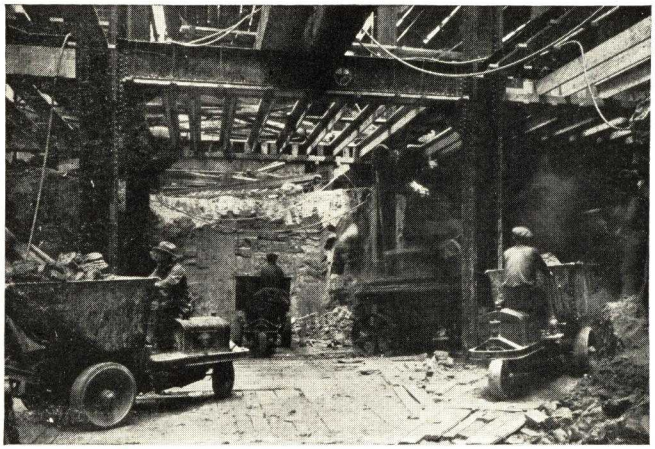
These companies have developed improved methods for installing caisson foundations, resulting in reductions in both cost and time required for installation. Under many conditions these newer methods permit the use of open caissons in place of the more expensive pneumatic type.

Some of the caisson foundations installed are:
Central Savings Bank, New York City
21 West Street Building, New York City
American Radiator Co., New York City
Gordon Baking Co., Long Island City. N. Y.
Fidelity Phila. Trust Co., Phila., Pa.
Cleveland Union Terminal, Cleveland, Ohio
City Hall, Buffalo, N. Y.

FOUNDATIONS UNDER EXISTING BUILDINGS. To save time in construction, Spencer, White & Prentis have developed methods for installing new building foundations prior to or during the demolition of existing buildings on the site. Time so saved has run from four to six months on large operations.

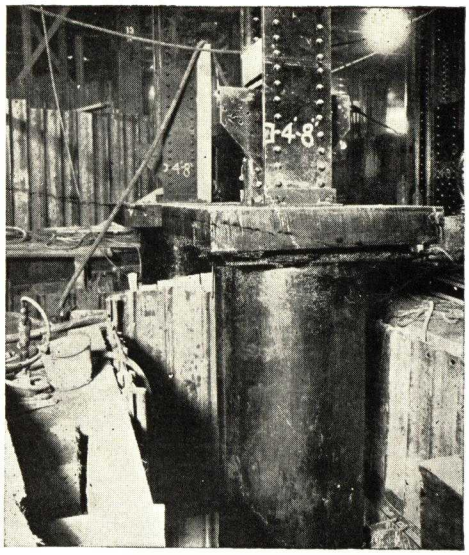
In the case of the Bank of Manhattan Building in New York City, foundations were installed during the demolition of an existing 13 story building. The three months saved in the foundations enabled the builder to complete the building within eleven months of the date of taking over the site. In the case of the Abraham & Straus Department Store, time restrictions were even more severe. Except at a heavy financial loss to the owner, the store could be abandoned only from January to October. The problem was solved by installing the piers one at a time working in partitioned off portions of the selling basement. The excavation of the forty foot cellar was carried on simultaneously with the erection of the new store.

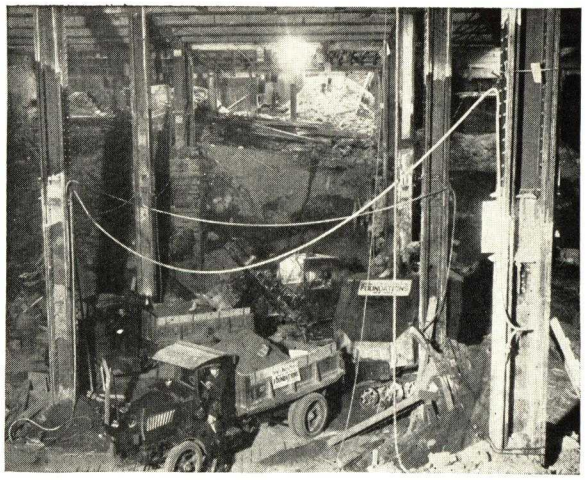
In many cases TUBA Steel Cylinders, caissons, PRETEST Cylinders, or spread footings can be installed in the basements of the old buildings on the site. When necessary, due to lack of space or time, temporary footings sufficient in area to support only a part of the ultimate load are installed, and are increased in size later. Steel erection is started immediately upon completion of the demolition. After the steelwork is under way, the general excavation and incidental work are done, and the temporary foundations increased to their permanent size.



Excavation of cellar by means of electric shovels as steel is erected. Hudson Department Store, Detroit, Michigan

Column of 70 story Bank of Manhattan Building, N. Y. C. supported on 4 foot cylinder installed during demolition. Final pier under construction simultaneously with steel erection.

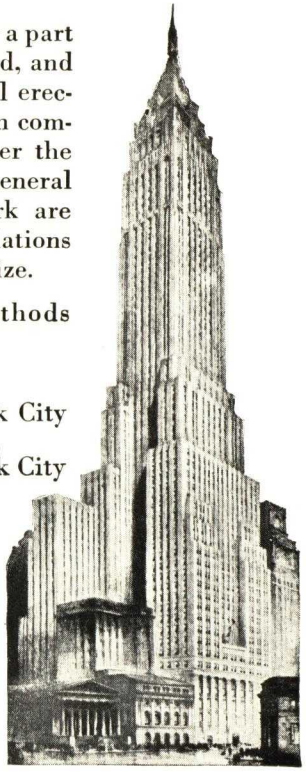




Excavating for basement after erection of steel. A. & S. Department Store, Brooklyn, N. Y.

Buildings where these methods were used include:

American Surety Co., New York City
Bank of Manhattan Building, New York City
Wanamaker Store New York City
A. & S. Department Store Brooklyn, New York
The J. L. Hudson Co. Detroit, Michigan

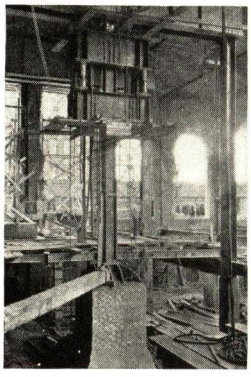


Caisson Foundations installed during demolition of old building, Bank of Manhattan Building, N. Y. C.

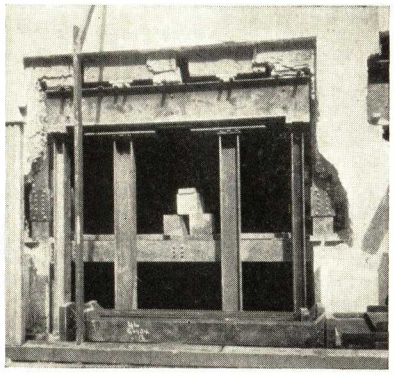
THE PRETEST METHOD APPLIED TO CONSTRUCTION OTHER THAN FOUNDATIONS. The scientific principles underlying the PRETEST METHOD have been applied to features of construction other than foundations.

Structural steel members such as beams, girders, or columns, are often installed within an existing building in order to relieve other structural members of their loading, or to permit of their removal; beams and girders will deflect upon the transfer to them of such loading, and columns will be subject to shortening because of their elastic deformation under compression. Such deflection or shortening may result in serious cracking of the superstructure, unless the transfer of the loading is made while the new members are in a pre-stressed state. This is accomplished by the PRETEST METHOD.

In the Onondaga Savings Bank, in Syracuse, N. Y., the construction of a banking room on the first floor necessitated the removal of the lower portions of several interior columns of the existing nine story building. It was planned to carry these columns above the second floor on girders spanning between adjacent columns on either side. The engineers figured that the transfer of these column loadings to the girders in an unstressed state would cause a deflection of ¾". All areas supported by these columns would settle accordingly, floors and walls would crack, and mechanical equipment would be seriously damaged. It was necessary therefore that each girder be deflected ¾" before the transfer of the load. Brackets were attached to the column, and by jacking between the girder and these brackets, the proper deflection was applied and held by the PRETEST METHOD until the connection between the column and the girder was completed.



Deflecting girders by the Pretest Method at Onondaga Savings Bank, Syracuse, N. Y. The lower brackets are attached to the girders, the upper brackets to the column, with the hydraulic equipment between.



Installation of store fronts by original shoring method, at 400 Park Avenue N. Y. C. The two center columns shown are temporary.

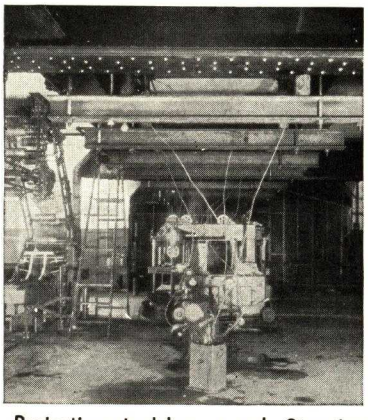
The alteration of the twelve story apartment at 400 Park Ave., New York City, to provide ground floor stores, required the development of an original method of shoring. Two conditions seriously complicated this problem; the building walls are self-supporting, 24" thick at the first floor, faced with limestone, and carry a load of twelve tons per linear foot at street level; secondly, the New York Central Railroad cut under Park Ave. is only two feet from the face of the building in which the store fronts were to be placed, and no loading from shores could be placed upon the roof over it. All supports and shores had to be confined within the limits of the wall itself. The special method of performing this work as devised by the engineers of Spencer, White & Prentis proved successful, and the new steel frame work installed and PRETESTED without a crack developing in the structure.

The printing plant of the News Syndicate, in Brooklyn, N. Y., is an extremely heavy structure of reinforced concrete. The flat slab of the second floor is 24" thick, and serves to support printing presses. The presses originally installed were removed after being in operation several years, and replaced by more modern and much heavier units. The floor slab was deemed incapable of supporting the new loadings, and it was decided to support the new presses on a system of structural steel beams and girders immediately beneath the second floor slab, the slab itself serving merely as a medium to transmit the loads of the presses to the new steel system below. The normal deflection of the steel would have damaged the delicate machinery so that prestressing of the steel was necessary. This transfer of loading was successfully accomplished by PRETESTING the beams and girders as the new presses were erected; the actual stresses in these members were verified by strain gauge readings.

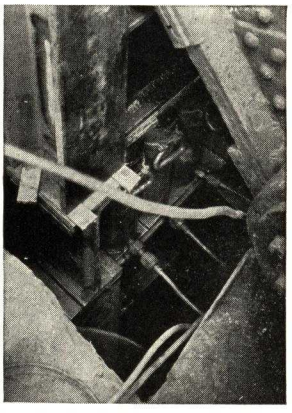
An investigation of the conditions of the Stratford Avenue Bridge, in Bridgeport, Conn., disclosed the fact that deterioration of certain of the truss members was such as to warrant the immediate closing of the structure to traffic. The end posts, particularly, had to be reinforced by adding to them additional structural members. The existing members being under compression, it was necessary to produce in the sections to be added an equivalent compressive stress before the connection was made. This was done by the use of hydraulic equipment, and the new sections PRETESTED before the welding of same to the orginal members.

PRETEST REINFORCEMENT OF RETAINING WALLS. Where lateral support is required as well as additional carrying capacity, inclined PRETEST CYLINDERS are installed. The illustration on the back cover is of a retaining wall at Douglaston, Long Island, so supported. The wall moved laterally, bulged approximately one foot, and cracked. The condition of the wall precluded any work beneath same, and as lateral stability was of greater moment than vertical support, the PRETEST CYLINDERS were placed as shown. The concrete grillage shown reinforced the wall, and served to carry same between the points of support.

The successful solution of unusual and difficult problems is assured by our extensive experience in this class of work, the application of scientific principles, and the personal attention given by the members of this corporation to every job, large or small.

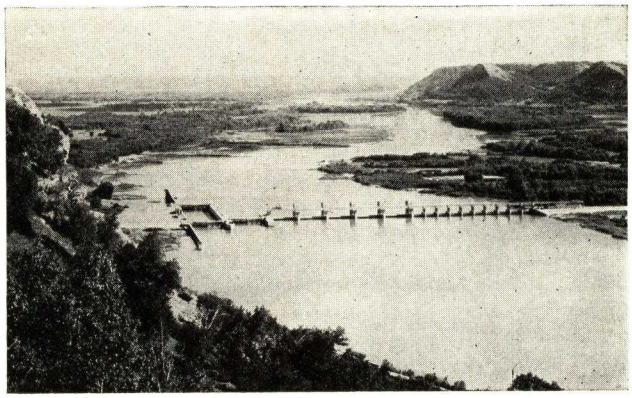


Pretesting steel beams and girders, News Syndicate Building, Brooklyn, N. Y. C.



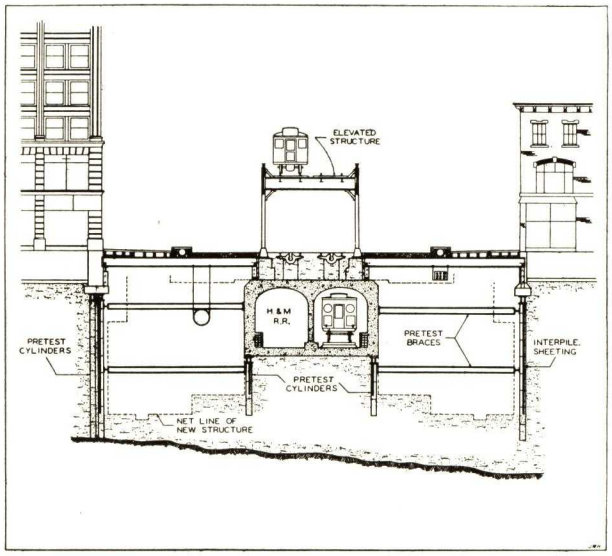
Stressing column reinforcing sections before welding same to original member, Stratford Ave. Bridge, Bridgeport, Conn.

MASS CONCRETE CONSTRUCTION



Lock and Dam No. 6 over Mississippi at Trempealeau, Wis.

SPENCER, WHITE & PRENTIS, INC., are organized and equipped to install heavy concrete structures such as bridge piers, locks and dams, viaducts, retaining walls, etc. Recent installations on the Mississippi River include Lock and Dam No. 6, at Trempealeau, Wisconsin, and Lock No. 3 at Red Wing, Minnesota, for the Corps of Engineers, U. S. Army.



This corporation is at present constructing a section of the new Sixth Avenue subway from 8th to 18th Streets, New York City, a work of outstanding difficulty. A few other S, W & P jobs are listed below.

Wall & Hanover Building, New York City, N. Y.
Starrett Lehigh Building, New York City, N. Y.
19 Rector St., New York City, N. Y.
12 Sub-stations—N. Y. Edison Co., New York City, N. Y.
N. Y. Steam Corp., New York City, N. Y.
F&M Schaefer Brewing Co., Brooklyn, N. Y.
Dime Savings Bank, Brooklyn, N. Y.
E. R. Squibb & Sons, Brooklyn, N. Y.
Gordon Baking Co., Long Island City, N. Y.
Yonkers Telephone Co., Yonkers, N. Y.
Universal Atlas Cement Co., Hudson, N. Y.
Ricketts Laboratory, R.P.I., Troy, N. Y.
Brockport Central High School, Brockport, N. Y.
Stamford Gas & Electric Co., Stamford, Conn.
D. M. Read Department Store, Bridgeport, Conn.
National Newark & Essex Building, Newark, N. J.
Salaam Temple, Newark, N. J.
Industrial Trust Co., Providence, R. I.
First National Bank Bldg., Tampa, Florida
Peninsular Telephone Bldg., Tampa, Florida

SERVICES. SPENCER, WHITE & PRENTIS, INC., are prepared to consult with architects, engineers and owners on their foundation and underpinning problems, to submit designs, and to install foundations, underpinning, and mass concrete construction.

NEW YORK CITY BUILDING CODE

Adopted July 20, 1937

8. 3. 2. 6 CONCRETE FILLED STEEL PILES

8. 3. 2. 6. 1 General Requirements for Concrete Filled Steel Piles. Piles consisting of concrete filled steel tubes shall have a minimum inside diameter of 10 inches and a shell thickness of at least $\frac{3}{8}$ of an inch (except that 10 and 12 inch piles may have a shell thickness of $\frac{5}{16}$ of an inch). The concrete filling shall be at least equal to average concrete as specified in *7.4.3.3, Average Concrete: Proportions and Allowable Working Stresses.* The ends of each tube shall be perpendicular to its axis, and all bearing surfaces shall be smooth and true-cut by an approved method. Splices shall be of such material and design as to insure good alignment of tubes. If splices below the upper splice are closer together than 20 feet a 5 per cent reduction in load values shall be made for each additional splice used.

Where the borings indicate that piles will be less than 60 feet in length, the minimum designed outside diameter of the tube shall be at least 1/40 of the length. If as actually driven, such piles exceed 40 diameters in length a one per cent reduction in load shall be made for each diameter of excess length. Where borings indicate that the piles will be 60 feet or more in length, the minimum diameter shall be 18 inches and the minimum shell thickness shall be $\frac{1}{2}$ inch, and no reduction from the allowable loading need be made for slenderness ratio.

After driving, the inside of the tube shall be cleaned of any foreign matter before placing the concrete filling. When tubes exceed 50 diameters in length the concrete in the tube below the upper 50 diameters shall be deposited with a tremie or fully lowered bottom-dump bucket. The concrete filling shall never be placed through water (except on specific written approval of the Superintendent after submission of the detailed method of procedure).

8. 3. 2. 6. 2 Concrete Filled Steel Piles Driven to Rock. When driven open-ended to refusal on bed rock the following maximum loads per pile may be used.

10-inch inside diam. pipe.....55 tons	16-inch outside diam. pipe.....100 tons
12-inch inside diam. pipe.....70 tons	18-inch outside diam. pipe.....120 tons
14-inch outside diam. pipe.....80 tons	20-inch outside diam. pipe.....140 tons
15-inch outside diam. pipe.....90 tons	22-inch outside diam. pipe.....150 tons

These unit values are based on the use of a shell $\frac{3}{8}$ of an inch thick. For each increase of $\frac{1}{16}$ inch in shell thickness an increased capacity of 10 per cent of the base value may be used, with a maximum increase from the above table of 20 per cent when piles are less than 60 feet in length and 10 per cent when 60 feet or over. A reduction of 10 per cent from the base value shall be made when $\frac{5}{16}$ inch shells are used. Piles 20 inches and more in diameter shall be filled with Class "B" concrete according to *7.4.3.3, Average Concrete: Proportions and Allowable Working Stresses.*

Concrete filled steel piles more than 22 inches in diameter shall be considered as reinforced concrete piers (except that the presumptive bearing capacity of the bed rock shall be limited to 60 tons per square foot gross area of tube).

The center to center spacing of tubes when driven to bed rock shall be at least 2 feet, and at least the diameter of the tube plus 10 inches.

8. 3. 2. 6. 3 Concrete Filled Steel Piles Driven to Hard Pan. When driven open-ended to refusal in cemented hard pan continuous to bed rock the following maximum unit loads may be used: 70 per cent of the base value allowed in *8.3.2.6.2, Concrete Filled Steel Piles Driven to Rock;* with a maximum for any pile of 70 tons. Piles so used shall be spaced at least 30 inches from center to center.

8. 3. 2. 6. 4 Concrete Filled Steel Piles Driven to Boulders or a Mixture of Gravel and Boulders. When driven open-ended to refusal in boulders or a mixture of gravel and boulders with no softer material underlying, the following maximum unit loads may be used: 50 per cent. of the base value allowed in *8.3.2.6.2, Concrete Filled Steel Piles Driven to Rock,* with a maximum for any pile of 50 tons. Piles so used shall be spaced at least 20 inches plus the diameter of the tube.

8. 3. 2. 6. 5 Driving Concrete Filled Steel Piles to Refusal. Refusal in connection with the driving of concrete filled steel piles shall mean inability to drive a pile further under a hammer of approved adequate weight after the tube has been completely washed and blown out at the bottom, and before filling with concrete.

8. 3. 2. 6. 6 Concrete Filled Steel Piles Driven Open-ended to Other Materials, or Driven with Closed Ends. When the bottoms of the piles are in or above any material of less sustaining power than prescribed in *8.3.2.6.2, Concrete Filled Steel Piles Driven to Rock, 8.3.2.6.3, Concrete Filled Steel Piles Driven to Hard Pan, and 8.3.2.6.4, Concrete Filed Steel Piles Driven to Boulders or a Mixture of Gravel and Boulders* or when driven with closed ends, they shall be treated as piles cast-in-place as required by *8.3.2.5, Piles Cast-in Place* (except that the minimum shell thickness shall be $\frac{5}{16}$ of an inch and the minimum outside diameter $10\frac{3}{4}$ inches). Tubes may be driven with closed ends, or if started open-ended shall be filled with concrete, the concrete properly cured, and thereafter be driven sufficiently to demonstrate the bearing capacity in accordance with the general requirements for concrete piles. The minimum spacing shall be 2½ feet on centers.

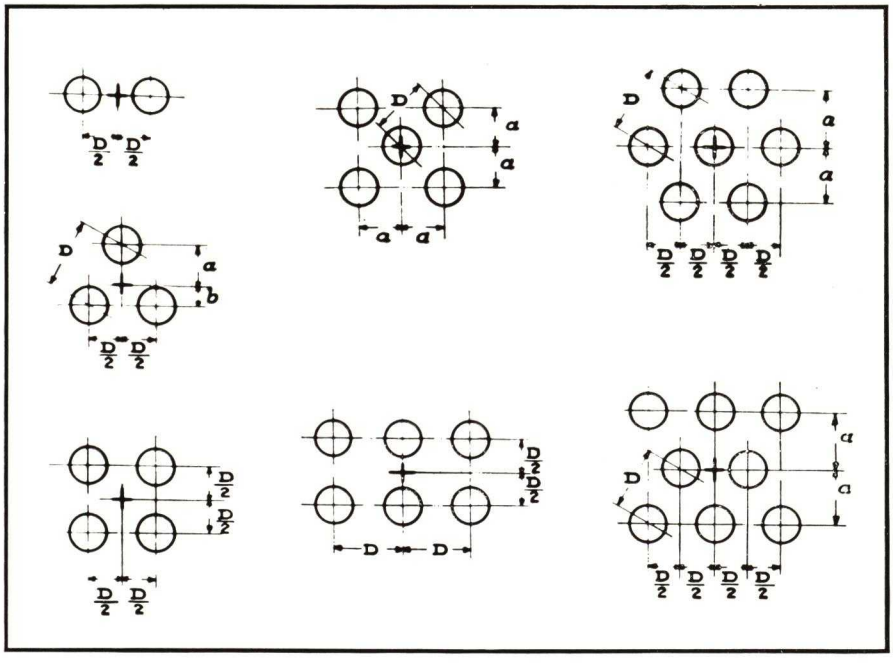
ALLOWABLE LOAD IN TONS, AND SPACING

Diam.	Wall Thickness	On Rock			On Hard Pan			On Boulders or Gravel and Boulders		
		Less than 60'	More than 60'	Spacing C. to C.	Less than 60'	More than 60'	Spacing C. to C.	Less than 60'	More than 60'	Spacing C. to C.
10¾"	5/16"	49.5	...	24"	34.7	...	30"	30.0	...	30"
	3/8	55.0	...	24	38.5	...	30	30.0	...	30
	7/16	60.5	...	24	42.4	...	30	30.3	...	30
	1/2	66.0	...	24	46.2	...	30	33.0	...	30
12¾	5/16	63.0	...	24	44.1	...	30	31.5	...	32
	3/8	70.0	...	24	49.0	...	30	35.0	...	32
	7/16	77.0	...	24	53.9	...	30	38.5	...	32
	1/2	84.0	...	24	58.8	...	30	42.0	...	32
14	3/8	80.0	...	24	56.0	...	30	40.0	...	34
	7/16	88.0	...	24	61.6	...	30	44.0	...	34
	1/2	96.0	...	24	67.2	...	30	48.0	...	34
15	3/8	90.0	...	25	63.0	...	30	45.0	...	35
	7/16	99.0	...	25	69.3	...	30	49.5	...	35
	1/2	108.0	...	25	70.0	...	30	50.0	...	35
16	3/8	100.0	...	26	70.0	...	30	50.0	...	36
	7/16	110.0	...	26	70.0	...	30	50.0	...	36
	1/2	120.0	...	26	70.0	...	30	50.0	...	36
18	3/8	120.0	...	28	70.0	...	30	50.0	...	38
	7/16	132.0	...	28	70.0	...	30	50.0	...	38
	1/2	144.0	132.0	28	70.0	70.0	30	50.0	50.0	38
	5/8	144.0	132.0	28	70.0	70.0	30	50.0	50.0	38
20	3/8	140.0	...	30	70.0	...	30	50.0	...	40
	7/16	154.0	...	30	70.0	...	30	50.0	...	40
	1/2	168.0	154.0	30	70.0	70.0	30	50.0	50.0	40
	5/8	168.0	154.0	30	70.0	70.0	30	50.0	50.0	40

GROUP PILE SPACING

Center to Center of Piles "D"	3-Pile Piers		5-Pile Piers	7- or 8-Pile Piers
	a	b	a	a
Inches	Inches	Inches	Inches	Inches
24	14	7	17	21
25	15	7½	18	22
26	15	7½	18½	22½
28	16	8	20	24½
30	17	8½	21½	26
32	19	9½	22½	28
34	20	10	24	29½
35	20	10	25	30½
36	21	10½	25½	31
38	22	11	27	33
40	23	11½	28½	35
42	24	12	30	36½
44	25½	13	31½	38½

SPACING FOR CONCRETE FILLED STEEL PILES



Spencer, White and Prentis Inc.

FOUNDATIONS & UNDERPINNING

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OFFICES

SPENCER, WHITE & PRENTIS INC., 10 E. 40th ST., N.Y.C.

SPENCER & ROSS INC. . 2485 Scotten Ave., Detroit, Mich.

PRODUCTS & SERVICES

TUBA STEEL CYLINDERS • PRETEST UNDERPINNING • PRETEST FOUNDATIONS
CAISSON FOUNDATIONS • DIFFICULT SHORING • SOIL EVALUATIONS
MASS CONCRETE CONSTRUCTION

UNDERPINNING & FOUNDATION CO., INC.

FOUNDED 1909

Foundation Engineers and Contractors
155 East 44th Street, NEW YORK, N. Y.

PRODUCTS AND SERVICES

UNDERPINNING, PILE FOUNDATIONS, OPEN AND PNEUMATIC CAISSONS, SUBWAY AND TUNNEL CONSTRUCTION, DAMS, BRIDGES, ETC.

Engineering Service—The services of our Engineering Department for consultations are at your disposal.

UNDERPINNING

Underpinning may be necessitated by any of the following: (a) Settlement of existing foundations. (b) Provision for additional capacity of existing foundations to accommodate new loads. (c) Influence of adjacent new excavation. (d) Lowering of basement level to provide additional useful space.

The most successful methods devised for underpinning work, are HERCULES UNDERPINNING PILES (see below), and extension of wall and column foundations by alternate pits with a minimum of shoring and/or needling of columns and walls, all of which this company has designed and installed.

HERCULES UNDERPINNING PILES

This type of construction, which has revolutionized underpinning work by its almost universal adaptability, was invented by officers of the UNDERPINNING & FOUNDATION CO., INC.

HERCULES UNDERPINNING PILES are tested cylindrical steel-and-concrete columns which transfer the load of a structure from the soil immediately beneath the footings to a deeper stratum of greater carrying capacity. They are constructed of sections of heavy steel pipe joined together by means of interior sleeve couplings and filled with concrete. Bearing capacity of each pile is tested by hydraulic jack.

Advantages—(a) Avoidance of loss of ground beneath existing foundations, particularly in quicksand and other dangerous strata. (b) No vibration or noise in sinking. (c) Capacity of each pile established by test. (d) Positive knowledge of the soil conditions. (e) Normal operation of the structure being underpinned—not interrupted.

HERCULES STEEL PILE FOUNDATIONS

The supremacy of HERCULES STEEL PILES has been proven by their repeated installations. Leading architests, engineers and contractors recommend them for all types of buildings wherever bad subsoil conditions exist, or where rock is encountered at a depth greater than ten feet below grade and where heavy loads are to be carried.

HERCULES STEEL PILES consist of heavy steel-and-concrete cylinders supporting structural loads on bedrock or other hard strata without depending on the frictional value of the intermediate soil. They are installed either singly or in groups. Diameter and wall thickness of cylinders are selected according to local conditions and loads to be carried, the ranges of sizes commonly used being given in the table herewith.

Installation—Tubes of standard length are driven open-end into the the ground by means of a pneumatic or steam hammer of suitable size. Plumbness and accurate alignment are assured by heavy guides. After cleaning, the pile is filled with concrete and cut off at the proper grade and provided with a steel capping plate. Each group of piles is then capped with reinforced concrete upon which the superstructure rests.

Stability—The integrity of the many structures resting on HERCULES PILES attests the conservatism of their design.

Durability—Exposure of HERCULES STEEL PILES which have been buried twenty years or more shows corrosion to be a negligible factor.

Economy—HERCULES STEEL PILES are usually more economical than open or pneumatic caissons and, where rock is at a reasonable depth, cheaper than friction piles. Their great carrying capacity and adaptability to close grouping permit small concrete caps. Where required, they may be driven within 2 in. of an adjoining wall and thus eliminate expensive cantilever construction.

Safety—Since the steel cylinder is driven open-ended the displacement of soil is practically nil. This fact and the fewer number of PILES required minimize "pile-driving vibration."

Speed — Important savings in time are usually effected by the use of HERCULES STEEL PILES.

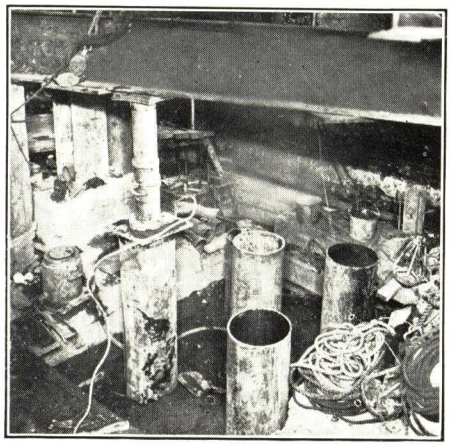
Special Uses—Adaptability under limited headroom, simplifies foundation problems within existing buildings, under overhead wires, viaducts, etc.

HERCULES STEEL PILES are frequently driven closed-end at somewhat reduced loadings.

SCHEDULE OF LOADINGS* FOR HERCULES STEEL PILES DRIVEN TO ROCK (IN TONS)

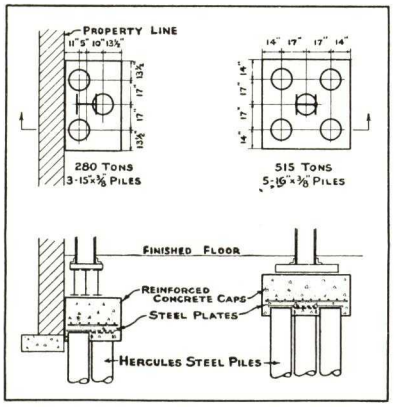
Thickness of shell, in.	Outside diameter, in.				
	10¾	12¾	15	16	18
⅜	57.6	73.6	93.5	103.0	123.1
7/16	64.4	81.8	103.3	113.4	134.9
½	71.2	90.0	112.9	123.8	146.6

*Computed in accordance with New York Building Code which allows 500 lbs. per sq. in. on the concrete section plus 7500 lbs. per sq. in. on the net section of the steel after discounting the outer 1/16-in. of shell thickness.



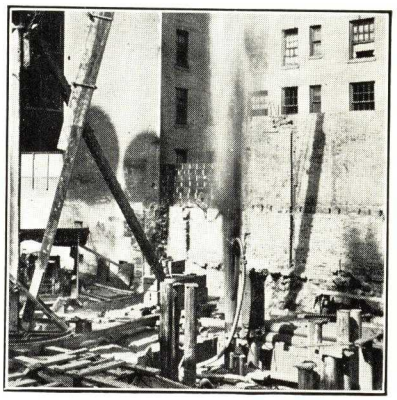
Sinking One of a Group of Hercules Underpinning Piles

Here the weight of the building affords reaction for the hydraulic jack through temporary I-beam construction



Typical Layout Hercules Steel Pile Footings

Showing small caps and elimination of extensive underpinning and cantilevers



Cleaning a Hercules Steel Pile by Means of Compressed Air

The air jet removes all material to required bearing preparatory to installation of concrete

WESTERN FOUNDATION COMPANY

Engineers and Contractors

TELEPHONE
Randolph 6221

308 West Washington Street
CHICAGO, ILL.

Products

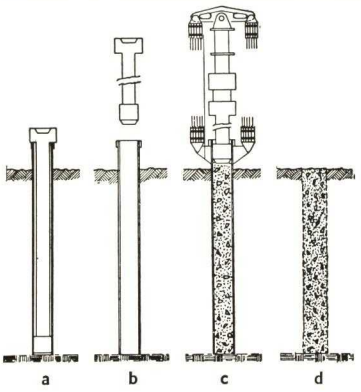
PILES: Cast-in-place Concrete; Composite Concrete and Wood; Steel Pipe, open or closed end; Precast Concrete; Wood.
Drilled Caissons; for loads up to 1,000 tons per caisson.
Underpinning.

Service Based on Experience

The WESTERN FOUNDATION COMPANY is prepared to install any type of foundation required where it is not practical to use spread footings. Experience shows that no one type of foundation is either economically or engineeringly correct for all soil conditions.

Five typical methods are shown below. Folder will be mailed on request showing numerous other types and giving full specifications.

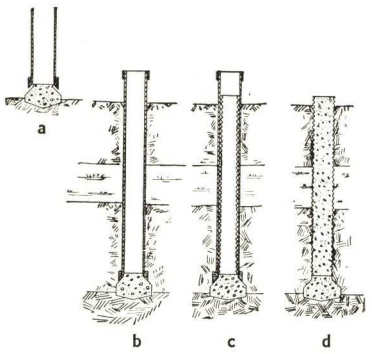
We invite correspondence and would be glad to have our engineers confer with any one relative to their problems.



Compressed Concrete Pile

(a) An apparatus consisting of a heavy steel drive casing and solid pointed core driven into ground until required resistance to driving is obtained.
(b) Core removed.
(c) Casing filled with concrete of coarse aggregate and small slump and core replaced in contact with concrete. Note that the force necessary to withdraw casing passes through core and therefore through concrete so that there is no chance of withdrawing casing without a simultaneous deposit of concrete taking place under high pressure.
(d) Finished pile; drive casing removed

Patented



Button Bottom Pile

(a) A preformed point with sloping shoulders is placed in position and casing lowered onto it.
(b) Casing is driven, pushing the point to firm bearing.
(c) A corrugated steel shell is placed in casing.
(d) Shell is filled with concrete and casing withdrawn leaving a steel encased concrete pile in place.
This type may be driven from hanging leads on a caterpillar crane making it suitable where few or scattered piles are called for

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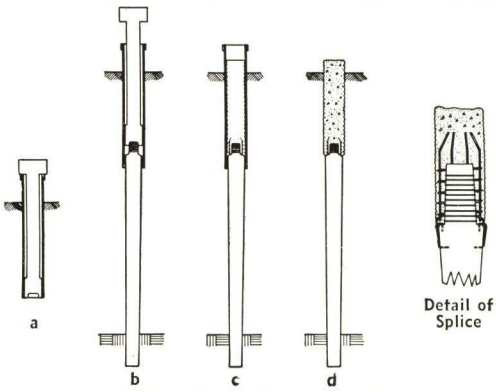


Composite Pile (Cased Concrete and Wood with Reinforced Splice)

(a) A heavy steel casing and a solid pointed core driven into ground to a point well below permanent ground water level.
(b) Core removed and a wooden pile driven through casing using the core as a follower. Wooden pile is provided with rope grommets to exclude water and mud.
(c) Core removed and corrugated metal shell, carrying reinforcing cage at lower end, inserted in casing and over head of wood pile.
(d) Corrugated shell filled with concrete; heavy casing removed.
Detail of Splice—Wire-wound tenon of pile, splice reinforcement (spiral and verticals), dogs which prevent lifting of shell due to driving of adjacent piles before concrete is set, and spacers and grommets which center wood pile in driving casing, form a seat for corrugated shell, and exclude mud and water

Patented

Some of Our Jobs Completed in the First Half of 1937

Bath, N. Y.—*Hospital, Veterans' Bureau*
Cased Pedestal Piles

Louisville, Ky.—*Grade Elimination L & N Ry.*
24-in. Precast Piles.

Buffalo, N. Y.—*Tifft Street Grade Elimination*
Cased Pedestaled Reinforced Concrete Piles

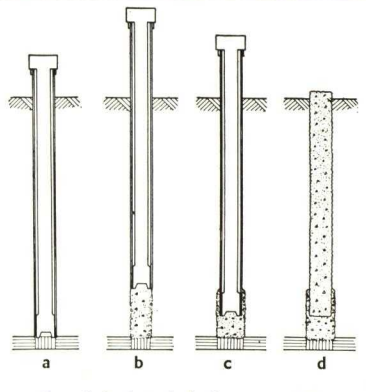
Syracuse, N. Y.—*Regional Market*
Cased Concrete and Composite (Concrete and Wood Piles)
Carl W. Clark, Architect; Abbott, Merkt & Co., Engineers

New York, N. Y.—*Municipal Garage, Department of Sanitation*
750-ton, 24-in. Drilled Caissons
F. B. McDuffee, Chief Engineer

Detroit, Mich.—*General Motors (2 contracts) Factory Buildings and Power House*
Cased Concrete Piles
Albert Kahn, Architect, Inc.

Kecoughtan, Va.—*Veterans' Bureau*
Cased Composite (Concrete and Wood Piles)

Louisville, Ky.—*Pumping Station, Commissioners of Sewerage of Louisville*
14 and 16-in. Precast Piles
W. M. Caye, Engineer



Cased Pedestaled Concrete Pile

(a) A heavy steel casing and a solid pointed core are driven into ground until solid strata is reached.
(b) Core removed and a wet mixed concrete placed in casing. With core in contact with deposited concrete, casing is pulled over core until again fully entered in casing.
(c) Core and casing together are redriven through deposited concrete, spreading it to form a pedestal.
(d) Core removed and a corrugated metal shell placed inside casing. Shell is filled with concrete and casing removed, soft concrete in pedestal flowing around it

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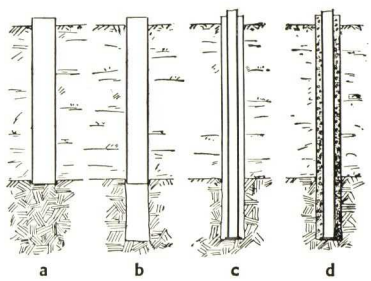

Drilled Caisson

(a) A steel pipe, say 24 in. diameter, is sunk to bed rock, sealed and cleaned.
(b) A socket with rough sides is drilled in the rock.
(c) A structural member is placed in the pipe extending from bottom of socket to the building column it is to support.
(d) Pipe and socket are filled with concrete completing the caisson. Lower end being anchored in rock the free length of caisson is reduced. Load is transferred from caisson to rock by bearing, friction, and bond between concrete and rough walls of socket.
Building columns are thus extended to and anchored into rock. Recommended for loads up to 1000 tons per caisson

Patented

STRUCTURAL SYSTEMS AND EQUIPMENT
- SECTION - 3

Section Number 1/5 Catalog Number

CATALOGS 1 to 62

MANUFACTURERS

THIS INDEX INCLUDES ONLY MANUFACTURERS WHOSE CATALOGS ARE FILED IN THIS SECTION

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American Concrete Expansion Joint Co. 3/60
American Cyanamid & Chemical Corp. 3/30
American Steel & Wire Co. 3/45
Arch Roof Construction Co., Inc. 3/18
Bethlehem Steel Co.
- Concrete Reinforcement 3/44
- Fabricated Steel 3/1
- Joists 3/3
- Structural Shapes 3/2

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BETHLEHEM STEEL COMPANY

Fabricated Steel Work

GENERAL OFFICES

BETHLEHEM, PA.

DISTRICT OFFICES

ALBANY	BUFFALO	DALLAS	JOHNSTOWN, PA.	PHILADELPHIA	SAN ANTONIO	TOLEDO
ATLANTA	CHICAGO	DETROIT	KANSAS CITY, MO.	PITTSBURGH	SAN FRANCISCO	TULSA
BALTIMORE	CINCINNATI	HARTFORD	LOS ANGELES	PORTLAND, ORE.	SAVANNAH	WASHINGTON
BOSTON	CLEVELAND	HONOLULU	MILWAUKEE	ST. LOUIS	SEATTLE	WILKES-BARRE
BRIDGEPORT	COLUMBUS	HOUSTON	NASHVILLE	ST. PAUL	SYRACUSE	YORK
		INDIANAPOLIS	NEW YORK	SALT LAKE CITY		

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For Other Bethlehem Pages, see File Index

FABRICATED STEEL WORK

Facilities

BETHLEHEM STEEL COMPANY is the largest and foremost fabricator of steel structures in the world and has the most modern facilities to manufacture and fabricate any type or size of structure.

The wide variety of structures in the accompanying list suggests the magnitude and range of service which Bethlehem renders.

Buildings

Public Buildings, Office, Mill, Factory and Industrial Buildings; Hotels and Apartment Houses; Grandstands and Auditoriums; Power Plants, Pier and Train Sheds; Freight Depots and Terminals; Docks and Piers; Steel Frame Buildings of all descriptions.

Bridges

Highway Bridges, Trestles, Suspension Bridges, Viaducts, Ore Bridges; Bascule, Swing and Lift Bridges; Railroad Locomotive Turntables.

Tanks

Oil Storage Tanks, Gasoline Station Tanks, Brewery Tanks, Elevated Water Tanks, Surge Tanks, Standpipes.

Towers

Transmission Poles and Towers, Radio Masts and Towers, Floodlight Towers, Water Cooling Towers.

Gas Plant Equipment

Gas Holders; Pressure Holders, Gas Purifiers and Scrubbers; Gas Condensers.

Oil Refinery and Chemical Plant Equipment

Petroleum Refining Plants, Agitators, Condensers, Gasoline Absorbers, After-coolers, Autoclaves, Pans, Stills, Cylinders, Dye Kettles, Nitrators; Acid and Absorbing Towers.

Steel Structural Work

Coal Storage Plants, Galvanizing Works, Coal Tipples, Coal Bins, Head Frames, Bridge Caissons, Derricks.

Steel Plate Work and Construction

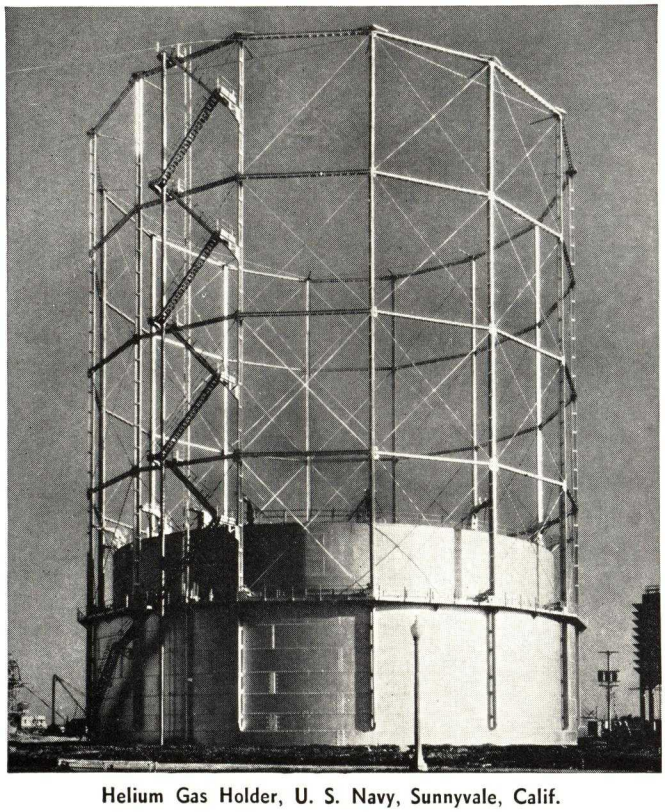
Boxes, Bins, Boiler Breechings, Chimneys, Chutes, Sheet Steel Caissons, Creosoting Cylinders, Hydraulic Accumulators and Cylinders, Digesters, Hoppers, Galvanizing Kettles, Cement Kilns, Foundry Ladles; Annealing, Drying and Evaporating Pans, Smokestacks, Rotary Driers and Kilns, Mixers.

Barges and Hulls

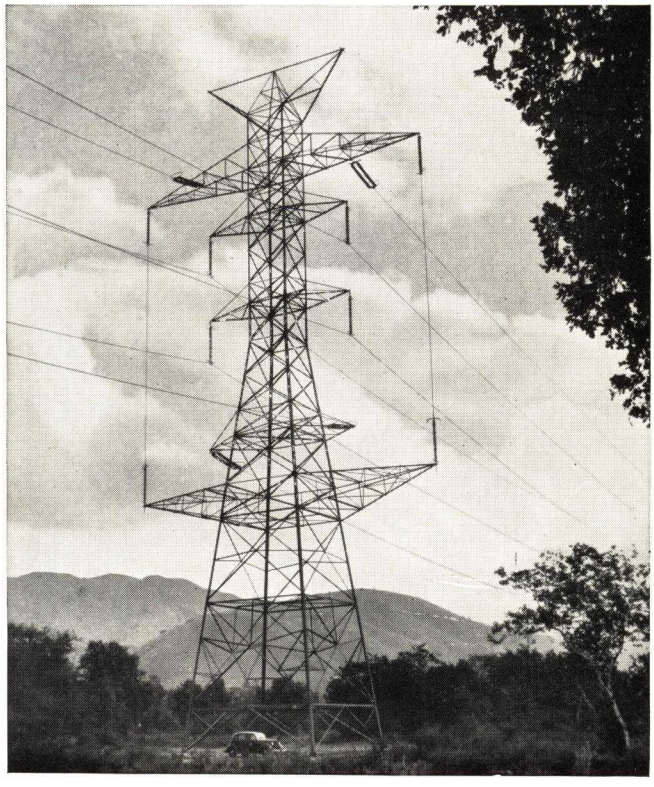
Steel Barges, Pontoons, Boat Hulls, Car Floats, Dredges.

Pipe

Welded Pipe, Steel Dredge Pipe, Pontoon Pipe, Underground Conduit, Riveted Steel Pipe Lines of large diameter, Flumes, Penstocks.



Helium Gas Holder, U. S. Navy, Sunnyvale, Calif.



Transposition Tower, Boulder Canyon Transmission Line

BETHLEHEM STEEL COMPANY

GENERAL OFFICES
BETHLEHEM, PA.

DISTRICT OFFICES

ALBANY	BUFFALO	DALLAS	JOHNSTOWN, PA.	PHILADELPHIA	SAN ANTONIO	TOLEDO
ATLANTA	CHICAGO	DETROIT	KANSAS CITY, MO.	PITTSBURGH	SAN FRANCISCO	TULSA
BALTIMORE	CINCINNATI	HARTFORD	LOS ANGELES	PORTLAND, ORE.	SAVANNAH	WASHINGTON
BOSTON	CLEVELAND	HONOLULU	MILWAUKEE	ST. LOUIS	SEATTLE	WILKES-BARRE
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BETHLEHEM STRUCTURAL SHAPES

BETHLEHEM WIDE-FLANGE STRUCTURAL SHAPES.

Also a full line of Standard Structural Shapes, including Beams, Channels and Angles.

BETHLEHEM LIGHT SECTIONS, including Beams, Columns, Joists and Stanchions.

Uses

Bethlehem Wide-Flange Shapes are used in all sizes of buildings and bridges. Light Beams and Joists are used especially for floor construction in buildings designed for lighter floor loads; also in the roof construction of all types of buildings. Stanchions are used as columns or posts in connection with Bethlehem Light Beams and Joists and other structural Shapes.

Advantages

Bethlehem Wide-Flange Structural Shapes are rolled from high grade structural steel on Bethlehem's Grey Mills. These sections combine advantages of economy in weight with a saving in the cost of fabrication.

BETHLEHEM WIDE-FLANGE SHAPES, INCLUDING LIGHT BEAMS, JOISTS, COLUMNS AND STANCHIONS SHOWING NOMINAL DIMENSIONS, WEIGHT AND SECTION MODULUS

*Section No.	Weight per ft., lb.	Section modulus, in.³
B36a 36″x16½″	300	1105.1
	280	1031.2
	260	951.1
	250	911.7
	240	873.6
	230	835.5
B36 36″x12″	194	663.6
	182	621.2
	170	579.1
	160	541.0
	150	502.9
B33a 33″x15¾″	240	811.1
	220	740.6
	210	704.4
	200	669.6
B33 33″x11½″	152	486.4
	141	446.8
	132	413.7
	125	385.1
B30a 30″x15″	210	649.9
	200	617.6
	190	586.1
	180	555.2
	172	528.2
B30 30″x10½″	132	379.7
	124	354.6
	116	327.9
	108	299.2
B27a 27″x14″	177	492.8
	163	452.9
	154	427.8
	145	402.9
B27 27″x10″	114	299.2
	106	277.2
	98	255.3
	91	233.2
B24b 24″x14″	160	413.5
	150	385.5
	140	358.6
	130	330.7
B24a 24″x12″	120	299.1
	110	274.4
	100	248.9
B24 24″x9″	94	220.9
	87	204.3
	80	185.8
	74	170.4
B21b 21″x13″	142	317.2
	132	294.8
	122	272.5
	112	249.6
B21a 21″x9″	103	213.1
	96	197.6
	89	182.8
	82	168.0
B21 21″x8¼″	73	150.7
	68	139.9
	63	128.0
	59	119.3
B18b 18″x11¾″	124	239.0
	114	220.1
	105	202.2
	96	184.4
B18a 18″x8¾″	85	156.1
	77	141.7
	70	128.2
	64	117.0
B18 18″x7½″	55	98.2
	50	89.0
	47	82.3
B16b 16″x11½″	114	197.4
	105	181.7
	96	166.1
	88	151.3
B16a 16″x8½″	78	127.8
	71	115.9
	64	104.2
	58	94.1
B16 16″x7″	50	80.7
	45	72.4
	40	64.4
	36	56.3
B14e 14″x16″	426	707.4
	412	682.1
	398	656.9
	384	632.2
	370	608.1
	356	583.6
	342	559.4
	328	535.8
	314	511.9
	300	488.2
	287	465.5
	273	442.0
	264	427.4
	255	412.0
	246	397.4
	237	382.2
	228	367.8
	219	352.6
	211	339.2
	202	324.9
	193	310.0
	184	295.8
	176	281.9
	167	267.3
	158	253.4
	150	240.2
	142	226.7
B14f	320	492.8
	136	216.0
	127	202.0
B14d 14″x14½″	119	189.4
	111	176.3
	103	163.6
	95	150.6
	87	138.1
B14c 14″x12″	84	130.9
	78	121.1
B14b 14″x10″	74	112.3
	68	103.0
	61	92.2
B14a 14″x8″	58	85.0
	53	77.8
	48	70.2
	43	62.7
B14 14″x6¾″	42	60.7
	38	54.6
	34	48.5
	30	41.8
B12c 12″x12″	190	263.2
	176	242.6
	161	222.2
	147	201.8
	133	182.5
	120	163.4
	106	144.5
	99	134.7
	92	125.0
	85	115.7
	79	107.1
	72	97.5
	65	88.0
B12b 12″x10″	64	85.8
	58	78.1
	53	70.7
B12a 12″x8″	50	64.7
	45	58.2
	40	51.9
B12 12″x6½″	36	45.9
	32	40.7
	28	35.6
	25	30.9
B10b 10″x10″	136	154.4
	124	139.9
	112	126.3
	100	112.4
	89	99.7
	77	86.1
	72	80.1
	66	73.7
	60	67.1
	54	60.4
	49	54.6
B10a 10″x8″	45	49.1
	41	44.5
	37	39.9
	33	35.0
B10 10″x5¾″	29	30.8
	26	27.6
	23	24.1
	21	21.5
B8b 8″x8″	67	60.4
	58	52.0
	48	43.2
	40	35.5
	35	31.1
	33	29.3
	31	27.4
B8a 8″x6½″	27	23.4
	24	20.8
B8 8″x5¼″	21	18.0
	19	16.0
	17	14.1
B6a 6″x10″	88	59.5
	80	53.8
	70	46.9
	60	40.0
	50	33.2
	40	26.3
LIGHT SECTIONS		
B6 6″x6″	41	27.0
	30	19.8
	27	17.6
	23	15.1
	20	13.1
BS6 6″x6″	18	11.7
	15½	10.0
BS5	18.9	9.5
BS4 4″x4″	13	5.45
	10	4.16
	7½	3.13
B12L 12″x4″	22	25.3
	19	21.4
	16½	17.5
B10L 10″x4″	19	18.8
	17	16.2
	15	13.8
B8L 8″x4″	15	11.8
	13	9.88
B6L 6″x4″	16	10.1
	12	7.24
BJ12	14	14.8
BJ10	11½	10.5
BJ8	10	7.79
BJ6	8½	5.07
B7	12	8.5
B6b	10	5.9

*Dimensions following section number are nominal over-all height and width of flange, respectively.

BETHLEHEM LIGHT SECTIONS

Beams, columns, joists and stanchions, rolled exclusively from open hearth steel, structural grade, to essentially the same shapes as the heavier wide-flange sections.

For nominal dimensions, weights, and section modulus of Bethlehem Light Sections, see preceding page.

Although light in weight for their depths, Bethlehem Light Sections have sufficient thickness of metal in both flange and web to make them suitable for use in first class construction, and within the requirements of the building laws of large cities.

In the accompanying tables are given the properties, dimensions, and allowable loads for Bethlehem light-weight beams, light-weight columns and joists.

LIGHT BEAMS AND JOISTS

Allowable Uniform Loads in Kips for Beams Laterally Supported
(For beams laterally unsupported, allowable loads must be reduced)

Span, ft.	Nominal Depth and Width—Weight per Foot														
	12x4				10x4				8x4			6x4			
	22	19	16½	14	19	17	15	11.5	15	13	10	16	12	8.5	
2							55.2	42.6	47.7	44.2	32.3		33.1	23.8	
3	76.8	70.0	66.2	57.2	61.5	58.3	55.0	42.0	47.3	39.5	31.2	39.0	29.0	20.3	
4	75.9	64.2	52.6	44.4	56.3	48.5	41.3	31.5	35.5	29.7	23.4	30.5	21.7	15.2	
5	60.7	51.4	42.1	35.5	45.1	38.8	33.0	25.2	28.4	23.7	18.7	24.4	17.4	12.2	
6	50.6	42.8	35.1	29.6	37.6	32.3	27.5	21.0	23.7	19.8	15.6	20.3	14.5	10.1	
7	43.4	36.7	30.1	25.4	32.2	27.7	23.6	18.0	20.3	16.9	13.4	17.4	12.4	8.7	
8	38.0	32.1	26.3	22.2	28.2	24.3	20.6	15.8	17.7	14.8	11.7	15.2	10.9	7.6	
9	33.7	28.5	23.4	19.7	25.0	21.6	18.3	14.0	15.8	13.2	10.4	13.5	9.7	6.8	
10	30.4	25.7	21.1	17.8	22.5	19.4	16.5	12.6	14.2	11.9	9.3	12.2	8.7	6.1	
11	27.6	23.3	19.1	16.1	20.5	17.6	15.0	11.5	12.9	10.8	8.5	11.1	7.9	5.5	
12	25.3	21.4	17.5	14.8	18.8	16.2	13.8	10.5	11.8	9.9	7.8	10.2	7.2	5.1	
13	23.4	19.8	16.2	13.7	17.3	14.9	12.7	9.7	10.9	9.1	7.2	9.4	6.7	4.7	
14	21.7	18.3	15.0	12.7	16.1	13.9	11.8	9.0	10.1	8.5	6.7	8.7			
15	20.2	17.1	14.0	11.8	15.0	12.9	11.0	8.4	9.5	7.9	6.2				
16	19.0	16.1	13.2	11.1	14.1	12.1	10.3	7.9	8.9	7.4	5.8				
17	17.9	15.1	12.4	10.4	13.3	11.4	9.7	7.4	8.3	7.0	5.5				
18	16.9	14.3	11.7	9.9	12.5	10.8	9.2	7.0							
19	16.0	13.5	11.1	9.3	11.9	10.2	8.7	6.6							
20	15.2	12.8	10.5	8.9	11.3	9.7	8.3	6.3							
21	14.5	12.2	10.0	8.5	10.7	9.2									
22	13.8	11.7	9.6	8.1											
23	13.2	11.2	9.2	7.7											
24	12.7	10.7	8.8	7.4											
25	12.1														

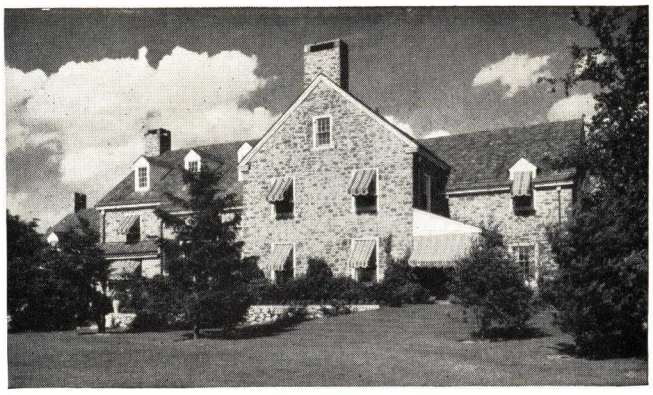
LIGHT COLUMNS

Allowable Concentric Loads in Kips

Unbraced length, ft.	Nominal Depth and Width—Weight per Foot												
	6x6							5x5	6x4		4x4		
	41	30	27	23	20	18	15.5	18.9	16	12	13	10	7.5
4	181	132	119	101	88	79	69	82	71	53	57	44	33
5	181	132	119	101	88	79	69	82	70	51	57	43	33
6	181	132	119	101	88	79	69	82	65	47	53	40	30
7	181	132	119	101	88	79	69	77	60	43	49	37	28
8	180	131	117	100	87	76	66	73	55	39	45	34	25
9	172	125	112	95	83	72	63	68	50	35	41	31	23
10	165	119	107	91	78	69	59	63	45	32	38	29	21
11	157	113	101	86	74	65	56	59	41	29	35	26	19
12	149	108	96	82	70	61	53	55	38	26	32	24	17
13	141	102	91	77	67	58	49	51	34	24	29	22	16
14	134	96	86	73	63	54	46	47	31	22	26	20	14
15	127	91	81	69	59	51	44	44	29	20	24	18	13
16	120	86	77	65	56	48	41	41	26		22	17	
17	113	81	72	61	53	45	38	38					
18	107	77	68	58	50	42	36	35					
19	101	73	64	54	47	40	34	33					
20	96	69	61	51	44	37	32	31					
21	90	65	57	49	42	35	30						
22	86	61	54	46	39	33	28						
23	81	58	51	43	37	31	27						
24	77	55	48	41	35	29							
25	73	52	46	39	33								
26	69	49											

Unbraced length with respect to least radius of gyration

Safe load values given above the upper heavy lines are for ratios of l/r not over 60, those between the heavy lines are for ratios from 61 to 120, and those below the lower heavy lines are for ratios from 121 to 200.



Residence, Bethlehem, Pa.
C. M. Lovelace and Otto Spillman, Architects and Engineers
F. F. Speck Construction Co., General Contractors
Bethlehem Fabricators, Inc., Fabricators

Uses of Light Sections

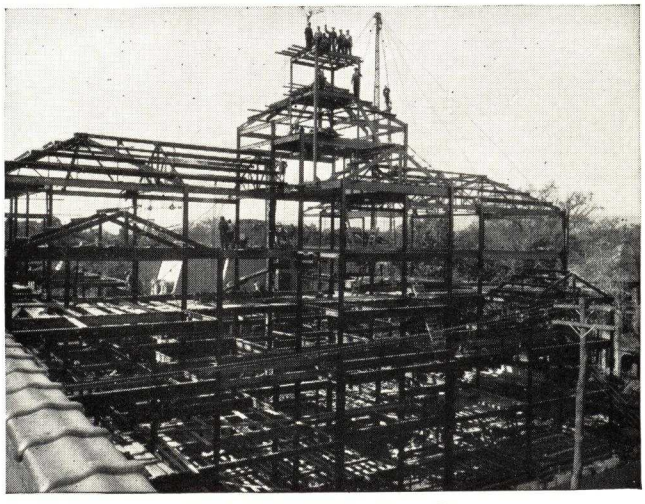
These light sections supplement the heavier Bethlehem Wide-Flange Structural Shapes, and as such afford architects and engineers greater latitude in working out economical designs.

Bethlehem Light Sections are finding wide application in the construction of apartment houses, school buildings, hospitals, hotels and similar structures having relatively light live loads.

Economies

The use of Bethlehem Light Sections effects definite economies. In floors, Bethlehem Light Sections, of depth sufficient to provide the requisite rigidity, can be set far enough apart without using a greater weight of steel than is needed to carry the load, and at the same time keep the floor slab thickness within economical limits.

Similar savings are obtained through the use of Bethlehem Light Sections as purlins in roof construction, as columns in upper stories where loads are lighter, as struts between columns—in fact, wherever it is desirable to combine rigidity with proper spacing of the structural members in floors and roofs.



Y. M. C. A., Wilkes-Barre, Pa.
T. A. Foster, Architect
Anthracite Bridge Co., Engineers and Fabricators
A. J. Sordoni, General Contractor
W. C. Shepherd, Building Counsellor

Other Advantages

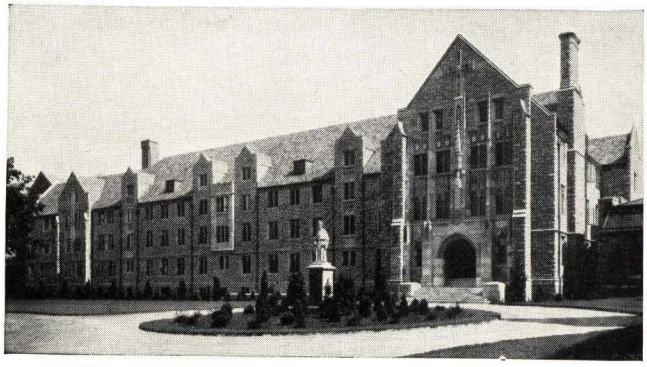
In addition to economy, Bethlehem Light Sections have the following advantages:

The light structural joists together with stanchions, forming an integral part of the steel frame, offer economy in design without loss in rigidity.

They are erected in the same manner as the heavier sections comprising the steel framework, and therefore can be handled by the same contractor or fabricator who has the complete job.

Wherever thicker floor slabs are desired, Bethlehem Light Sections can be also used to advantage, because the inherent strength of the sections permits greater spacing, than with other types of light sections.

In summing up these advantages it is apparent that the wide range of Bethlehem Light Sections will greatly simplify the problem of working out economical designs for structural steel.



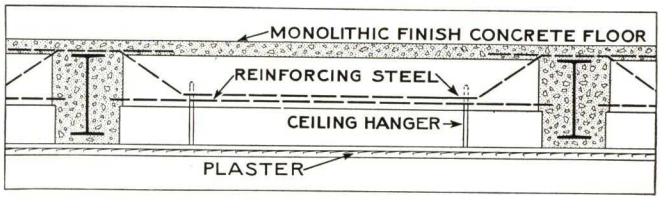
Monastery Building, Villanova College, Villanova, Pa.
DAGIT & SON, Architects
W. BISHOP SCHUYLER, Engineer
HENRY E. BATON, INC., General Contractors
SHOEMAKER BRIDGE CO., Fabricators

Garage, Lenoxville, Pa.
DEAN JOHNSON, Owner and Designer
J. F. BRANDT, Chief Engineer of Anthracite Bridge Co., Engineer for steel work

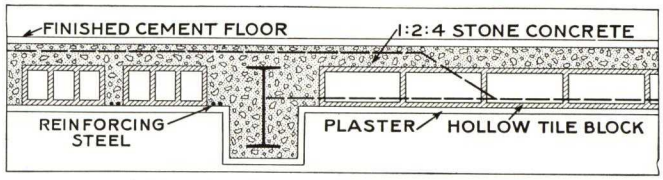
Public Works Office Building, Boston, Mass.
EDWARD T. P. GRAHAM, Architect
E. A. TUCKER, Engineer
GEO. B. H. MACOMBER CO., General Contractors
LEHIGH STRUCTURAL STEEL CO., Fabricators

Floor Construction

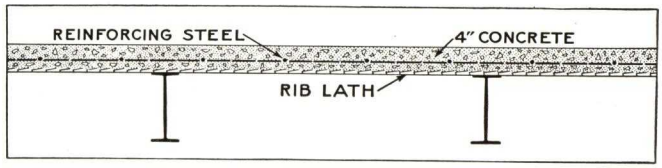
Many different types of floor construction are used in steel buildings. Of the more popular systems, four general types are illustrated below.



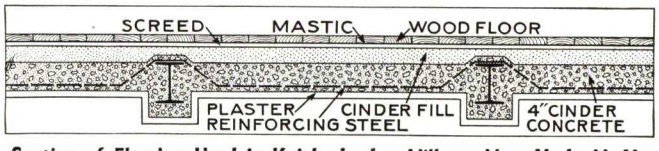
Floor Section Used in Public Works Office Building, Boston, Mass.



Type of Floor Construction Used in Century Apartments, New York, N. Y.



In the Structure of Garage, Lenoxville, Pa., This Type of Floor Construction Was Used

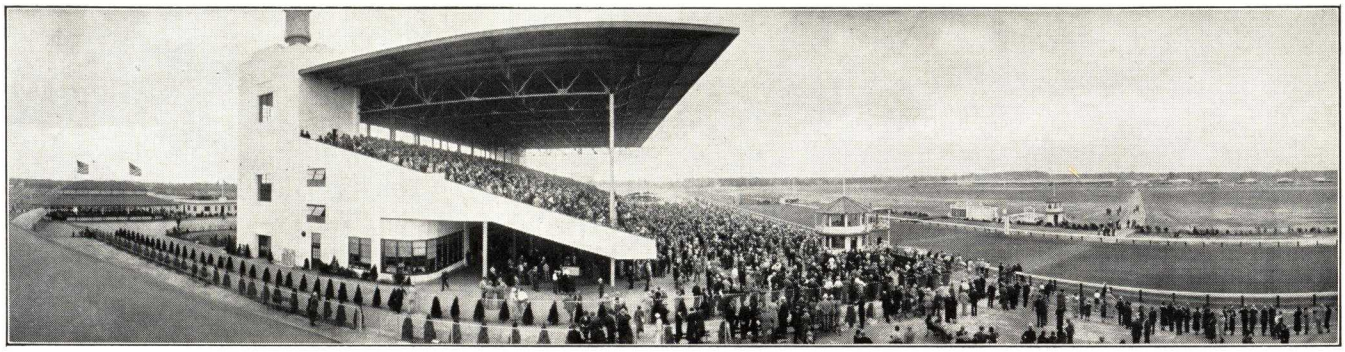


Section of Flooring Used in Knickerbocker Village, New York, N. Y.

In any case, Bethlehem light-weight beams are used in an identical manner with the heavier wide-flange shapes, and usually with relatively wide spacing.

The size and shape of these light beams affords such stability that the necessity for cross bracing or bridging is minimized. Where the spans are unusually long and the lateral movement is apt to overcome the rigidity of the bracing ordinarily provided by the concrete floor slabs, special bridging is recommended.

In using Bethlehem Light Sections in steel-concrete floor construction and by spacing them and spanning them to their capacity, only the minimum amount of



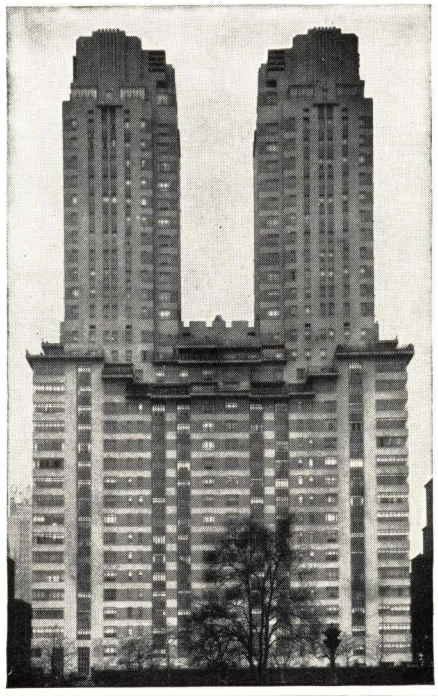
Race Track Grand Stand, Houston, Tex.

FUNK & WILCOX CO., Architects; MARK LINENTHAL, Engineer; STANDARD CONSTRUCTION CO., Houston, General Contractors; BETHLEHEM STEEL COMPANY, Fabricators

steel need be used. In combination with careful selection of the other necessary materials—steel lath, reinforcing steel, gypsum or concrete slabs—surprising economies in the cost of materials and labor can be effected.

Century Apartments, New York, N. Y.

OFFICE of IRVIN S. CHANIN, Architect
ALEXANDER D. CROSETT, Engineer
CHANIN CONSTRUCTION CO., INC., General Contractors
BETHLEHEM STEEL COMPANY, Fabricators



School for Colored Handicapped Children, Baltimore, Md.

WM. F. STONE, JR., Architect; VAN R. P. SAXE, Engineer; P. C. STREETE ENGINEERING CO., General Contractors; LEHIGH STRUCTURAL STEEL CO., Fabricators

Knickerbocker Village, New York, N. Y.

JOHN S. VAN WART, Architect; ALEXANDER D. CROSETT, Engineer; Fred F. FRENCH COMPANY, General Contractors; HARRIS STRUCTURAL STEEL CO., Fabricators

BETHLEHEM STEEL COMPANY

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BETHLEHEM, PA.

DISTRICT OFFICES

ALBANY, ATLANTA, BALTIMORE, BOSTON, BRIDGEPORT, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, COLUMBUS, DALLAS, DETROIT, HARTFORD, HONOLULU, HOUSTON, INDIANAPOLIS, JOHNSTOWN, PA., KANSAS CITY, MO., LOS ANGELES, MILWAUKEE, NASHVILLE, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ORE., ST. LOUIS, ST. PAUL, SALT LAKE CITY, SAN ANTONIO, SAN FRANCISCO, SAVANNAH, SEATTLE, SYRACUSE, TOLEDO, TULSA, WASHINGTON, WILKES-BARRE, YORK

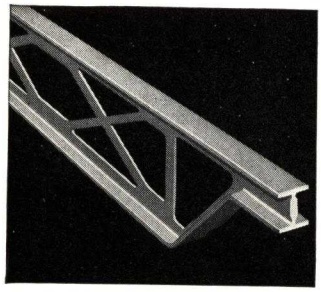
EXPORT DISTRIBUTOR: Bethlehem Steel Export Corporation, 25 Broadway, NEW YORK, N. Y.

For Other Bethlehem Pages, see File Index

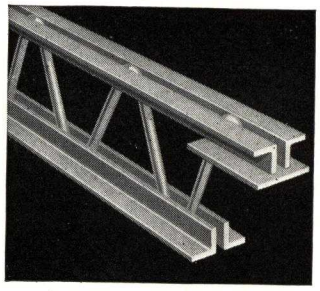
OPEN WEB STEEL JOISTS AND EXPANDED STEEL STUDS

Bethlehem Steel Joists, Longspan Joists, Rigid Bridging, Bethlehem Steel Studs, and Accessories.

STEEL JOISTS



Bethlehem Expanded Steel Joist—End View

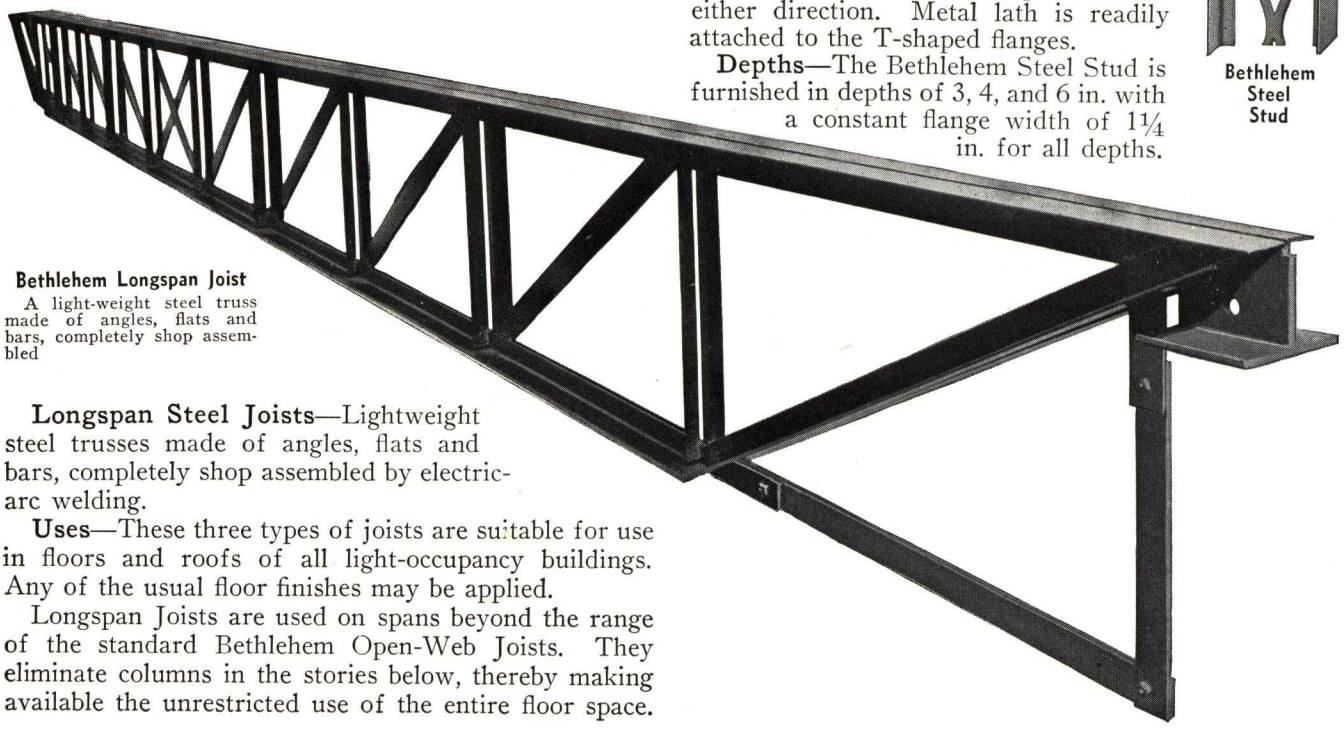


Bethlehem Welded Steel Joist—End View

Bethlehem manufactures three types of steel joists; these are:

Bethlehem Expanded Steel Joists—Expanded one-piece light-weight steel trusses, made from one solid piece by a continuous hot slitting and rolling process.

Bethlehem Welded Steel Joists—Steel trusses composed of angle chords and continuous bar web and assembled by the pressure-welding method.



Bethlehem Longspan Joist
A light-weight steel truss made of angles, flats and bars, completely shop assembled

Longspan Steel Joists—Lightweight steel trusses made of angles, flats and bars, completely shop assembled by electric-arc welding.

Uses—These three types of joists are suitable for use in floors and roofs of all light-occupancy buildings. Any of the usual floor finishes may be applied.

Longspan Joists are used on spans beyond the range of the standard Bethlehem Open-Web Joists. They eliminate columns in the stories below, thereby making available the unrestricted use of the entire floor space.

In combination with concrete floor slabs and plastered ceilings, they provide rigid, permanent fire-safe construction at moderate cost.

Depths—Bethlehem Joists—8 to 16 in., varying by 2-in. steps. Longspan Joists—18 to 32 in., varying by 2-in. steps.

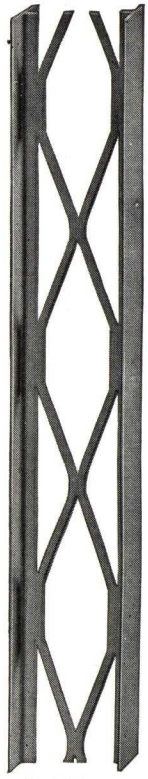
Clear Spans—Bethlehem Joists—up to 32 ft. Longspan Joists—up to 64 ft.

STEEL STUDS

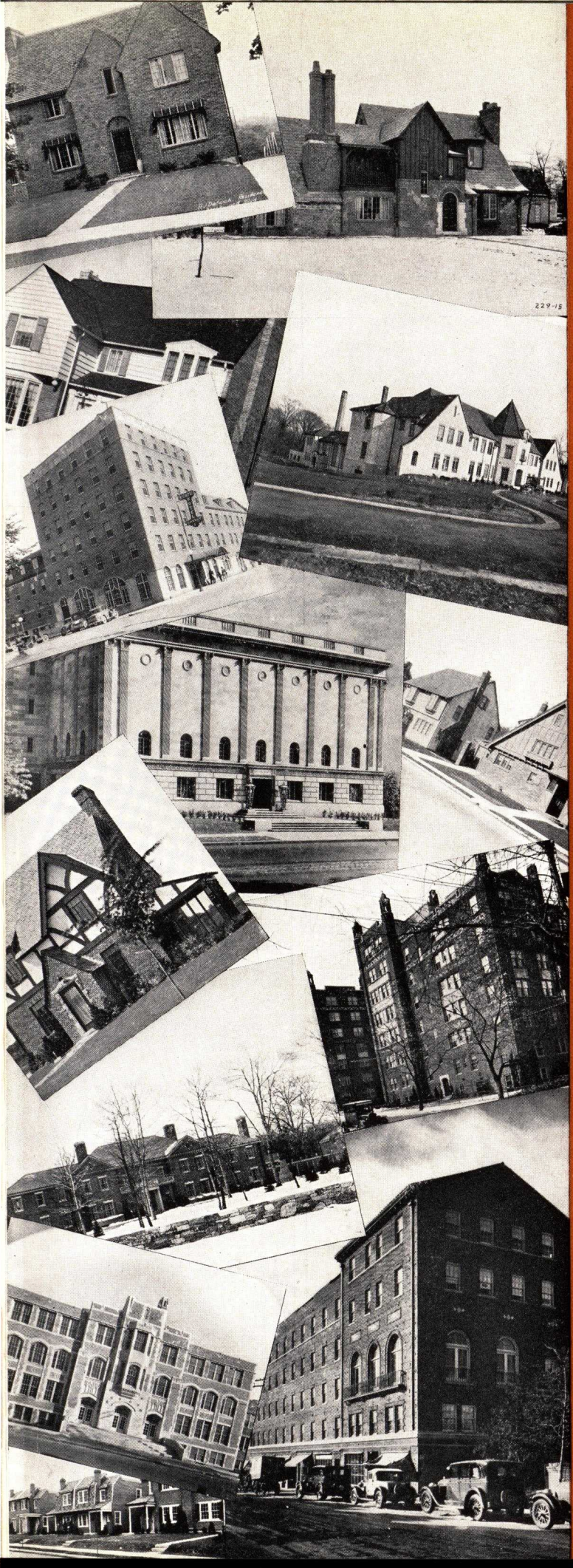
Bethlehem Steel Studs are one-piece, load-bearing members made by continuous hot-slitting and rolling processes. They find application in partitions in all types of fireproof construction, and especially in exterior walls and interior bearing walls of dwellings and other light-occupancy structures.

Combined with metal lath and plaster, the Bethlehem Steel Stud provides a partition that is economical to build, light in weight, non-shrinking, and soundproof. It may be used as exterior wall material in connection with stucco or masonry veneer. Piping and conduit are run freely within the hollow wall or partition, in either direction. Metal lath is readily attached to the T-shaped flanges.

Depths—The Bethlehem Steel Stud is furnished in depths of 3, 4, and 6 in. with a constant flange width of 1¼ in. for all depths.



Bethlehem Steel Stud



J & L

JUNIOR BEAM FLOORS

FOR

RESIDENCES

SCHOOLS

AND

OTHER LIGHT OCCUPANCY BUILDINGS

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH.

J & L JUNIOR BEAMS FOR GENERAL CONSTRUCTION

THE J & L JUNIOR BEAM is the lightest rolled structural steel I-beam now available and was designed to provide the building industry with sections which would make possible new economies in practically all types of construction. That this object has been accomplished has been proved in hundreds of buildings ranging from small residences to large schools, stores, apartments, hospitals and many other light occupancy structures.

The Junior Beam is made of structural grade steel rolled from the billet to the full I-section in a continuous mill with but slight change in temperature from the reheating furnace to the cooling bed.

The function of the Junior Beam used as a floor beam or roof purlin is to carry the live and dead loads and transfer them to the heavier main carrying members of the frame work or to the supporting walls.

The data on the following pages are divided into two sections for convenience of use and because certain requirements govern the design and use of Junior Beams in general construction which do not apply when they are used in residences. The first section contains engineering design data and tables which the architect, engineer and contractor will use for buildings other than residences. Loads, spacings, end connections and floor and ceiling construction data affect the design in such buildings. The second section relates primarily to the layout and construction of floors for residences for which the design is less complicated and the plan usually involves fewer details and more simple construction.

Advantages of J & L Junior Beam Floors

The J & L Junior Beam Floor offers the architect and contractor many advantages. Some of these are suggested below and others will occur to the reader as he studies the data in this catalog.

Unusual economies due to the light weight of the floors and the consequent saving in main frame and foundations.

No shoring is necessary to place the concrete slabs. This reduces costs and permits workmen to install partitions, plumbing, and to do steam fitting, etc., without waiting for removal of the shoring.

Walls can be erected as soon as the steel is placed.

Junior Beams are carried in stock and are available without delay.

Jones & Laughlin Service

Jones & Laughlin District Sales Offices are situated in all important centers. J & L engineers familiar with J & L Junior Beams and their uses are available in these offices for advice and assistance.

When you desire to have detailed information in connection with the design of J & L Junior Beams, please ask the nearest office for Bulletin which contains all such data.

The JONES & LAUGHLIN STEEL CORPORATION offers, also, the aid of skilled field engineers to service any particular building operation in which Junior Beams are used.

JONES & LAUGHLIN STEEL CORPORATION
American Iron and Steel Works
PITTSBURGH, PENNSYLVANIA
For List of Sales Offices, Warehouses and Fabricating Plants—See Back Cover

ENGINEERING DATA ON J & L JUNIOR BEAMS FOR GENERAL CONSTRUCTION

Junior Beams are homogeneous steel I-sections in their original symmetrical form as rolled and, as such, can be used in structural design up to their full value by employing standard engineering formulae and without empirical assumptions.

Official Classification of Junior Beams

Junior Beams are extensively used throughout the United States and Canada in floor systems, the carrying capacity being based on the same fiber stress as that of standard weight structural steel sections.

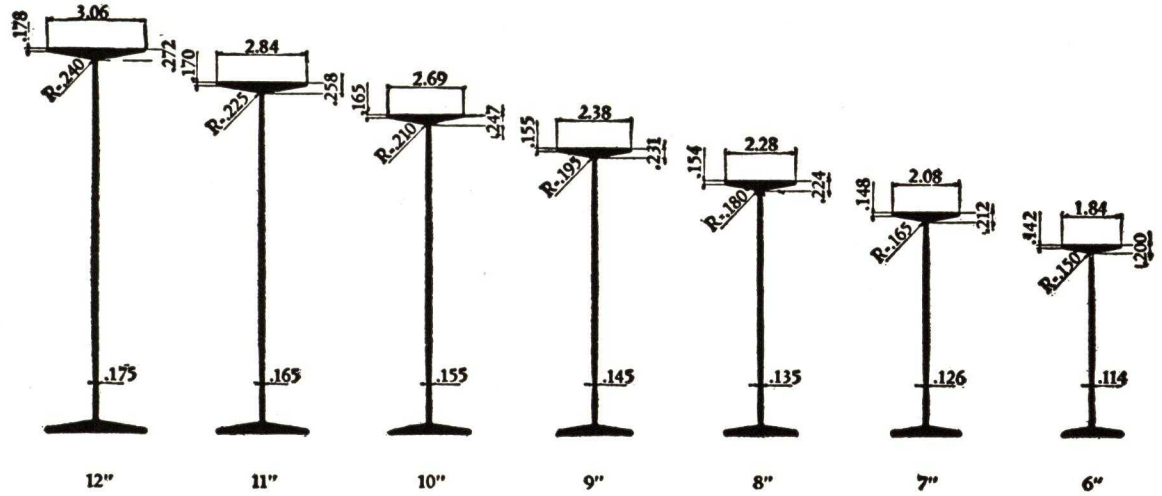
J & L Junior Beams are rated as structural steel by the American Institute of Steel Construction and their properties and dimensions are included in the handbook of information published by the Institute.

Uses for Junior Beams and General Construction

The principal use of Junior Beams is as secondary members in floor and roof construction of buildings. They are also being used in increasing quantities as purlins, rafters and girts for mill and hangar buildings, ceiling supports over auditoriums, protection sheds and scaffolding, monorails, supports for conveying and mechanical equipment, and all classes of structural work where, due to their light weight, they are the most economical sections to be used.

The adaptability of Junior Beams to floor construction provide many economies due to light weight of floor and ease of erection. A floor containing the least amount of steel, concrete and labor can be designed by judicious combination of companion materials. It is advantageous to utilize in good designs, the actual strength of properly proportioned thin concrete slabs by spacing Junior Beams to their capacity and also where practicable, designing the Junior Beams as continuous spans. The floor will be light, rigid, and have a minimum amount of deflection. It will be quickly erected, firesafe and soundproof. Precast gypsum slabs and other lightweight materials are also employed in obtaining similar economies.

Sizes, Weights and Properties of J & L Junior Beams



Depth, in.	Weight, lbs. per ft.	Flange width, in.	Web thickness, in.	Area, sq. in.	Radius of gyration		Moment of inertia		Section modulus	
					Hor. axis	Vert. axis	Hor. axis	Vert. axis	Hor. axis	Vert. axis
12	11.8	3.06	0.175	3.45	4.573	0.532	72.21	0.978	12.01	0.638
11	10.3	2.84	.165	3.01	4.200	.498	53.08	.746	9.63	.525
10	9.0	2.69	.155	2.64	3.847	.480	39.01	.608	7.78	.452
9	7.5	2.38	.145	2.20	3.450	.423	26.20	.394	5.81	.332
8	6.5	2.28	.135	1.92	3.116	.423	18.67	.343	4.65	.301
7	5.5	2.08	.126	1.61	2.744	.393	12.13	.248	3.45	.239
6	4.4	1.84	.114	1.30	2.372	.357	7.30	1.65	2.42	.179

TABLE OF SPACINGS

TOTAL SAFE LOADS FOR J & L JUNIOR BEAMS

FIBER STRESS—18,000 POUNDS PER SQUARE INCH

Span of Beam	Depth of Beam	Total Safe Uniform Load on Beam Pounds	TOTAL LOAD PER SQUARE FOOT and SPACING OF JUNIOR BEAMS IN INCHES														
			50 Lb.	60 Lb.	70 Lb.	80 Lb.	85 Lb.	90 Lb.	95 Lb.	100 Lb.	105 Lb.	110 Lb.	115 Lb.	120 Lb.	130 Lb.	140 Lb.	150 Lb.	160 Lb.
26′-0″	12″	5542	51	42½	36½	32	30	28½	27	25½	24½	23	22	21	19½	18	17	16
25′-0″	12″	5764	55	46	39½	34½	32½	30½	29	27½	26½	25	24	23	21	19½	18½	17
24′-0″	12″	6004	60	50	43	37½	35½	33½	31½	30	28½	27	26	25	23	21½	20	18½
	11″	4815	48	40	34	30	28	26½	25	24	23	22	21	20	18½	17	16	15
23′-0″	12″	6265	65	54½	46½	41	38½	36½	34	32½	31	29½	28½	27	25	23	21½	20½
	11″	5024	52	43½	37½	32½	31	29	27½	26	25	23½	22½	21½	20	18½	17½	16
22′-0″	12″	6549	71	59½	51	44½	42	39½	37½	35½	34	32½	31	29½	27½	25½	23½	22½
	11″	5253	57	47½	41	36	33½	31½	30	28½	27	26	25	24	22	20½	19	18
	10″	4244	46	38½	33	29	27	25½	24½	23	22	21	20	19	18	16½	15½	14½
21′-0″	12″	6861	78½	65½	56	49	46	43½	41½	39	37½	35½	34	32½	30	28½	26	24½
	11″	5503	63	52½	45	39½	37	35	33	31½	30	28½	27	26	24	22½	21	19½
	10″	4446	51	42½	36½	32	30	28	26½	25½	24	23	22	21	19½	18	17	16
20′-0″	12″	7204	86½	72	61½	54	51	48	45½	43	41½	39	37½	36	33	31	29	27
	11″	5778	69½	57½	49½	43	41	38½	36½	34½	33	31½	30	29	26½	25	23	21½
	10″	4668	56	46½	40	35	33	31	29½	28	26½	25½	24	23	21½	20	18½	17½
	9″	3486	42	35	30	26	24½	23	22	21	20	19	18	17½	16	15	14	13
19′-0″	12″	7584	96	80	68½	60	56½	53½	50½	48	45½	43½	41½	40	37	34½	32	30
	11″	6082	77	64	55	48	45	42½	40½	38½	36½	35	33½	32	29½	27½	25½	24
	10″	4914	62	51½	44½	38½	36	34½	32½	31	29½	28	27	26	24	22	20½	19½
	9″	3670	46½	38½	33	29	27	25½	24½	23	22	21	20	19½	18	16½	15½	14½
18′-0″	12″	8005	107	89	76	67	63	59½	56½	53½	51	48½	46½	44½	41	38	35½	33½
	11″	6420	85½	71½	61	53½	50½	47½	45	43	41½	39	37	35½	33	30½	28½	26½
	10″	5187	69	57½	49½	43	40½	38½	36½	34½	33	31½	30	29	26½	24½	23	21½
	9″	3874	51½	42	37	31½	29½	28	26½	25	24	23	22	21½	19½	18	17	16
	8″	3101	41½	34½	29½	26	24½	23	22	20½	19½	18½	18	17	16	14½	14	13
17′-0″	12″	8476	120	100	85½	75	70½	66½	63	60	57	54½	52	50	46	42½	40	37½
	11″	6797	96	80	68½	60	56½	53½	50½	48	45½	43½	41½	40	37	34½	32	30
	10″	5492	77½	64½	55½	48½	45½	43	41	39	37	35	33½	32	30	27½	26	24
	9″	4102	58	48	41½	36	34	32	30½	29	27½	26½	25	24	22	20½	19½	18
	8″	3283	46½	38½	33	29	27	25½	24½	23	22	21	20	19½	18	16½	15½	14½
16′-0″	11″	7222	108	90	77½	67½	64	60½	57	54	51½	49	47	45	41½	39	36	34
	10″	5836	87½	73	62½	54½	51½	48½	46	44	41½	40	38	36½	33½	31	29	27
	9″	4358	65	54½	46½	40½	38	36	34	32½	31	29½	28½	27	25	23	21½	20½
	8″	3489	52½	43½	37	33	31	29	27½	26	25	24	22½	21½	20	18½	17½	16½
	7″	2589	39	32	27½	24	23	21½	20½	19½	18½	17½	17	16	15	14	13	12
15′-0″	11″	7704	123	102½	88	77	72½	68½	65	61½	58½	56	53½	51½	47½	44	41	38½
	10″	6225	100	83	71	62½	58½	55½	52½	50	47½	45	43½	41½	38½	35½	33	31
	9″	4648	74½	62	53	46½	44	41½	39	37	35½	34	32	31	28½	26½	24½	23
	8″	3721	59½	49½	42½	37	35	33	31½	30	28½	27	26	25	23	21	20	18½
	7″	2762	44	37	31½	27½	26	24½	23	22	21	20	19	18½	17	15½	14½	13½
14′-0″	10″	6669	114	95	81½	71½	67	63½	60	57	54½	52	49½	47½	44	41	38	35½
	9″	4981	85½	71	61	53½	50	47½	45	42½	41½	39	37	35½	33	30½	28½	26½
	8″	3987	68½	57	49	42½	40	38	36	34	32½	31	29½	28½	26	24½	22½	21½
	7″	2959	51	42	36½	32	30	28	26½	25½	24	23	22	21	19½	18	17	16
	6″	2077	35½	29½	25½	22	21	20	18½	18	17	16	15½	14½	13½	12½	12	11
13′-0″	10″	7182	132	110	95	83	78	74	70	66	63½	60	57½	55	51	47½	44	41½
	9″	5364	99	82½	71	62	58½	55	52	49½	47	45	43	41	38	35	33	31
	8″	4294	79½	66	56½	49½	46½	44	41½	39½	38	36	34½	33	30½	28	26½	24½
	7″	3187	59	49	42	37	34½	32½	31	29½	28	26½	25½	24½	22½	21	19½	18½
	6″	2236	41½	34½	29½	25	24	23	21½	20½	19½	18½	18	17	16	14½	13½	13
12′-0″	9″	5811	116	96½	83	72½	68	64½	61½	58	55½	53	50½	48½	44½	41½	38½	36
	8″	4651	93	77½	66½	58	55	51½	49	46½	44½	42	40½	39	36	33	31	29
	7″	3452	69	57½	49	43	40½	38½	36	34½	33	31½	30	28½	26½	24½	23	21½
	6″	2423	48½	40½	34½	30	28½	27	25½	24	23	22	21	20	18½	17	16	15
11′-0″	9″	6339	138	115	99	86½	81½	77	73	69	66	63	60	57½	53	49½	46	43
	8″	5074	111	92	79	69	65½	61½	58½	55½	52½	50	48	46	42½	39½	37	34½
	7″	3766	82	68½	59	51	49	45½	43½	41	39	37	35½	32½	31½	29½	27	25½
	6″	2643	57½	48	41	36	34	32	30½	29	27½	26	25	24	22	20½	19	18
10′-0″	8″	5582	134	111	96	84	79	74½	70½	67	64	61	58	56	51½	48	45	42
	7″	4143	99	82½	71	62	58	55	52	49½	47	45	43	41½	38	35½	33	31
	6″	2907	69½	58	50	43½	41	39	36½	35	33	31½	30½	29	27	25	23	21½
9′-0″	7″	4603	123	102	87½	76½	72	68	64½	61½	58½	56	53	51	47	44	41	38
	6″	3230	86	71½	61½	53½	50½	48	45	43	41	39	37½	36	33	31	29	27
8′-0″	7″	5178	155½	129½	111	97	92	86½	82	77½	74½	70½	67	64½	59½	55½	51½	48½
	6″	3634	109	91	78	68	64	60½	57½	54½	52	49½	47½	45½	42	39	36	34

* In designing Junior Beam Floors, bear in mind that the use of the deepest Junior beam at the widest spacing will provide a floor having the least amount of steel per square foot.

END CONNECTIONS FOR J & L JUNIOR BEAMS

The illustrations at the right show the method of framing Junior Beams to a steel frame with clip angles, and details of the standard Junior Beam end connection.

Clip Angle End

Figs. 1 and 2 show how Junior Beams are framed to the main carrying members by use of one clip angle at each end of the Junior Beam. The Junior Beams and carrying beams are merely punched before shipment. The clip angles may be shipped loose, or bolted to either the Junior Beams or to the primary members, as desired.

Standard End

Figs. 3, 4 and 5 show details of the J & L standard Junior Beam end. The end is composed of two angles riveted back to back on the Junior Beam. In all three of these sketches, the top of the Junior Beams are $2\frac{1}{2}$ in. above the supporting structural members.

Fig. 3 shows the standard end for 6″, 7″ and 8″ Junior Beams.

Fig. 4 shows the standard end for 9″ and 10″ Junior Beams.

Fig. 5 shows the standard end for 11″ and 12″ Junior Beams.

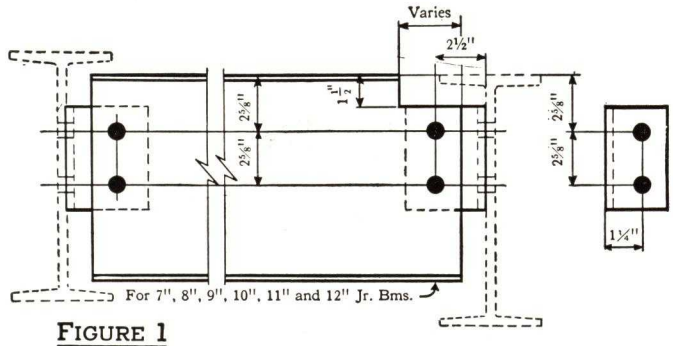


FIGURE 1

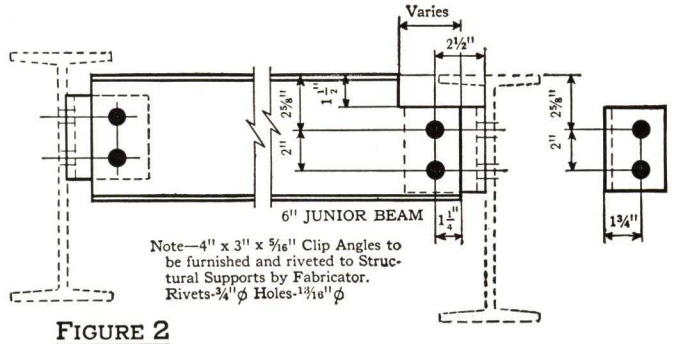


FIGURE 2

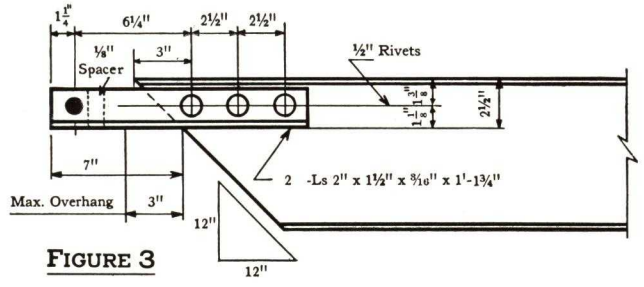


FIGURE 3

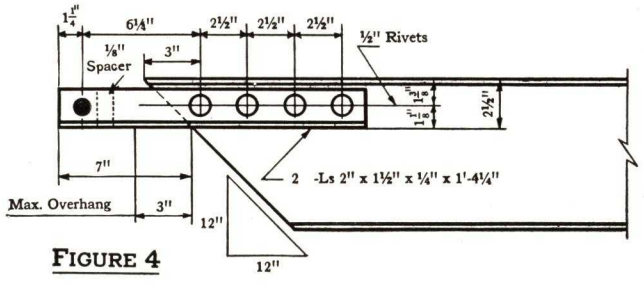


FIGURE 4

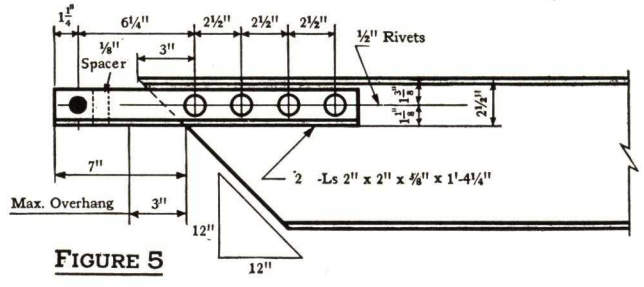
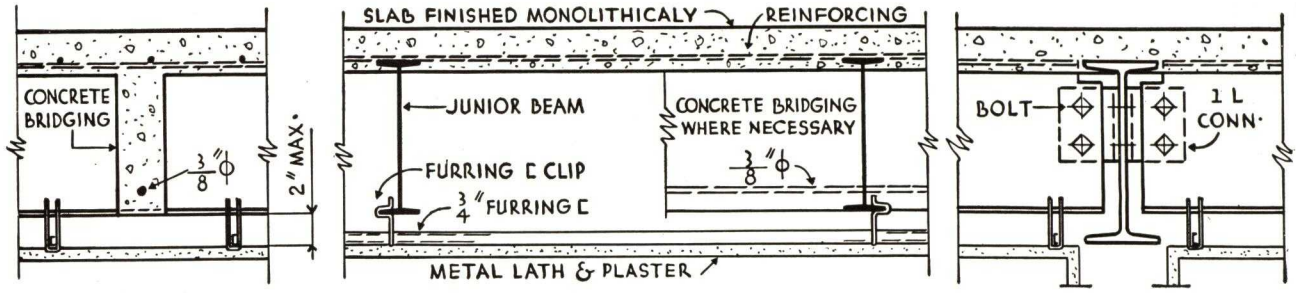


FIGURE 5

J & L JUNIOR BEAMS FLOORS IN GENERAL CONSTRUCTION

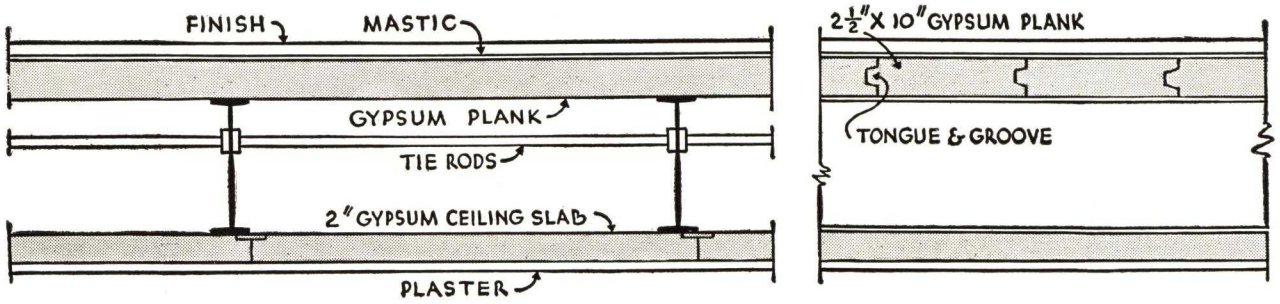
Monolithically-Finished Concrete Floor



Where possible the Junior Beams are made continuous over three supports or more.

By encasing the top flanges, the floor is made rigid and does not require bridging in light occupancy buildings. Where concentrated loads must be transferred over two or more beams, it is done by the use of concrete bridging poured monolithically with the slab. The slab is poured on a simple form, of either wood or metal. If wood is used, the beams can be spaced so that ripping of form boards is avoided. Clips are furnished for fastening the ceiling furring channels to the bottom flanges, allowing 2 in. of space to the bottom of the channels in which to run electrical conduits. This is the most economical quality floor that can be built.

Gypsum Slabs

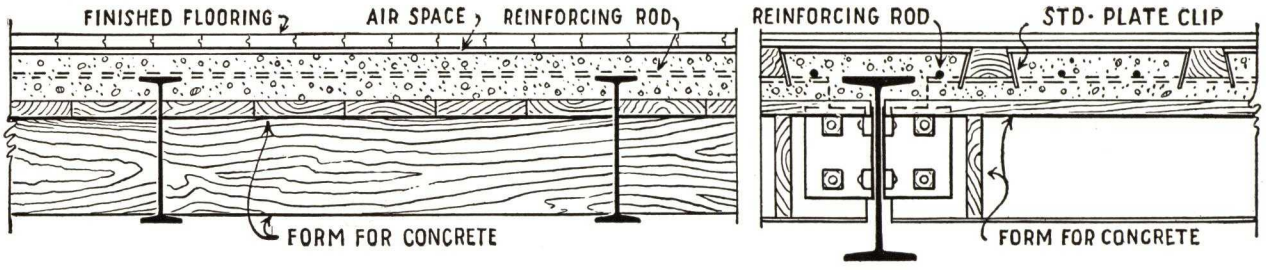


The lightest type of floor providing four-hour fire protection is obtained by the use of precast gypsum floor planks and ceiling slabs, securely fastened to the Junior Beams by means of clips and hangers.

The floor planks are furnished in lengths 6 ft. 0 in. to 10 ft. 0 in. and the Junior Beams spaced to accommodate the required loading.

This floor is quickly erected and due to the light weight, effects considerable economy in the main steel frame and foundations.

Wood Form — Concrete Slab — Wood Floor



This type of Junior Beam floor is easy to install and is especially satisfactory. When 8 in. Junior Beams are used, the spreaders (vertical boards supporting form) will be 1 in. by 6 in. The form is constructed of ordinary sheathing. The reinforcing is ¼ in. rods, 6 in. to 8 in. o. c., and the wooden sleepers, fastened to the top flanges of the Junior Beams with standard plate clips, are spaced 12 in. to 16 in. o. c. No bridging is necessary as the concrete slab engages and holds rigidly the top flanges of the steel. Plaster ceiling is applied in the same manner shown at top of page in details of monolithically-finished concrete floor.

SPECIFICATIONS FOR J & L JUNIOR BEAMS IN GENERAL CONSTRUCTION

Architects and engineers should include Junior Beams in the structural steel section of specifications, as they are an integral part of the structural framework of the building, to be supplied by the structural steel contractor. This procedure insures proper co-ordination of design and detail under one engineering control and also proper timing of arrival of all structural material to the site and erection by the same erector.

The following specifications have been developed with the idea that they will aid designers in properly specifying J & L Junior Beams. Specifications may be used either in whole or in part with absolute confidence; they represent the best thought and standard practice at the present time.

Description—The structural part of the floor system shall consist of the slab supported on Jones & Laughlin Junior Beams, acting as secondary members of dimensions as shown on drawings. Before shipment, all J & L Junior Beams shall be given a coat of paint.

Partitions—Proper provision shall be made in the loading for the weight of partitions.

Bridging—The J & L Junior Beam shall be bridged as shown on the drawings with (tension compression) (tie rod) (solid concrete crossbeam) (12½ gauge wire). Where wire or tie rod bridging is used, the end Junior Beam in each panel shall be fastened to bridging anchors set in outside wall or to parallel structural steel.

Wall Plates—Standard Junior Beam wall plates shall be used under the ends of Junior Beams resting on bearing walls.

Anchors—Where Junior Beams rest on masonry walls, a ½ in. by 8 in. round anchor shall be used (in such Junior Beams as the local building code requires).

Sleepers—Where wood floors on top of concrete slabs attached to sleepers are specified, the sleepers shall be preferably of hardwood, embedded in the slab. Sleepers shall be attached to the tops of Junior Beams by means of proper clips. Sleepers shall be run (at right angles to the Junior Beams and be spaced . . . in. apart) (diagonally to the Junior Beams). Substitution may be made for the above, dependent upon the type of floor system under consideration.

Floor Slabs—Concrete floor slabs shall be designed to suit the loading and spacing of Junior Beams. The slabs shall be poured on (self-centering lath) (paper-backed fabric) (removable forms). The concrete shall be composed of one part cement and a graded mixture consisting of not more than seven parts of fine and coarse aggregate. Where the slab is poured on lath, it shall be mixed sufficiently dry to prevent dripping. Where the slab is poured on removable forms, the maximum size of the aggregate shall be ½ in. and the concrete shall be of a consistency which will allow it to encase the beam flanges and flow under the wood sleepers. Where floor slabs of other material than concrete are used, they shall be designed to carry the specified loading in accordance with manufacturer's specifications.

Permanent Centering—Lath shall be applied with sheets running at right angles to the Junior Beams. Metal lath shall be securely fastened to the tops of the Junior Beams with lath clips on 12 in. centers, except at ends of sheets where lath clips shall be at 6 in. centers, and applied with a special tool furnished by the manufacturers of the J & L Junior Beams. Lath sheets shall be securely wired together along the side laps midway between Junior Beams. Any approved form of metal lath or backed floor fabric may be used. Any and all clips, ties, or other accessories necessary for the proper application of each particular type of centering shall be used in accordance with these specifications or the specifications of the manufacturer of the respective centering materials. The writer of the specifications shall define the type and quality of the centering to meet the particular requirements.

Removable Forms—Either wood or steel forms may be employed, placed so that the compression flange of the Junior Beams will be embedded. Where a plaster ceiling is not used and appearance is a factor, there should be a minimum of ¾ in. embedment of top flange. Standard practice regarding the use of shoreless forms will obtain.

Temperature and Shrinkage Reinforcing—When finished floors are made of composition, terrazzo or materials other than wood, provisions shall be made for proper size of steel reinforcing.

Ceiling Lath—Ceiling lath, covered elsewhere under plastering specifications shall be firmly wired to (pencil rods) (furring channels) which in turn shall be securely fastened to the bottom flanges of the Junior Beams by means of approved clips. Use of J & L furring clip to obtain proper space for conduits is recommended.

Where the spacings of the Junior Beams are narrow, flat or ribbed lath may be fastened directly, by means of an approved clip, to the lower flanges of the Junior Beams. Ribbed lath shall be applied so that the ribs are at right angles to the direction of the pencil rods, or, when pencil rods are omitted, to Junior Beams.

HANGERS AND ACCESSORIES FOR J & L JUNIOR BEAMS

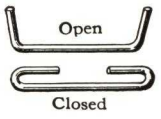
BEAM ANCHOR

For use in anchoring Junior Beams in masonry wall. This anchor is supplied in one size only, as shown. Requires a 13/16 in. hole punched in center of web of Junior Beam, 2 in. from end.

WALLBEARING PLATE

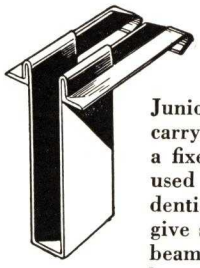
Holds Junior Beam steadily in vertical position during erection. Made in seven sizes, one for each Junior Beam. When ordering, specify depth of Junior Beams.

LATH CLIP



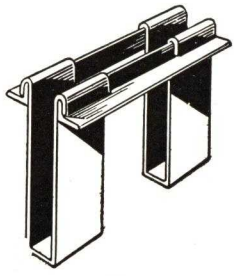
For attaching metal lath to either top or bottom flanges of Junior Beams. Made in seven sizes, one for each Junior Beam. When ordering, specify depth of Junior Beams.

STANDARD STIRRUP HANGERS



Single

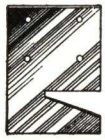
Single: For supporting one Junior Beam at right angles to another Junior Beam or structural carrying beam. This is not a fixed connection and is used principally in residential floors. In ordering, give size of both carrying beam and Junior Beam to be supported. For use where top flanges of beams are to be flush.



Double

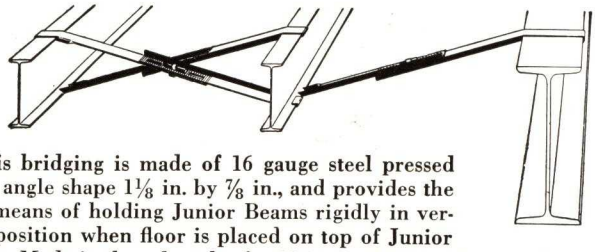
Double: For use as above where Junior Beams are opposite each other and supported by one primary member.

STANDARD PLATE CLIP FOR SLEEPERS



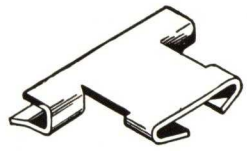
This plate clip is used for fastening sleepers to top flanges of Junior Beams. It is also used for fastening ceiling screeds to bottom flanges of Junior Beams.

RIGID BRIDGING



This bridging is made of 16 gauge steel pressed to an angle shape 1⅛ in. by ⅞ in., and provides the best means of holding Junior Beams rigidly in vertical position when floor is placed on top of Junior Beams. Made in three lengths, for 12 in. to 20 in. spacing, for 20 in. to 30 in. spacing and for 30 in. to 36 in. spacing. In ordering, give number of pairs required and spacing of Junior Beams. Wire Bridging can be used as an alternate in certain localities.

TOP FLANGE CLAMP



To be attached to top flanges of Junior Beams when Junior Beams rest on shelf angles. A similar clamp is furnished for attachment to the bottom flange of Junior Beams when Junior Beams rest on top of structural members. The latter clamp has an offset equal to the thickness of the flange of the structural member. These clamps hold Junior Beam steadily in vertical position during erection.

SCREED CHAIRS

Type R

Type P

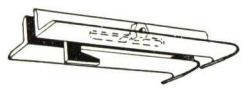
To be used in association with metal lath and concrete construction.

Type R—To be used when the sleeper is placed at right angles to the Junior Beams. Sleepers are held securely by nails through loops in sides of chair.

Type P—For use as above when sleepers run parallel with Junior Beams.

STANDARD ADJUSTABLE ANGLE HANGERS

Double



Single

Double: This connection used principally in residential floors, may be used to support Junior Beams at right angles to and on top of main carrying member. Junior Beams project 2½ in. above top flange of main carrying member. Ends of Junior Beams must be cut at an angle of 45 degrees.

Single: To be used under same conditions as double hangers, but to support Junior Beam on only one side of main carrying member.

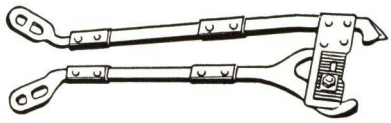
REINFORCING ROD CLIP

For attaching ¼ in. reinforcing rods to either top or bottom flanges of Junior Beams.

FURRING CHANNEL CLIP

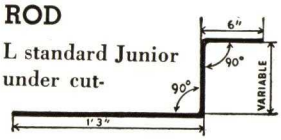
For attaching furring channels to bottom flanges of Junior Beams to provide for plastered ceiling. This clip is supplied in four sizes: ¾ in., 1 in., 1½ in. and 2 in. In ordering, specify size required.

LATH CLIP TOOL



Used for crimping standard lath clips on flanges of Junior Beams.

CEILING EXTENSION ROD



To be used in connection with J & L standard Junior Beam end. This rod carries ceiling under cut-out end of Junior Beam.

BRIDGING ANCHOR

To be used at end of a run of wire bridging. Anchor in wall and attach to both top and bottom flanges of Junior Beam.

J & L JUNIOR BEAM FLOORS FOR RESIDENCES

Study of deterioration in residential construction reveals that, even with the best of foundations, walls and roof, serious and expensive defects develop as soon as shrinkage occurs in the floor joists, as it will when they are of wood. The immediate effect of this shrinkage is a settling of all interior construction depending on the floor joists for support. The results are plaster cracks in walls and ceilings, twisted door frames, uneven floors and gaps between baseboards and flooring.

When the J & L Junior Beam floor for residences is used, the first floor is an integral part of the foundations, providing the same rigid, vibration-free, non-shrinkable support for the interior walls of the house that the foundations provide for the exterior walls. It acts as a complete fire stop between the basement and the remainder of the house, and prevents moisture from rising through partition walls to the floors above. It is vermin-proof and impervious to the attacks of termites.

The J & L Junior Beam floor for residences is universally adaptable. It may be used as the first floor of any house, without imposing any restrictions whatever on either the architect or the builder. The additional advantages of having the same steel and concrete system for the floors above the first are available in any house having solid masonry walls or steel framing. Any type of wearing surface may be applied, hardwood, terrazzo, tile, linoleum, composition block, etc. By following the methods described and illustrated in the following pages, the architect can easily design a Junior Beam floor and any experienced builder can make up his list of materials and install this steel and concrete system as easily as the old-fashioned wooden joist floor. The materials may be obtained through the usual sources of steel supply, or the Jones & Laughlin Steel Corporation will furnish the names of Junior Beam dealers in any given territory.

CONSTRUCTION OF A J & L JUNIOR BEAM FLOOR

The principal materials in the J & L Junior Beam floor for residences are steel and concrete, combined to give maximum structural soundness at lowest cost. No fabrication is required for connecting the steel beams. See Figure 1, in which (1) shows how Junior Beams rest on lower flange of carrying member and (2) how standard stirrup hanger is used to support Junior Beam at right angle to another Junior Beam or standard I-beam.

Fig. 2-a illustrates the installation of the Junior Beam Floor in veneer construction. Outside brick wall, interior wall, concrete firestop and slab and the hardwood wearing surface are cut away to show details of the floor. The Junior Beams are shown resting directly on concrete foundations. The sleepers (2 in. by 3 in. wooden nailing strips) are held securely to the steel by two plate clips at each point where they cross a Junior Beam. Two plain steel reinforcing bars, ¼ in. in diameter, are fastened to the Junior Beams between sleepers. The concrete floor slab and the concrete firestop along the foundation wall are then poured in temporary wooden forms, imbedding the top flanges of the Junior Beams, so that the beams, sleepers and reinforcing rods are held rigidly in place. Sleepers are spaced from 12 in. to 16 in. apart and the concrete is leveled approximately ¼ in. to ⅜ in. below the tops of them. The hardwood floor is nailed directly to the sleepers. The 2 in. by 4 in. plate for receiving sidewall studs is nailed to wooden blocks imbedded in the concrete firestop along the sidewall shown.

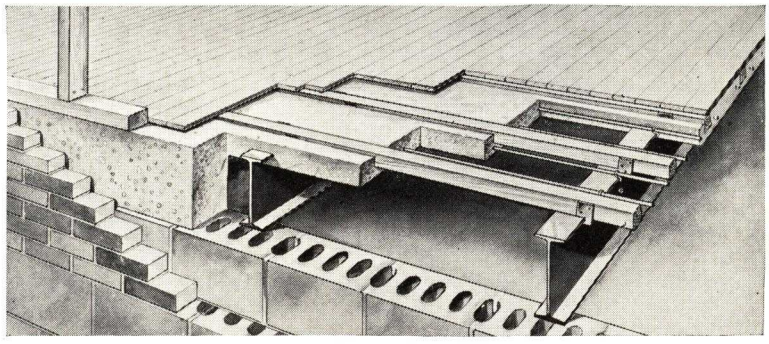


Figure 2-a

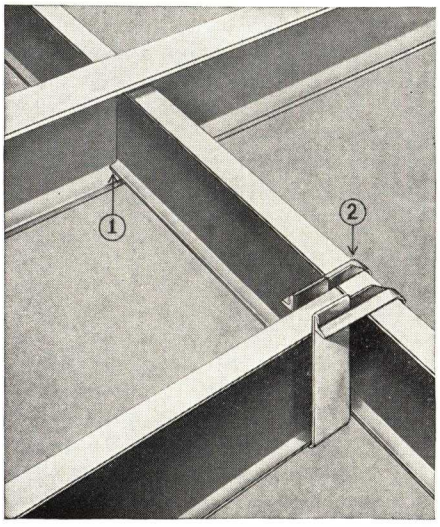


Figure 1

Fig. 2-b shows the J & L Junior Beam floor for residences with linoleum finish. When the finished floor is to be linoleum, tile, terrazzo, wood parquet or any material to be set in mastic, no sleepers are necessary. The concrete slab is floated smooth at the time of pouring, and requires no separate finish to receive the mastic. The finished flooring is then applied according to the manufacturer's specifications. In this floor, ¼ in. steel reinforcing bars are placed 18 in. apart at right angles to the principal reinforcing of similar material, to prevent temperature cracks in the slab. Reinforcing mesh of equivalent strength may be used in place of reinforcing bars.

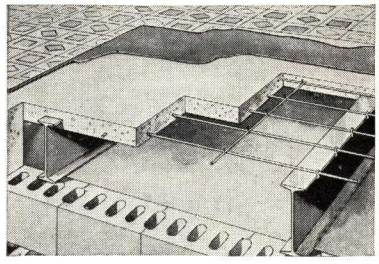


Figure 2-b

HOW TO LAY OUT A J & L JUNIOR BEAM FIRST FLOOR FOR A TYPICAL RESIDENCE

In the laying out of a house for Junior Beam Floors, approximately the same system that is used in placing wood supports can be applied to locating the steel beams and supporting columns. The main carrying beam is placed under the bearing partition. The Junior Beams are then located in the same manner as wooden joists. Junior Beams are doubled under non-bearing partitions. In framing a stairwell, a Junior Beam, supported by the standard stirrup hanger, serves as the header.

Fig. 3 shows the first floor architectural plan and the corresponding steel layout for a representative moderate priced house. The bearing partition separating the living room from the dining room and kitchen, supports the floor joists of the second floor and attic. Therefore, the main carrying member is located under this partition. In this house, the position of the stairwell prevents running the main carrying member from wall to wall, so it is stopped at the stairwell and supported by a basement column, either a pipe or H-column with plates welded or bolted on both top and bottom. Another main carrying member is placed across the projection at the front of the house.

The next step in laying out the steel is the locating of the Junior Beams that frame the stairwell. The flanges of these beams should be kept approximately 1 in. from the stair opening to allow for plastering. Next, two Junior Beams are located under each of the non-bearing partitions (the one partition separating dining room and kitchen and the other separating living room and stairway to second floor). The final step is the locating of the remaining Junior Beams necessary to carry the floor only, at spacings that are multiples of the width of the boards to be used for the concrete form. For detail drawings of floor construction see pages 13 and 14.

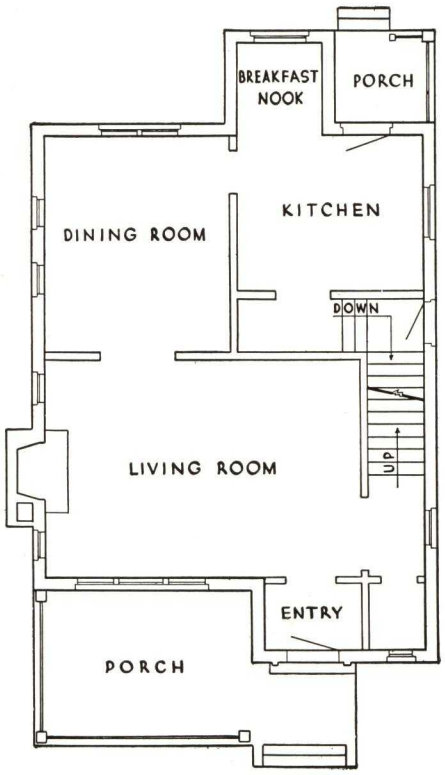
The Junior Beam layout is based on the beam sizes and spacings shown in the table on page 11. The range of live loads in this table covers requirements of all the various building codes. In addition to these live loads, a dead load of 45 lbs. per sq. ft. is provided for in the spacings given. The dead load is made up of:

Finished Flooring	4 lbs. per sq. ft.
Concrete	30 lbs. per sq. ft.
Junior Beams	3 lbs. per sq. ft.
Plaster ceiling	8 lbs. per sq. ft.
Total dead load	45 lbs. per sq. ft.

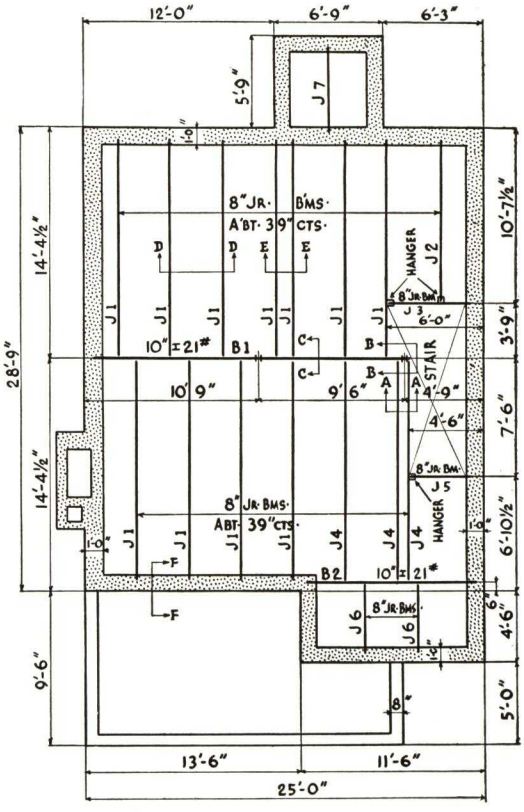
The spacings given in the table are based on the use of 8 in. common lumber (four, five or six boards between Junior Beams).

Use of Junior Beams of the same size throughout the floor represents the simplest construction. This eliminates need for end fabrication of the steel and for bringing foundation walls to different levels. Generally the saving in money on these two items will more than cover the extra cost of any excessive weight in the steel used. By referring again to the table it will be noted that the 8 in. Junior Beam can be used for spans up to 16 ft., and will meet the floor plan requirements of most moderately priced houses.

Occasionally a condition is encountered that obviously will overload a Junior Beam. Where this occurs the Junior Beam should be replaced by a standard I-beam of equal depth. Overloading of Junior Beams is most likely to result from use of tile floor and tile walls in bathrooms and from exceptionally wide stair openings.



First Floor Plan



First Floor Steel Plan

Figure 3

(For Construction Details at Section Points on First Floor Steel Plan refer to Pages 13 and 14)

TABLE OF JUNIOR BEAM SPACINGS
For Various Live Loads

Span	20 Lb. L. L.		30 Lb. L. L.		40 Lb. L. L.		50 Lb. L. L.		60 Lb. L. L.	
	Size ins.	Space ins.	Size ins.	Space ins.	Size ins.	Space ins.	Size ins.	Space ins.	Size ins.	Space ins.
12′-0″	6	31	6	31	—	—	—	—	—	—
	7	46	7	46	7	39	7	31	7	31
	8	46	8	46	8	46	8	46	8	39
	9	46	9	46	9	46	9	46	9	46
13′-0″	6	31	—	—	—	—	—	—	—	—
	7	39	7	39	7	31	7	31	8	31
	8	46	8	46	8	46	8	39	9	46
	9	46	9	46	9	46	9	46	10	46
14′-0″	7	39	7	31	8	39	8	31	8	31
	8	46	8	46	9	46	9	39	9	39
	9	46	9	46	10	46	10	46	10	46
15′-0″	7	31	8	39	8	31	8	31	9	31
	8	46	9	46	9	39	9	39	10	46
	9	46	10	46	10	46	10	46	11	46
16′-0″	8	39	8	31	8	31	9	31	9	31
	9	46	9	39	9	39	10	46	10	39
	10	46	10	46	10	46	11	46	11	46
17′-0″	8	31	8	31	9	31	9	31	10	31
	9	39	9	39	10	46	10	39	11	46
	10	46	10	46	11	46	11	46	12	46
18′-0″	8	31	9	31	9	31	10	31	10	31
	9	39	10	46	10	39	11	46	11	39
	10	46	11	46	11	46	12	46	12	46
19′-0″	9	31	9	31	10	31	10	31	11	31
	10	46	10	39	11	46	11	39	12	46
	11	46	11	46	12	46	12	46	—	—
20′-0″	9	31	10	31	10	31	11	31	11	31
	10	39	11	46	11	39	12	46	12	39
	11	46	12	46	12	46	—	—	—	—
21′-0″	10	39	10	31	11	31	11	31	12	31
	11	46	11	39	12	46	12	39	—	—
	12	46	12	46	—	—	—	—	—	—
22′-0″	11	39	11	39	11	31	11	31	12	31
	12	46	12	46	12	39	12	39	—	—
23′-0″	11	39	11	31	11	31	12	31	12	31
	12	46	12	39	12	39	—	—	—	—
24′-0″	12	39	12	39	12	31	12	31	12	29

NOTE:—When spacings are greater than 39″, sleepers should be 2″ x 4″ laid flat, instead of the usual 2″ x 3″ beveled sleepers.

TYPICAL BILL OF MATERIALS

The bill of materials for the first floor of this typical house, made up from only the completely dimensioned foundation plan (Figure 3), is as follows:

1 piece 10″ I 21 lb. x 20′-1″ marked B1 (flat flange)
1 piece 10″ I 21 lb. x 10′-6″ marked B2 (flat flange)
11 pieces 8″ Jr. Bms. x 13′-7¼″ marked J1
1 piece 8″ Jr. Bm. x 9′-8½″ marked J 2
1 piece 8″ Jr. Bm. x 5′-1″ marked J3
3 pieces 8″ Jr. Bms. x 13′-9″ marked J4
1 piece 8″ Jr. Bm. x 3′-7″ marked J5
2 pieces 8″ Jr. Bms. x 4′-2¾″ marked J6
1 piece 8″ Jr. Bm. x 5′-4″ marked J7
2 pieces 4″ H 13.8 lb. Cols. x 6′-8″ with 8″ x ½″ x 8″ Base Plate and 6″ x ½″ x 6″ Cap Plate.
3 Standard stirrup hangers for 8″ Jr. Bms. supported by 8″ Jr. Bms.
1300 Lineal feet of ¼″ Round Reinforcing Bars.
450 Standard Plate Clips for Sleepers.
200 Reinforcing Bar Clips.
B1 and B2 to be punched with 13/16″ holes staggered in top flange about 3′-0″ apart.
1 Beam J1 and J4, and Beams J3 and J5 to be punched in web with 13/16″ holes 2′-6″ Cts. for attaching blocks around stairwell.

If flexible conduit is used all beams should be punched with 13/16″ holes in webs about 4′-0″ Cts.

The length given for the main carrying beam allows 6″ bearing on the foundation wall and holds the other end, supported by columns, 1″ from the stair opening. Junior Beams are specified at lengths that allow 3½″ bearing on foundation walls and approximately ¾″ clearance from center of main carrying member to allow for the web thickness of that section.

The Junior Beam stairwell headers (J3 and J5 on Figure 3) are cut to allow approximately ¼″ clearance between the ends of them and the edge of the flanges of the Junior Beams (J1 and J4 on Figure 3) on which they are supported by standard stirrup hangers. Note that in ordering standard stirrup hangers to support one beam at right angles to another, the size and type of both the beam to be supported and the carrying beam must be specified.

APPLYING THE J & L JUNIOR BEAM SYSTEM TO FLOORS ABOVE THE FIRST

In the preceding page the application of the Junior Beam system has been limited to the first floor, as a Junior Beam first floor may be installed in any house regardless of the materials used for frame and outside wall. The additional advantages of also having the Junior Beam system in floors above the first are available in any house having masonry walls or steel framing.

While Junior Beam floors throughout a house represent additional dead load, the footer course under foundation walls need not be wider than the usual 18 in. or 24 in., providing the soil will safely support a load of 3,000 lbs. per sq. ft. The load on exterior walls is about 4,500 lbs. per lin. ft. The load on the columns is 90 lbs. per sq. ft. of floor supported when the live load is calculated at 40 lbs. In this house, the center column supports 420 sq. ft. of floor, or about 36,000 lbs. and the column footing should be designed accordingly.

The vertical supports may be either regular pipe columns or 4 in. H-sections with plates welded or bolted on both top and bottom. Plates on the columns should not be wider than flange on the main carrying member the columns support. The only holes in all of this steel construction which must be located accurately are those in the flanges of the main carrying members providing for bolting these beams to the plates on the ends of the columns. As in Junior Beam first floor construction, Junior Beams throughout other floors are rested on masonry walls and bottom flanges of main carrying members, or are supported in standard hangers.

THE J & L JUNIOR BEAM SECOND FLOOR

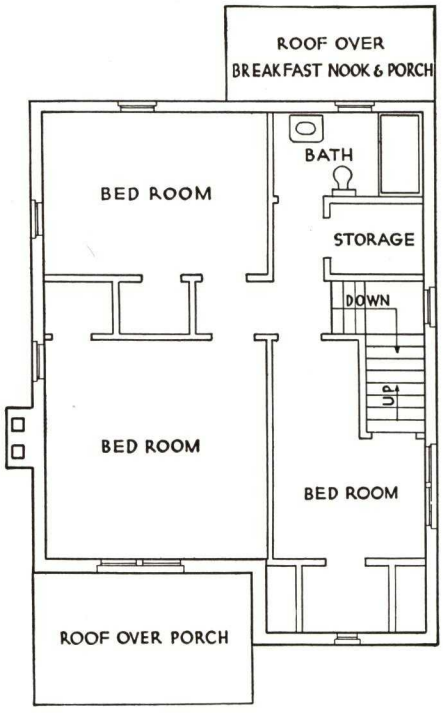
The second floor architectural and steel plans (Fig. 4, next page) illustrate how the same beam arrangement used in the first floor is retained as far as possible in the second floor, with the main carrying member and supporting columns in the same relative positions. This allows for duplication in lengths of materials used in the two floors and also permits the builder to use much of his form lumber in the second floor just as he used it in the first floor.

The procedure in laying out the steel for the second floor is the same as that followed in making up the bill of materials for the first floor. The main carrying member is located, the stairwell framed, Junior Beams doubled under non-bearing partitions and the remaining area spanned by Junior Beams spaced to correspond as nearly as possible with the first floor Junior Beam spacing. It will be noted that a header beam has been placed across the projection at the rear of the house, to support the wall above it, just as a similar header beam was placed across the projection at the front of the house in the first floor steel plan. Because of the addi-

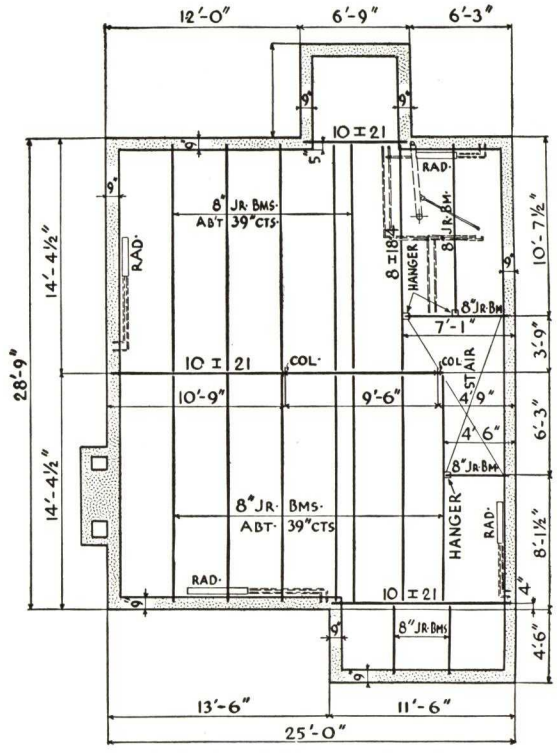
tional load of bathroom floor and walls, an 8 in. standard I-beam is used in place of a Junior Beam at this point.

It will be seen from the location of radiators and bathroom fixtures, as shown in the steel plan, that it will be necessary for the steam fitter and plumber to burn only a few holes in the webs of Junior Beams to accommodate piping.

As in the case of the foundation walls, the second floor walls are brought to an even elevation.



SECOND FLOOR PLAN

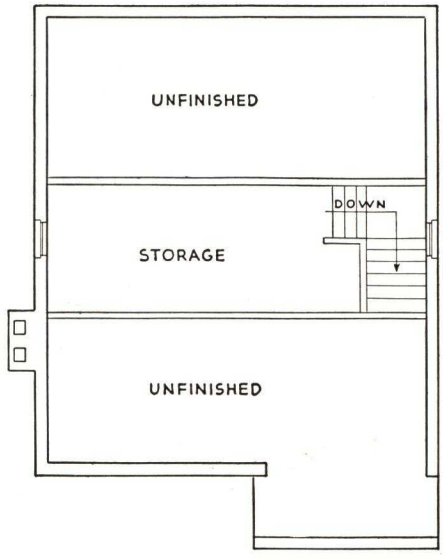


SECOND FLOOR STEEL PLAN

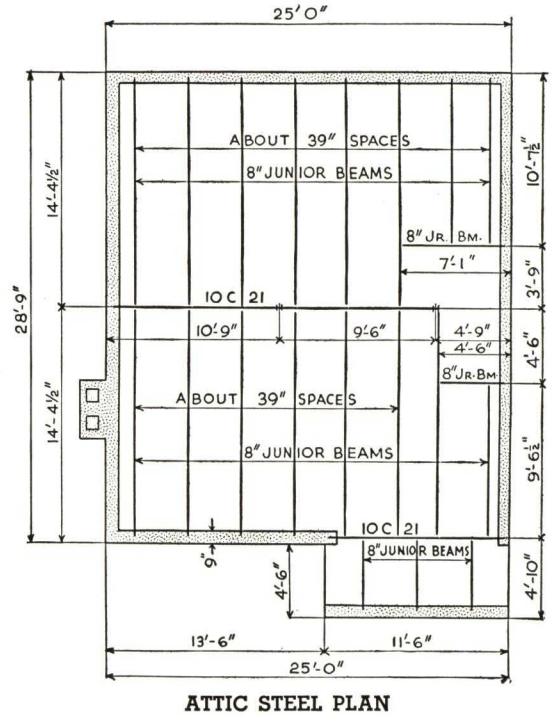
Figure 3

THE J & L JUNIOR BEAM ATTIC FLOOR

The architectural and steel plans (Fig. 4) for the attic illustrate the similarity between making up the bill of material for this floor and for the first and second floors. The principal difference between this floor and those under it is the absence of non-bearing partitions paralleling the Junior Beams in the attic, which makes it unnecessary to double the beams at any point.



ATTIC FLOOR PLAN



ATTIC STEEL PLAN

Figure 4

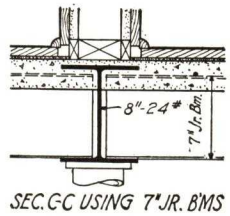
INSTALLATION DETAILS • J & L JUNIOR BEAM

Wood Finish Flooring on Sleepers

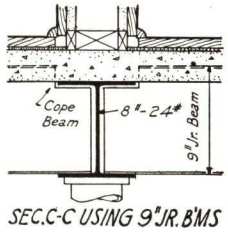
(For points at which sections are taken refer to First Floor Steel Plan, Page 10)

The large Section C-C shows 8-in. deep Junior Beams framing into a 10-in. flat flange girder. The Junior Beams rest directly on the flat lower flange of the girder without fabrication. Either 8-in. or 9-in. (see smaller Section C-C) frame into a 10-in. girder without coping. Wooden sleepers are fastened securely to the top flanges of the Junior Beams by two standard sleeper clips and steel reinforcing bars are attached with standard reinforcing rod clips. Where doorways are cut through the bearing partition, sole plates are omitted and the flooring runs over the girder without a break. Section D-D shows the construction of a typical bay and Section E-E shows the spacing of the Junior Beams at a non-bearing partition.

The vertical supports may be either regular (unfilled) pipe columns or 4-in. H-sections with plates bolted or welded on both top and bottom. Plates should be no wider than the girder flanges.

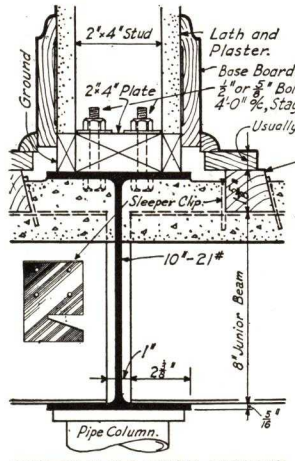


SEC. C-C USING 7" JR. B'MS

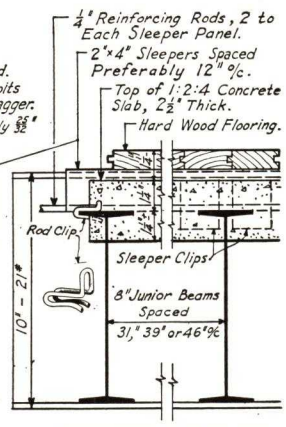


SEC. C-C USING 9" JR. B'MS

Scale $\frac{3}{4}$" = 1'-0"



SECTION C-C THRU GIRDER AT BEARING PARTITION



SECTION D-D THRU TYPICAL BAY

Scale : 1½" = 1'-0"

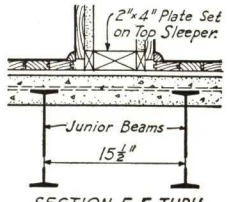
Wood or Other Types of Finish Flooring Set in Mastic

(For points at which sections are taken refer to First Floor Steel Plan, Page 10)

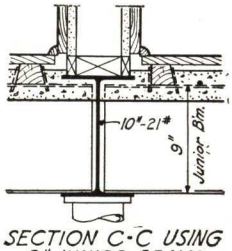
When the finished floor is to be linoleum, tile, terrazzo, wood parquetry blocks, or any material to be set in mastic, no sleepers are necessary. The concrete slab is floated smooth at the final pouring and requires no separate finish to receive the mastic. The finished flooring is then applied according to the manufacturer's directions. The 8-in. 24# flat flange section is used as a girder. The slab passes over the top of the main carrying member as shown in Section C-C.

When 8-in. or 9-in. Junior Beams are required to carry the load, they must be coped for framing into the 8-in. girder (see lower small Section C-C). The 7-in. Junior Beams can be framed without coping (see upper small Section C-C). Since the top flanges of the Junior Beams are held rigidly by the slab, no bridging is necessary to insure lateral rigidity. Section D-D shows construction of typical bay.

The vertical supports may be either regular pipe columns or 4-in. H-sections with plates welded or bolted on both top and bottom. Plates should be no wider than the girder flange.

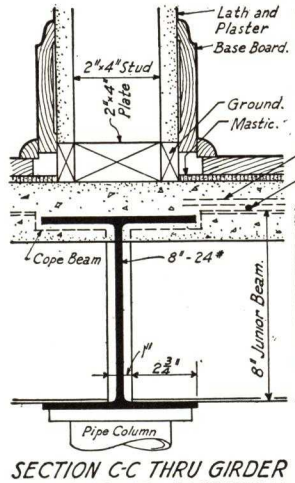


SECTION E-E THRU NON-BEARING PARTITION

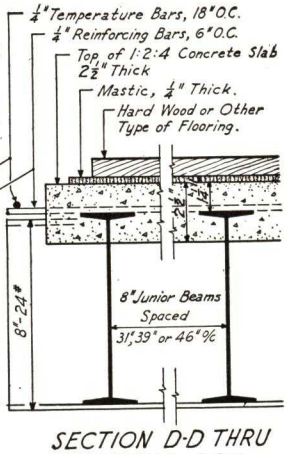


SECTION C-C USING 9" JUNIOR BEAMS

Scale : $\frac{3}{4}$" = 1'-0"



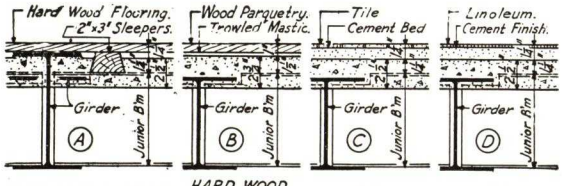
SECTION C-C THRU GIRDER AT BEARING PARTITION



SECTION D-D THRU TYPICAL BAY

Scale : 1½" = 1'-0"

Various Floor and Ceiling Treatments



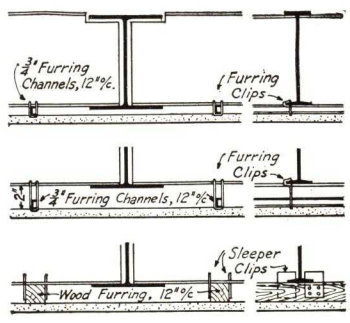
HARD WOOD FLOORING ON WOOD SLEEPERS | HARD WOOD PARQUETRY LAID IN MASTIC | TILE FLOORING | LINOLEUM FLOORING

At "A" above is shown hardwood flooring applied to sleepers. With a 10 in. girder, it is necessary to use 8 in. or larger Junior Beams. This is so that 2 in. by 3 in. sleepers will carry the finish flooring over the top flange of the girder. With an 8 in. girder any size Junior Beams may be used that satisfy the requirements of the load to be carried.

At "B" is shown hardwood parquetry block flooring set in mastic, and made to line with the construction at "A" by making the slab ¼ in. thicker. Parquetry block floors not required to line with wood flooring on sleepers would have the usual 2½ in. slab.

Details "C" and "D" show how tile or linoleum floors are made to line with the wood floor, in cases where they are used for baths, kitchens, etc.

For ordinary basement ceilings, J & L Junior Beam construction presents a neat and acceptable appearance. Where special rooms require a plastered ceiling, the construction is rendered very simple by the use of standard J & L furring clips, (see illustration). These are made in four sizes to permit a clearance of ¾ in., 1 in., 1½ in., or 2 in. between the bottoms of the beams and the plaster. The installation of electric conduit may be handled in several different ways. It may be imbedded in the concrete slab. Flexible conduit may be run through holes punched at the neutral axis in the webs of the Junior Beams. Flexible conduit may be run between the plaster and the bottoms of the Junior Beams by the use of the standard furring clips. Rigid conduit may be fastened to the bottom flanges of the Junior Beams, in which case, if a plaster ceiling is to be applied, the 2 in. furring clips are used to give ample room. For ceiling finishes that must be held in place by nails, furring strips are fastened to the bottom flanges by inverting the standard sleeper clips.



SECTIONS PARALLEL TO BEAMS | SECTIONS ACROSS BEAMS

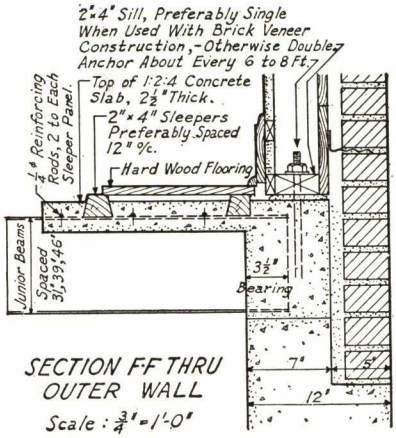
INSTALLATION DETAILS • J & L JUNIOR BEAM

Details of End Bearing on Foundation

(For points at which sections are taken refer to First Floor Steel Plan, Page 10)

Since the top of the foundation wall on which the Junior Beams have their bearing may be irregular or uneven, it becomes necessary to level them by shimming. Cement grout or wooden wedges may be used as leveling material, since the beams are held by their upper flanges as soon as the concrete has attained its set, and the material used for shimming carries no load.

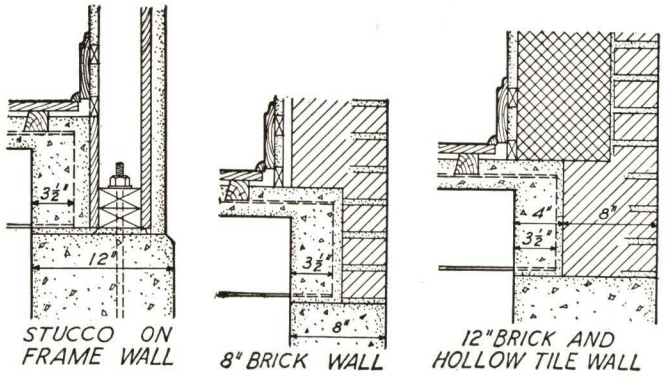
The sill details shown indicate the complete firestopping obtained with this construction. It is at the sill that a great deal of the harmful shrinkage occurs in the ordinary wood-framed house. The J & L Junior Beam floor does not shrink. It is rigid, vibration-free, and shrinkproof.



SECTION F-F THRU OUTER WALL
Scale: ¾"=1'-0"

In the section showing brick veneer construction, the floor must be in place before the wall framing is erected.

The drawings show hardwood flooring on sleepers, but the sill construction is similar for any type of finished flooring.



STUCCO ON FRAME WALL

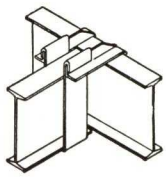
8" BRICK WALL

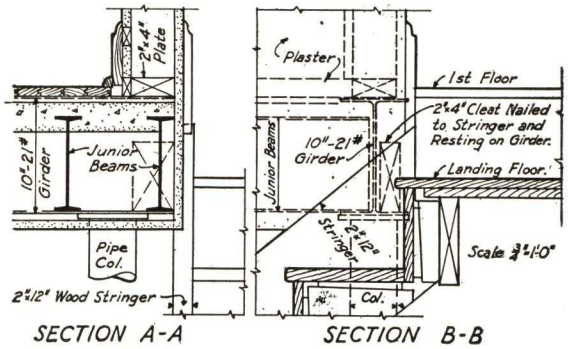
12" BRICK AND HOLLOW TILE WALL

Stair Details and Plumbing Pipes

(For points at which sections are taken refer to First Floor Steel Plan, Page 10)

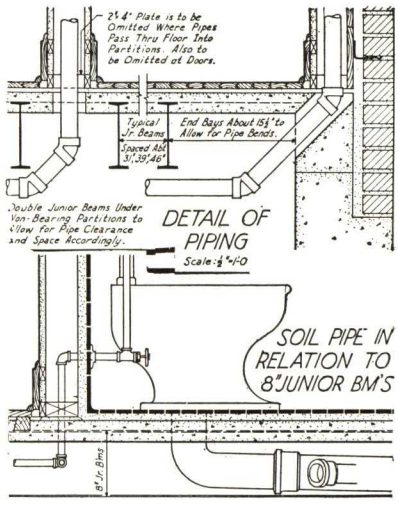
For supporting a Junior Beam at right angles to another Junior Beam or standard I-beam, a standard stirrup hanger is employed. This is not a fixed connection. The stirrup hanger keeps the top flanges of the beams flush. It is used for framing headers and trimming around stair openings, chimney openings, etc.





SECTION A-A SECTION B-B

At the right is shown how pipes are carried through the concrete floor slab and into non-bearing partitions. Pipe sleeves or boxes are set in the concrete form to maintain a seal between basement and the floors above. In houses having a hot air system, the ducts enter non-bearing partitions in a similar manner. Where pipe is carried into the outside wall, the opening thru the firestop is provided by setting a pipe sleeve inside the concrete form. The first Junior Beam must be placed at least 10 in. from the wall to give the plumber room in which to work.



SPECIFICATIONS FOR J & L JUNIOR BEAM FLOOR FOR RESIDENCES

1. Jones & Laughlin Junior Beams of the size and at the spacings as shown on the plans shall be used to support the (first) (first and second) (first, second and third) floors.

2. Two Junior Beams, spaced to provide for piping, shall be used under non-bearing partitions running parallel with Junior Beams.

3. The main carrying beam (or beams) and columns under bearing partitions shall be as shown.

If bearing partition plate is to be bolted to main carrying member:

4. Main carrying beam (or beams) shall be punched in top flange with 13/16 in. holes about 4 ft. 0 in. centers staggered.

If flexible conduit is to be used:

5. Junior Beams and main carrying beam (or beams) shall be punched in webs with 13/16 in. holes about 4 ft. 0 in. centers.

6. Beams framing stairwell shall be punched in webs with 13/16 in. holes to provide for blocking.

7. Bearing of steel on walls shall be 6 in. for main carrying beam (or beams) and a minimum of 3½ in. for Junior Beams.

8. All steel shall have one shop coat of paint.

9. Concrete forms shall be built so that the bottom of the concrete slab will be approximately 1¼ in. below the tops of Junior Beams. (See "J & L Junior Beams for Residences" published 1935 by Jones & Laughlin Steel Corporation, for recommended form construction.)

SPECIFICATIONS FOR J & L JUNIOR BEAM FLOOR FOR RESIDENCES (Continued)

If wood flooring is to be nailed or pegged to sleepers:

10. Beveled 2 in. by 3 in. sleepers (2 in. by 4 in. sleepers laid flat) spaced at (12 in.) (16 in.) centers, shall be placed directly on top of flanges of Junior Beams and fastened securely to each beam by two standard plate clips, one on each side of sleeper. Concrete reinforcing shall be ¼ in. round steel reinforcing bars spaced at 6 in. centers and fastened to top flanges of Junior Beams by reinforcing bar clips. Floor shall be leveled after forms, sleepers and reinforcing bars are in place.

If finished flooring is to be set in mastic:

11. Concrete slab shall be floated smooth at time of pouring. Concrete reinforcing shall be ¼ in. round steel bars spaced at 6 in. centers and fastened to top flanges of Junior Beams by reinforcing bar clips. Temperature reinforcing shall be ¼ in. steel reinforcing bars spaced at 18 in. centers and placed at right angles to main reinforcing. Steel mesh of equivalent strength may be used in place of ¼ in. steel reinforcing bars. Floor shall be leveled after forms and reinforcing are in place.

If construction is to be frame or veneered walls:

12. Firestop around outside walls shall be constructed as shown on the plans and shall be continuous around entire building. (See "J & L Junior Beam Floors for Residences" for firestop details.)

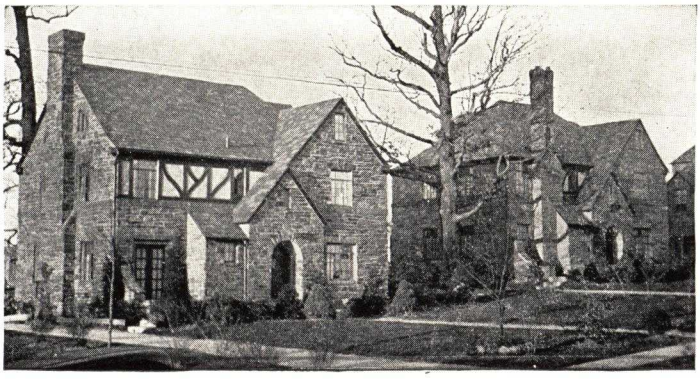
13. Sleeves or boxes shall be placed in concrete formwork to accommodate piping which will pass through concrete floors and concrete firestop.

14. The concrete slab shall be a 1-2-4 mix with pea gravel or crushed aggregate not exceeding ½ in. in size. Concrete shall be of a consistency that, when poured, it may be worked well under top flanges of Junior Beams (and under sleepers. Concrete shall be leveled approximately ¼ in. below tops of sleepers.) When forms are stripped, under side of slab shall present an even surface free from honeycombing or spalling under beam flanges.

If new lumber is used for forms:

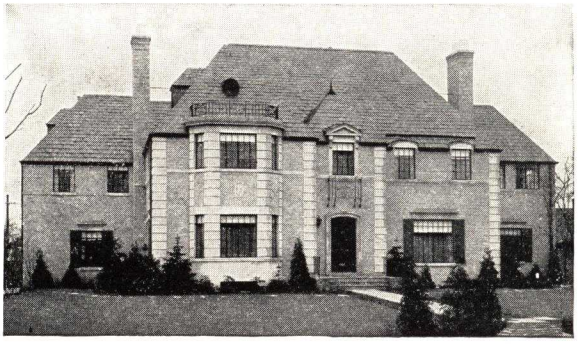
15. Form lumber, after being stripped, may be used for roof sheathing.

TYPICAL RESIDENCES HAVING J & L JUNIOR BEAM FLOORS



RESIDENCES, CYNWYD, PA.

Architect: Max A. Bernhardt Builder: L. H. Greenhouse & Co.



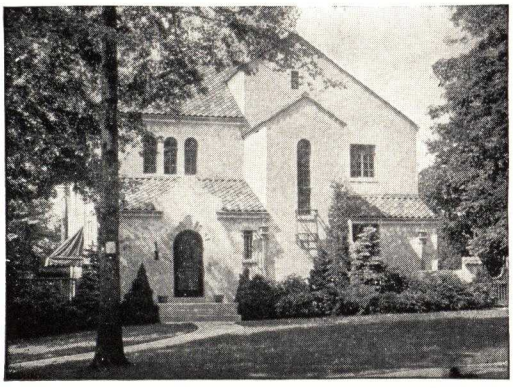
RESIDENCE, EVANSTON, ILL.

Architect: Raymond F. Houlihan Builder: C. A. Hemphill

RESIDENCE, SOUTH ORANGE, N. J.

Owner: A. Burton Cohen

Architect: Thomas Paterson, Jr.



RESIDENCE, LEXINGTON, MASS.

Architect: Howland S. Chandler Builder: Custance Brothers

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

GENERAL OFFICES

Jones & Laughlin Building, Pittsburgh, Pa.

SALES OFFICES

Atlanta	Healey Building	Memphis	1 Auction Avenue
Boston	Consolidated Gas Building	Milwaukee	Bankers Building
Buffalo	Liberty Bank Building	Minneapolis	Phoenix Building
Chicago	Conway Building	New Orleans	N. Miro & Japonica Streets
Cincinnati	Carew Tower	New York	500 Fifth Avenue
Cleveland	Union Trust Building	Philadelphia	Broad St. Station Building
Dallas	Magnolia Building	Pittsburgh	Jones & Laughlin Building
Denver	Continental Oil Building	St. Louis	Boatmen's Bank Building
Detroit	Fisher Building	San Francisco	Standard Oil Building
Houston	Shell Building	Seattle	Smith Tower
Los Angeles	Roosevelt Building	Tulsa	Thompson Building

CANADIAN REPRESENTATIVES

JONES & LAUGHLIN STEEL PRODUCTS COMPANY

Pittsburgh, Pa., U. S. A.

Toronto Daily Star Building, Toronto, Ont., Canada

J & L WAREHOUSES

Chicago	Cincinnati	Detroit	Memphis
New Orleans	New York (Long Island City)*		Pittsburgh

FABRICATING WORKS

New Orleans	New York (Long Island City)*	Pittsburgh

*Operated by National Bridge Works Division
of Jones & Laughlin Steel Service, Inc.

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1938

STRAN-STEEL

CONSTRUCTION DATA

UNIT OF NATIONAL STEEL

STRAN-STEEL DIVISION

GREAT LAKES STEEL CORPORATION

DETROIT, MICHIGAN

1938

EASY TO HANDLE

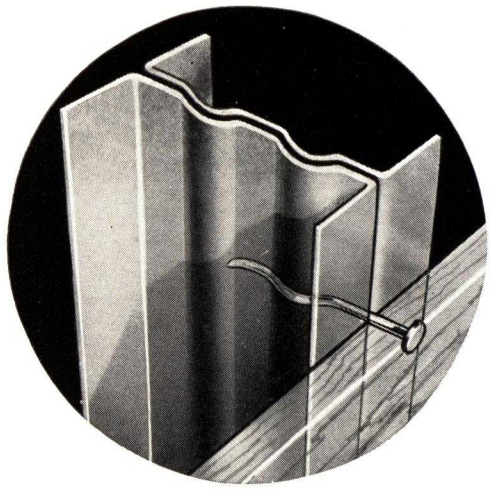
STRAN-STEEL sections are easy to handle. What cutting is required is done with a hack saw or on large jobs with a portable power saw. STRAN-STEEL standard lengths have been worked out so that a minimum of cutting is needed.

STRAIGHT AND TRUE

STRAN-STEEL sections are straight and true. It is not necessary to place the "crown" up, for there is no crown on STRAN-STEEL members. Being steel, they are free from knots, checks, tendency to split and warp, and will not change their dimensions due to atmospheric changes. These sections are made to machine limits and are entirely uniform. This is the case whether you use a short piece, or a much longer member.

ONLY SIMPLE TOOLS USED

In all cases, only ordinary hand tools used in general carpentry are required in erecting STRAN-STEEL. Where large quantities are used on a job, portable power saws are frequently used.



● STRAN-STEEL'S patented nailing groove is a curved space between two strips of channel-shaped steel welded back-to-back to form the member. Nails driven through collateral materials into this space are clinched in a grip of steel.

STRAN-STEEL RESIDENTIAL CONSTRUCTION

STRAN-STEEL is a strong and sturdy steel framing material for houses, partitions and all other light load-bearing structures. It is rigid, warp-proof, shrink-proof and provides a maximum of fire safety.

STANDARD MEMBERS

STRAN-STEEL is obtainable in the form of studs, joists, rafters and sill plates. It is carried in stock, cut to standard lengths to eliminate most of the cutting on the job.

NO CHANGE IN PLANS REQUIRED

The construction of a building in which STRAN-STEEL is used proceeds in the same way as if ordinary framing were used. Dimensions of STRAN-STEEL members conform exactly to the requirements of other materials used with it. Therefore, using STRAN-STEEL entails no change of architectural plan. Special detailing is not required. All standard exterior and interior materials may be used with STRAN-STEEL. It is erected easily and quickly by anyone skilled in carpentry and the usual practices of house construction. No welding is required. Connections are made with self-thread-cutting sheet metal screws.

SUPPLIED BY LUMBER DEALERS

In many cities STRAN-STEEL is available through lumber dealers who stock, sell and service this material. These dealers have the constant co-operation of the Great Lakes Steel Corporation, STRAN-STEEL Division.

STRAN-STEEL
FLOOR CONSTRUCTION

If a concrete sub-floor is to be used, the top of the foundation paralleling the joists is constructed level with the top of the joist. Then anchor bolts are set in the wall in order to receive the bottom wall plate. If wood sub-floors are to be used, the foundation walls are built up so that the wood plate, laid on top of the foundation, is level with the top of the STRAN-STEEL joist.

Anchor bolts should be placed 4′ 0″ on centers in the top of the wall to receive the STRAN-STEEL wall plates.

BRIDGING CLIPPED ON

Joists are set 24″ on center, starting from a joist set flush with the inside of the built up foundation walls. This is the "starter joist." As the joists are set in place, the STRAN-STEEL bridging can be clipped on, so that when the last joist is placed, the job is ready for the application of the flooring.

CUTTING SELDOM NECESSARY

The joists are furnished to the job either cut to fit, or in standard lengths. These standard lengths have been carefully figured out, and often no cutting whatsoever is needed. At least a four-inch bearing on solid masonry is required. In certain cases the use of government anchors is required. The holes punched in the ends of the STRAN-STEEL joists may be used for anchors.

STRAN-STEEL
WALL CONSTRUCTION

The erection of walls in STRAN-STEEL framing is quite simple and follows wood construction closely. One important deviation, however, is spacing, STRAN-STEEL standard studding being spaced 24″ on centers. As in ordinary construction, complete sections of wall studding are assembled to the top plate and erected as a unit. Two screws in diagonally opposite flanges of the studs secure them at both top and bottom.

Partition walls parallel to and between joists are set on partition supports. Outer walls parallel to joists are framed 8″ higher than walls supporting joists.

Where there are no heat or plumbing stacks, and a partition wall is directly over a joist, the bottom plate is omitted, the joist doubled, and the studs are attached with 2″ sections of plate secured directly to the joist.

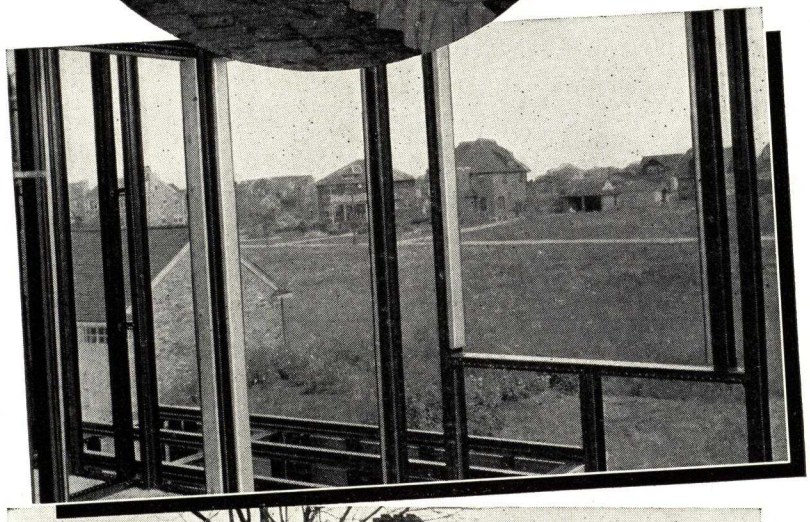
SCREW HOLES PUNCHED IN ALL MEMBERS

Holes will be found in the flanges of each STRAN-STEEL stud and joist. Matching holes will be found in the flange and base of the STRAN-STEEL channel plate. These holes are used in fastening one STRAN-STEEL member to another. A self-thread-cutting screw is used in making these connections. This is a cadmium-plated sheet metal screw, easy to set in place, and will remain in place, holding securely for the life of the building.

Holes in the web of the various STRAN-STEEL studs and joists are for the quick installation of conduit, plumbing, etc.

● Before pouring concrete sub-floor, metal lath is stapled directly to the STRAN-STEEL joists.

● Framing walls with STRAN-STEEL follows conventional practice, STRAN-STEEL studding and plates being handled like other materials. Spacing is 24″ o.c.



3/5

STRAN-STEEL

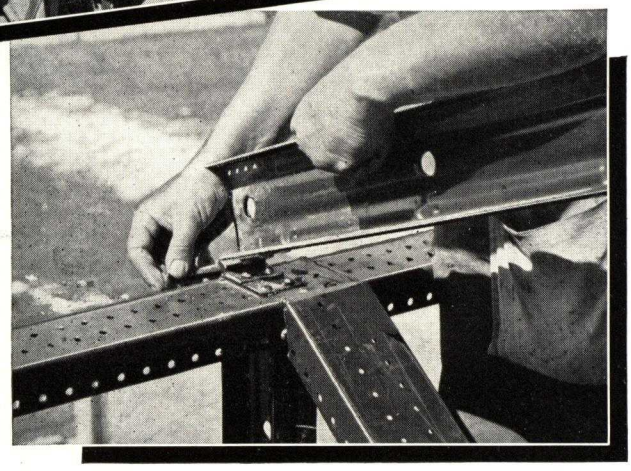
ROOF FRAMING

In residential roof construction, STRAN-STEEL provides permanence, rigidity and fire-safety, the most important factors in the construction of any roof. STRAN-STEEL eliminates rotting, warping, sagging and the consequent damage responsible for much of the expense of maintaining a home.

The design of a home determines which STRAN-STEEL members should be used. Their use conforms to standard practice, making it possible for anyone familiar with roof design and construction to select the proper members. STRAN-STEEL 3⅝″ studs are used where 2 x 4's are ordinarily used. And on roofs with long spans, STRAN-STEEL joists, or 3⅝″ stud sections with supports, are used.

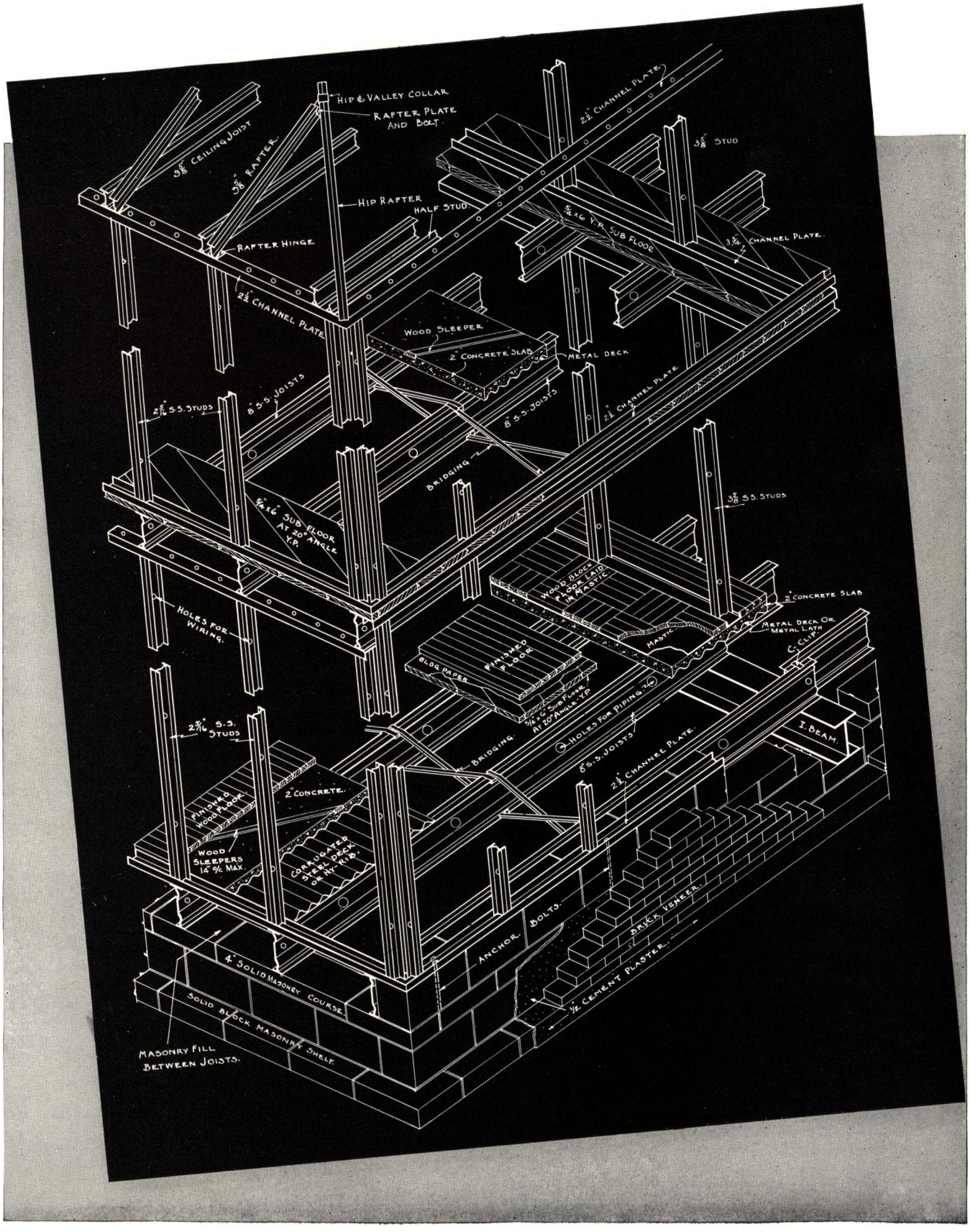
Although lightning is not considered a major hazard, it accounts for many fires and fatalities each year. Its destructiveness is greater in structures of poor electrical conductivity, such as wood, stone, brick and concrete. Should lightning strike a building framed with STRAN-STEEL, the bolt is immediately grounded through the framework itself, thus safeguarding both structure and occupants. STRAN-STEEL framing has no effect on radio reception.

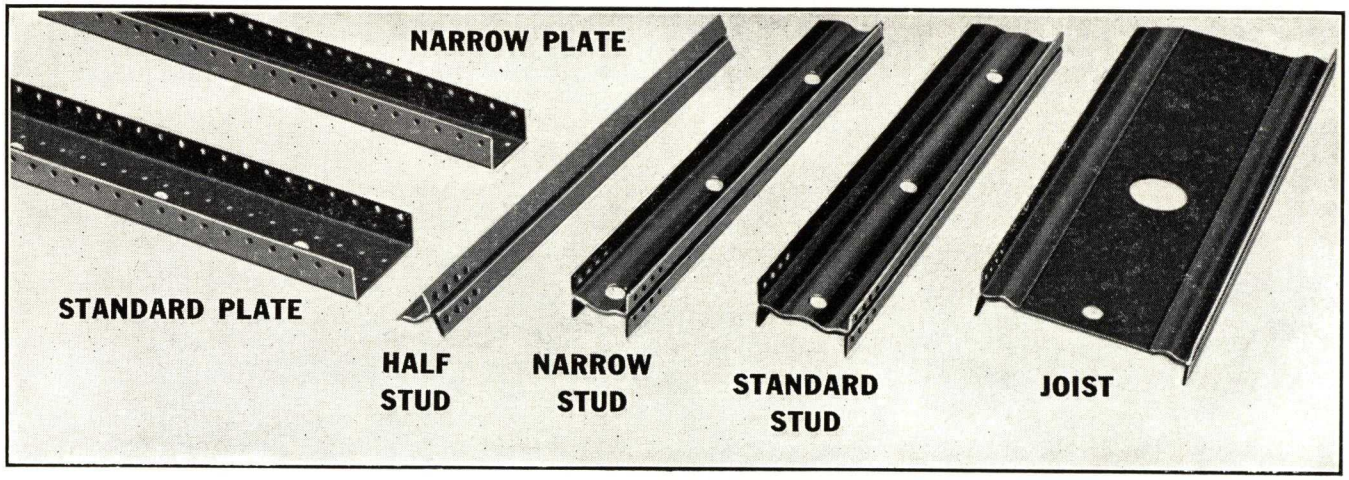
● Tightening bolts at rafter peak after rafters have been raised and temporarily braced in position.

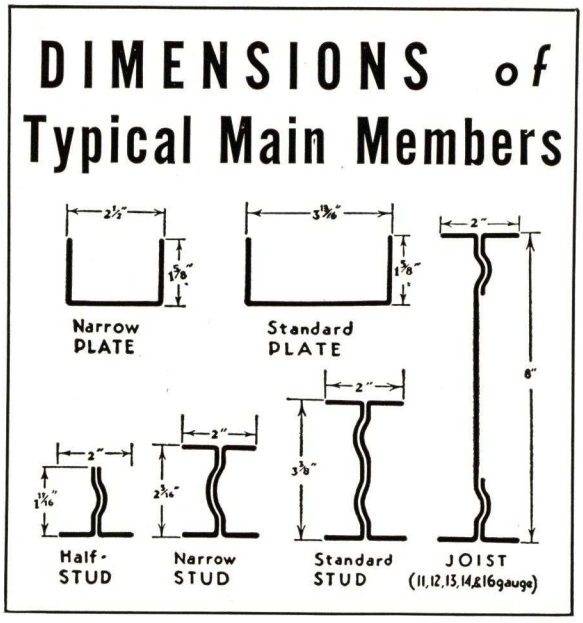


● Inserting hinge pin in rafter hinge; the hinge takes care of any pitch roof and pin is held in place with cotter key.

TYPICAL STRAN-STEEL FRAMING ASSEMBLY







● Width over flanges and depth of typical STRAN-STEEL members is shown here. See STRAN-STEEL Handbook for further details.

STRAN-STEEL MEMBERS

SIMPLICITY and adaptability characterize STRAN-STEEL. There are only three main members. One of these, the joist member, is supplied in various gauges to accommodate varying floor spans and loads. Studs and plate are furnished in several widths. Rafters are formed from either stud or joist sections.

TYPICAL JOIST—Joists are manufactured in five gauges—16-14-13-12-11. This member is used for floor joists and roof rafters. Recommended spacing 24″ o.c. See Table of Properties—Page 14, or STRAN-STEEL Handbook.

STANDARD STUD—3⅝″ in depth with 2″ flange—various gauges. This member is used for framing exterior walls up to two and one-half stories and interior bearing walls of two stories. Recommended spacing of STRAN-STEEL studding is 24″ o.c. This member is also used for ceiling joists and roof rafters.

NARROW STUD—2 5/16″ in depth with 2″ flange. This member is used for framing exterior walls up to two stories in height and interior bearing and non-bearing walls. This member is also used for ceiling joists having light loads. This member is adaptable as furring around ducts, pipe chases, etc., where nailing of collateral materials is required.

HALF STUD—1 11/16″ deep with 2″ flange. This member is used as an auxiliary nailing piece to provide for nailing of collaterals where structural strength is not required.

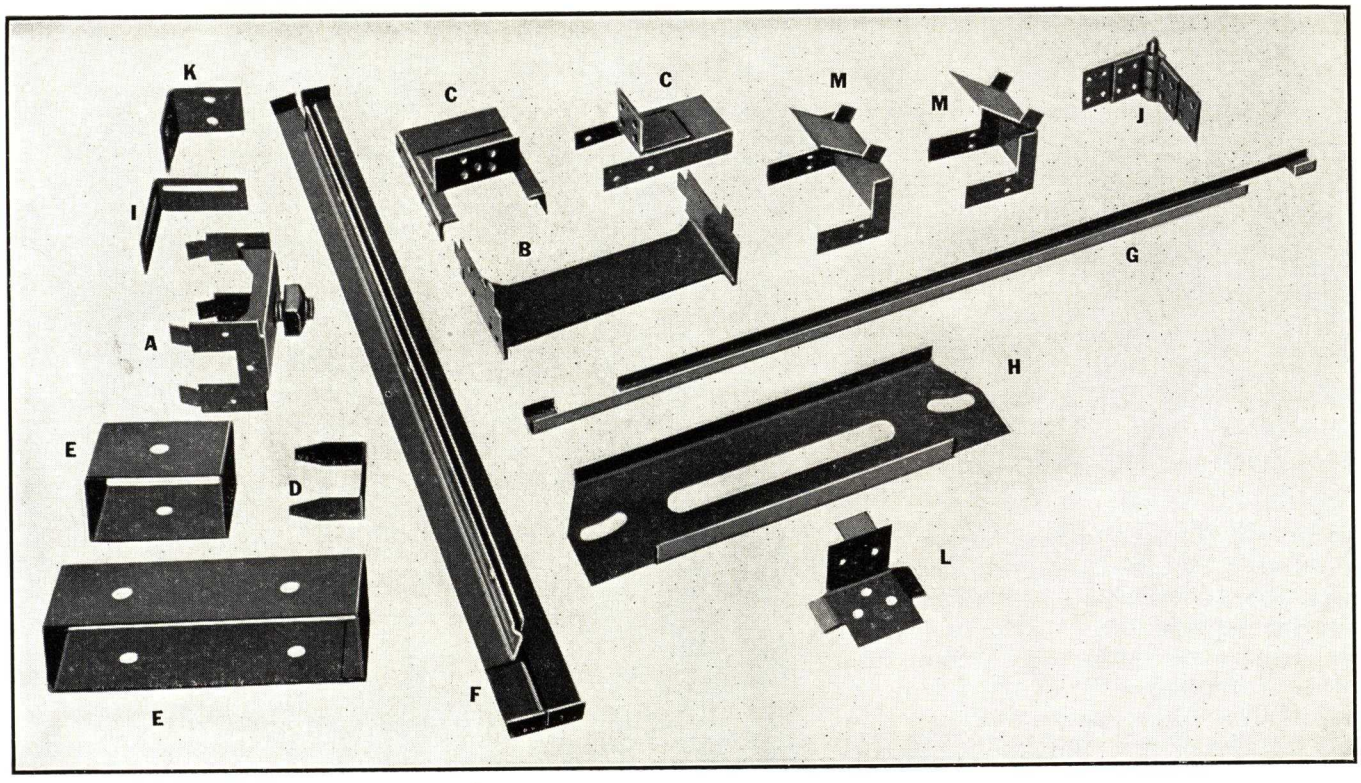
STANDARD PLATE—3 1/8″ wide with 1⅝″ flanges. This member is used with 3⅝″ stud section as a top and bottom plate and as a sill and head member for window and door openings where nailing section is not desired. Holes in flanges punched at 1″ intervals for stud connections. Punching in web of channel for anchor bolts at 6″ intervals.

NARROW PLATE—2½″ wide with 1⅝″ flanges. This member used with narrow stud similar to standard channel plate with similar punching.

STANDARD PUNCHING FOR PIPE, WIRING, CONDUITS, ETC.—All STRAN-STEEL main members are factory punched in the flanges except the half stud section. Holes are provided in the studding for the passage of conduits, etc. Joists are punched on top and bottom flanges with eight holes 13/64″ in diameter, for the placing of screws. In the web, 1¼″ from each end, a hole 13/16″ in diameter for placing of a government anchor. In the web 36″ apart, hole 2⅜″ in diameter for piping, etc.

FINISH—All STRAN-STEEL members and attachments are painted with a heavy dip-coat of special rust resisting red enamel. The finish is tough and very adhesive—will not chip and resists scratching in handling and erection.

STANDARD LENGTHS—See table on page 14.



STRAN-STEEL ATTACHMENTS

One of the features which has much to do with the rapid acceptance of STRAN-STEEL is the simplicity of the attachments. The illustrations and the descriptions show the striking degree to which all attachments have been simplified. They are designed to interconnect all STRAN-STEEL members with metal-attaching screws, or bolts; several are also punched for nailing to main members for additional security.

A—COLLAR TIE BRACKET—For attaching members (used as collar ties) to rafters.

B—JOIST HANGER—For joists, various gauges. Attaches rapidly and securely with screws.

C—HEADER BRACKETS—For connecting joist headers and stud headers over openings.

D—"C-CLIP"—Driven into nailing grooves of adjacent parallel members as a tie. Usually spaced 18″ to 3′ apart.

E—HIP AND VALLEY COLLARS—For connecting rafters and jack rafters to the hip and valley members.

F—PARTITION SUPPORT—Used under each stud of non-bearing partitions which run parallel to and between joists.

G—BRIDGING, CHANNEL TYPE—Used in pairs between joists. Ends are coped out to engage joist flanges.

H—RAFTER PLATE—For connecting rafters and jack rafters to the hip and valley members.

I—CORNER BRACKET—Used at top and bottom of stud and plate corner; also bent to reinforce all corners other than 90° such as bays, etc.

J—RAFTER HINGE—Loose butt hinge with cotter key through hinge pin; connects lower ends of rafters to plate.

K—ANGLE BRACKET—Used to connect valley rafters to top wall plate.

L—COMBINATION CLIP—Connects stair carriage to adjacent stud; also used for tying half-stud lath backing to adjacent studs.

M—RAFTER CLIPS—Connects gable studs to rafters.

MUSHROOM-HEAD NAILS—2½″ and 1⅝″ Cadmium-plated or plain nails with 1″ inverted cup heads, used for attaching gypsum board plaster base, insulating sheathing, etc.; large head secures adjacent edges of board joints. Supplied in 10-lb. cartons as an extra item, if specified; 10 lbs. required for 1000 sq. ft. of side wall; 15 lbs. required for 1000 sq. ft. of ceiling.

SCREWS—Cadmium-plated No. 14 sheet metal self-thread-cutting screws.

STRAN-STEEL
for INDUSTRIAL USES

PRODUCTS—STRAN-STEEL Steel Framing

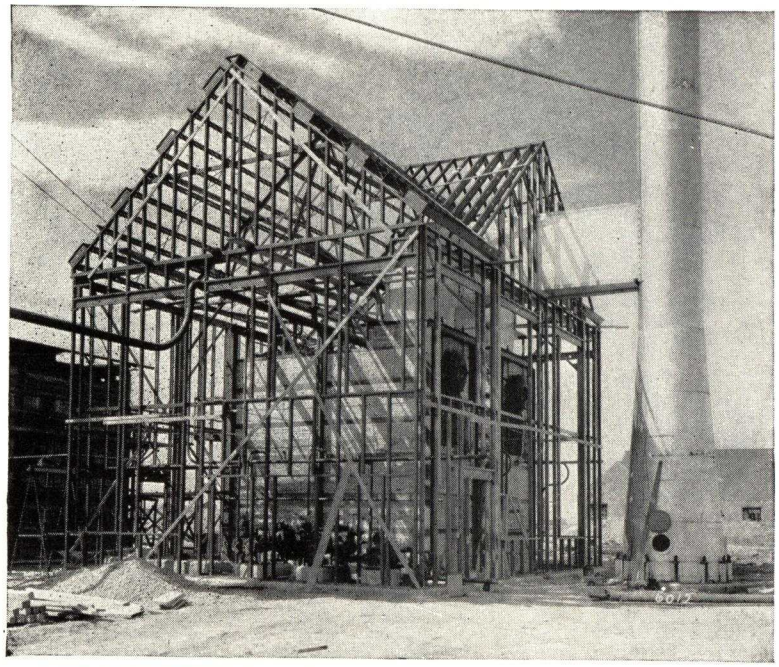
Originally used for dwelling house construction, the many advantages of STRAN-STEEL metal framing have caused its widespread use in industrial buildings. Few industries use such a wide variety of different sizes and types of buildings as the oil industry and it is in the construction of these buildings that STRAN-STEEL fills a long felt need.

STRAN-STEEL is Fire Safe, Shrink Proof, Termite Proof and Permanent. Because it is produced to conform to established dimensions of the materials which it replaces, its use requires no changes in architectural plans or dimensions. STRAN-STEEL permits the use of all standard exterior and interior materials and finishes. It is erected easily and rapidly by anyone skilled in carpentry. Connections are made by simple attachments, screw driver, and metal screws.

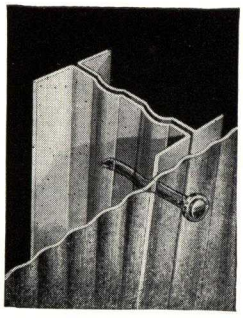
STRAN-STEEL is adaptable for industrial buildings, houses, partitions and all light load-bearing structures. A feature of its design (see phantom illustration) permits nailing collateral materials directly to the steel framework.

STRAN-STEEL is supplied in the form of joists, studs, rafters and plates. It is shop-coated with an adhesive finish which protects it so thoroughly that no field painting is required.

Framing a building with STRAN-STEEL follows the traditional practice closely, except that all members are ordinarily spaced on two-foot centers. This reduces the number of members used and materially simplifies certain subsequent operations such as duct work. Foundation thicknesses are unchanged. Standard STRAN-STEEL members are shown on page 4.



● STRAN-STEEL being used in the construction of a refinery boiler house.

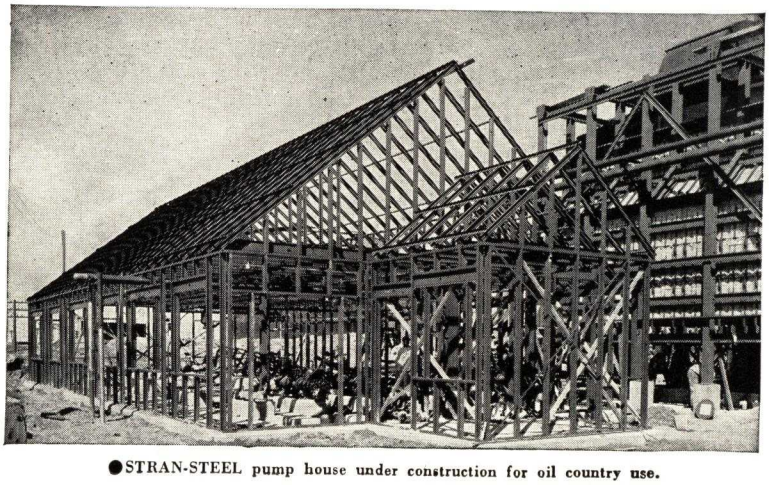


● Illustration shows how STRAN-STEEL is formed to receive and hold ordinary nails. Nails driven into the nailing groove hold with 25 per cent more grip than in wood.

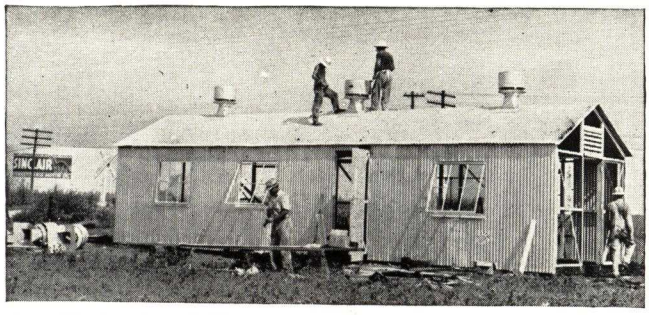
STRAN-STEEL framing used with fire-safe collateral materials makes a wholly fire-safe structure, an important feature for an oil country building. The steel framework being grounded the entire structure is lightning-proof. STRAN-STEEL, obviously, is termite-proof.

STRAN-STEEL is sold by the lineal foot. It is stocked in standard lengths. The plates and studs are stocked and shipped in conventional lengths and can be cut to size if necessary with a hack or power saw. This is a decided advantage and many oil companies and other concerns, who have a continuous building program under way, maintain stocks of this material in their various divisional storage yards and draw upon it as needed—saving both time and money.

Where companies have standardized their plans or maintain a staff of architects and engineers they will have no difficulty in adapting STRAN-STEEL to their regular construction specifications. To those firms who do not have such an organization, we



●STRAN-STEEL pump house under construction for oil country use.

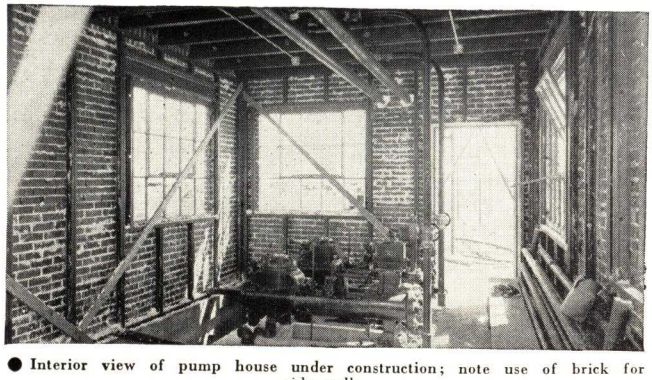


● STRAN-STEEL Construction is used extensively on pipe lines. A typical meter house.

● Small dwelling houses offer an economical method of solving the housing problem in field camps, etc.

offer you the services of our engineering department who will gladly cooperate with you and give you the benefit of their broad experience in industrial construction. Send us a rough sketch of the type of building you want, giving size, number of windows and doors, etc., and we will gladly submit suggestions and plans from which the building in question can be erected.

One of the most important factors in the permanency, rigidity and fire-safety of an entire structure is its roof. The use of STRAN-STEEL fulfills more completely all of the requirements and conforms more closely to traditional methods of roof construction than any other framing material. Any type of roofing material can be used.

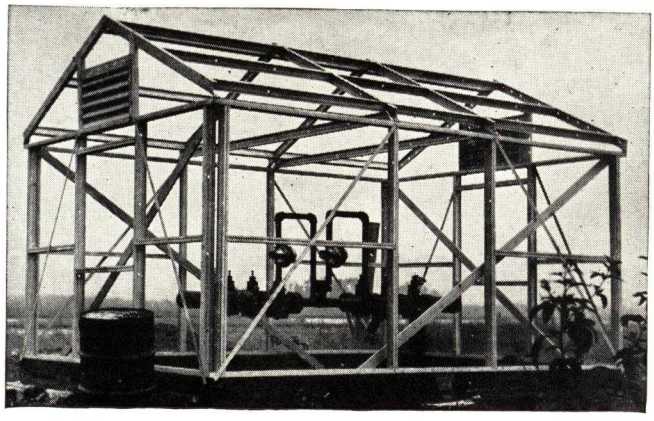


● Interior view of pump house under construction; note use of brick for side walls.

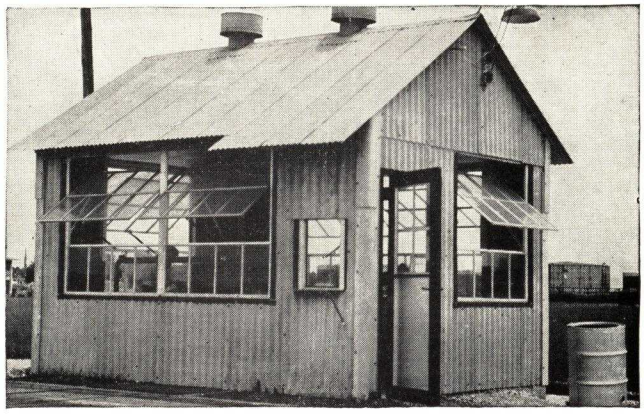
While we recommend the use of steel sash and doors for STRAN-STEEL buildings, wooden sash or doors may be used where the fire hazard is not a problem and costs must be kept at a minimum. STRAN-STEEL lends itself to the use of all standard types of building equipment and does not require special material of any sort.

FURTHER ADVANTAGES OF STRAN-STEEL—Openings are as simple to frame in STRAN-STEEL as in conventional construction with these additional advantages: (1) openings remain true and square as framed; (2) size and locations of openings may be altered to suit conditions arising on the job by merely removing and replacing a few attaching screws.

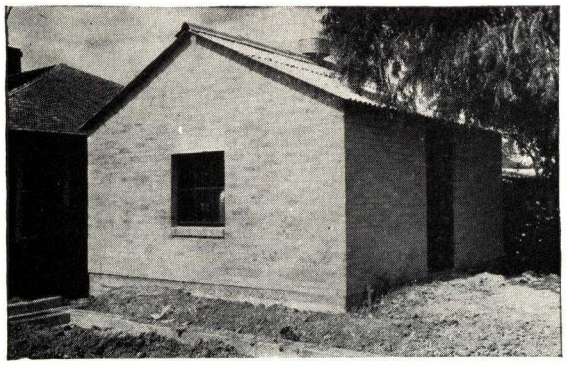
STRAN-STEEL Construction lends itself to any type of exterior finish. For field warehouses, field offices, supply stores, meter stations, bolt and engine houses, camp and dwelling houses, and other semi-permanent construction, corrugated iron or asbestos sheeting is frequently used. The STRAN-STEEL frame is quickly erected by the regular carpenter force in the same manner as a wooden frame building. The flexibility of this system permits each building to be tailor-made to fit each particular requirement. Additions can easily be added as needed or the general arrangement shifted about to meet special conditions.



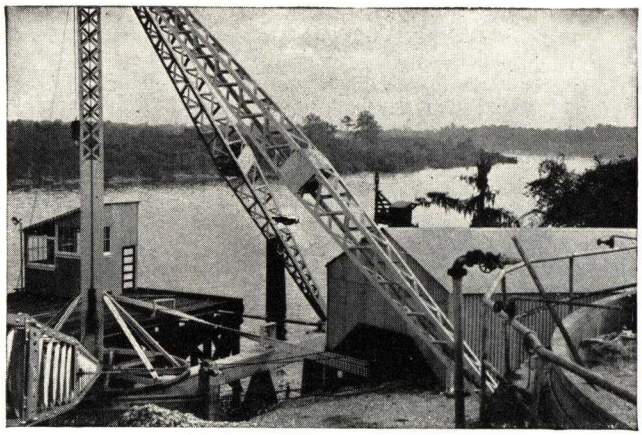
● Small valve house on a gas line. Building to be sheeted with corrugated galvanized iron.



● Buildings of this type lend themselves for use as field offices, scale houses and other oil field use. This one is sheeted with corrugated asbestos.



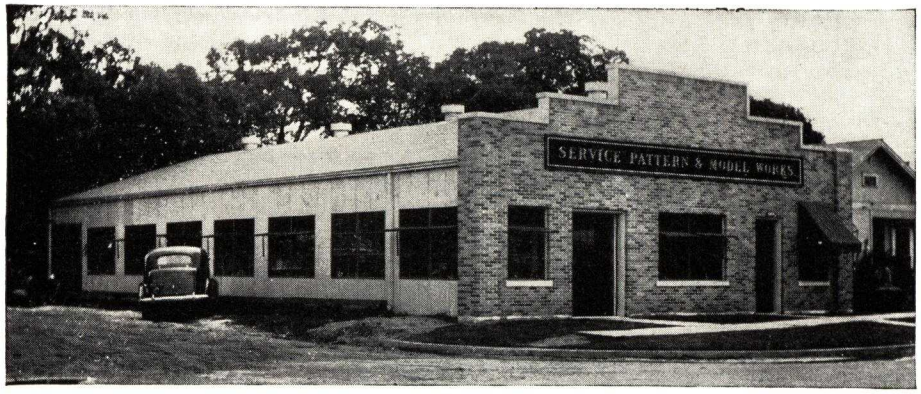
● For permanent construction or in residence sections, oil companies use these brick clad buildings for service requirements.



● This group of STRAN-STEEL buildings are used to house derrick and dock equipment and were built for this particular purpose.

When a building has served its purpose in one location, its high salvage value permits it to be dismantled and re-erected at slight expense.

For permanent construction the exterior walls may be of brick, or stone veneer, stucco, or any of the newer exterior materials, providing a type of construction which is as permanent as solid masonry, is shrink proof, termite proof, lightning proof and fire safe.



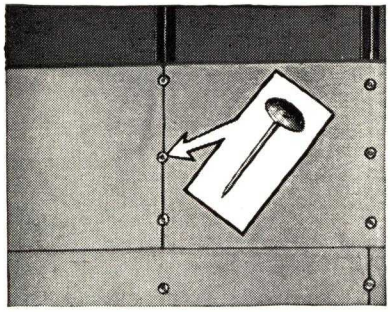
● The small factory building illustrates the use of STRAN-STEEL with corrugated iron side walls, brick front and built up roofing.

Although lightning is not ordinarily considered a major hazard, the fact remains that many fires and fatalities result each year as a result of destructive electrical storms.

A steel framed building is one of the relatively few places where one is entirely safe from lightning.

The interior finish can be as simple or elaborate as desired. Sheet rock, plywood, wall board, plaster and other similar materials can be used with perfect freedom. STRAN-STEEL Buildings built of steel sheeting can easily be insulated against heat or cold and made as comfortable as other types of construction.

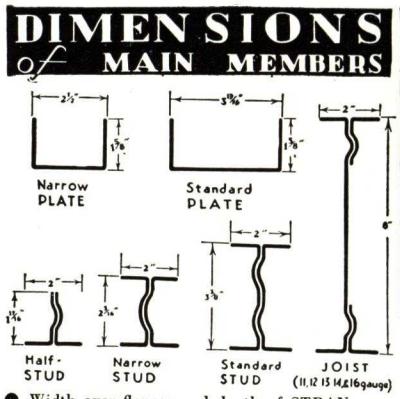
Insulated sheathing or plaster board is attached rapidly and securely to STRAN-STEEL, by nails which penetrate 1¼" or more into nailing groove. Nail heads should be sufficiently large to prevent their pulling through and also allow them to hold firmly the adjacent edges of the material at the joints. All wiring can be easily covered.



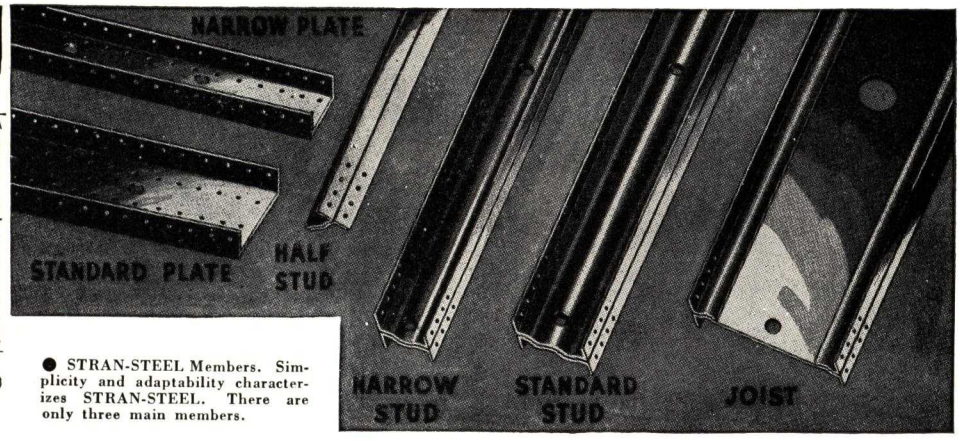
● Illustration shows how wall board is secured to STRAN-STEEL studs at butt joints or edges with large headed roofing nails or special cup headed nails.

Where fireproof materials and steel sash are used throughout, the fire hazard is entirely eliminated, a desirable feature in meter and valve houses and other types of oil country buildings.

● Sheeted with asbestos board at present, this little office building is to be moved to another site and switched to brick wall construction for permanent use.



● Width over flanges and depth of STRAN-STEEL members is shown above. All are made from 16-gauge steel (.0625 in.); joists are also furnished in four other gauges as mentioned below.



● STRAN-STEEL Members. Simplicity and adaptability characterizes STRAN-STEEL. There are only three main members.

STRAN-STEEL MEMBERS—Simplicity and adaptability characterize STRAN-STEEL. There are only a few main members. One of these, the joist member, is supplied in five gauges to accommodate varying floor spans and loads. This affects material savings at each floor level and permits lower over-all dimensions without sacrificing ceiling heights. Studs and plates are furnished in two widths. Rafters are formed of either stud or joist sections.

Joists are furnished in five gauges—16, 14, 13, 12, 11. These members are used in floor construction and for roof rafters.

STANDARD STUDS, 3⅝ In., Various Gauges—This member is used for framing outside walls as well as for inside bearing and non-bearing partitions which enclose heat ducts. Standard spacing is 2 ft. on centers.

NARROW STUD, $2\frac{5}{16}$ In., Various Gauges—This member is used for framing outside walls as well as for inside bearing and non-bearing partitions which enclose water, gas or steam pipes and wiring. The narrow stud is also used for short-span rafters and non-bearing ceiling joists. Set 2 ft. on centers.

HALF STUD, $1\frac{11}{16}$—Used as non-bearing nailing strip in partitions built out to enclose soil pipes, extra deep duct work, etc. Also used as lath backing in corners between studs and at ceiling between joists.

STANDARD PLATE, $3\frac{13}{16}$ In., 1⅝ In. Flanges—This member is used with 3⅝ in. stud as sill and cap plate in outside walls and partitions; also used as stringer, sill header, rib band, girt and brace. It is punched at 1 in. intervals in the flanges for aligning and attaching 3⅝ in. studs, and in the web for attaching to joist tops.

NARROW PLATE, 2½ In., 1⅝ In. Flanges—Used with $2\frac{5}{16}$ in. narrow stud in the same way standard plate is used with standard studs; also used with half-stud furring.

STANDARD PUNCHING—All STRAN-STEEL main members are shop punched in the flanges, and with the exception of the half-stud, in the web to permit interconnection.

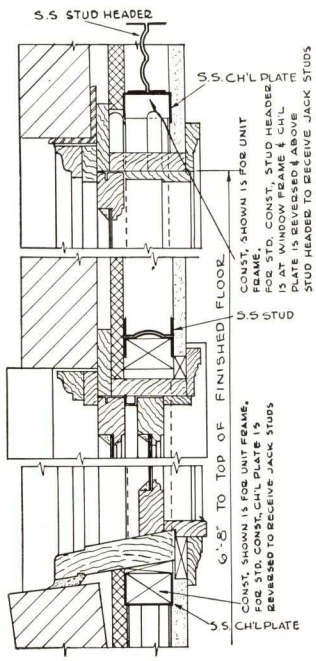
$1\frac{3}{16}$ in. holes are also punched in the webs of the standard studs and narrow studs to permit running conduit. The web of all joists are punched at intervals with 2¼ in. holes to permit running of conduits or steam, water or gas pipes at right angles to the long axis of the joist.

FIELD PUNCHING—Is easily and quickly accomplished by Standard Whitney punches.

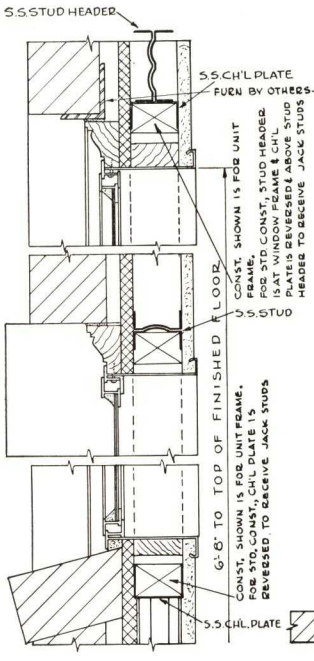
● STRAN-STEEL members are sawed to size on the job, eliminating waste and insuring economical construction and flexibility.

● Illustrating the method of setting floor joist and studding.

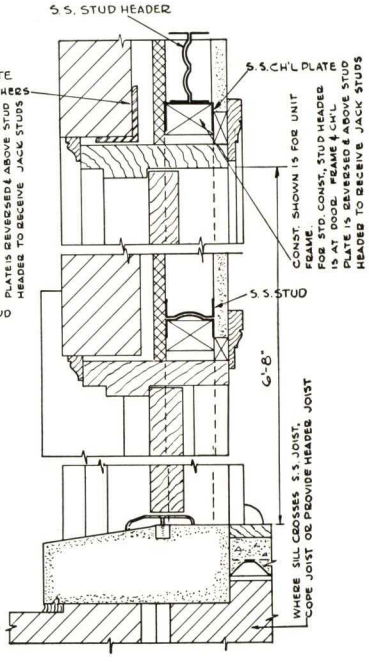
TYPICAL STRAN-STEEL DETAILS



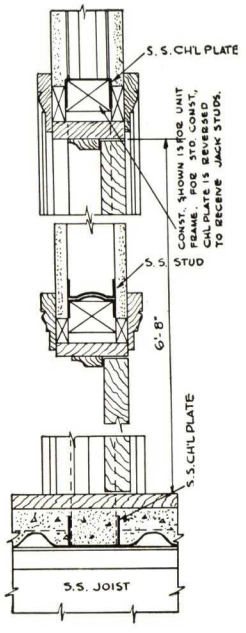
TYPICAL WOOD WINDOW



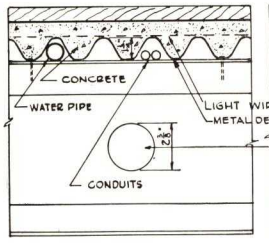
TYPICAL STEEL CASEMENT

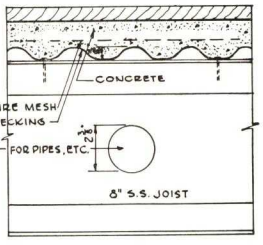


TYPICAL EXTERIOR DOOR

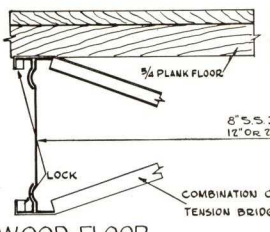


TYPICAL INTERIOR DOOR

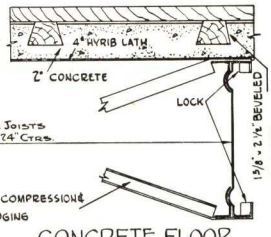




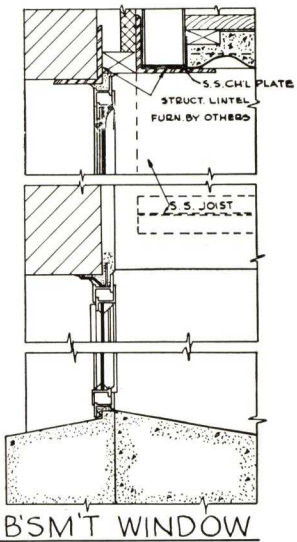
1¼" STEEL SUBFLOOR 3¼" STEEL SUBFLOOR



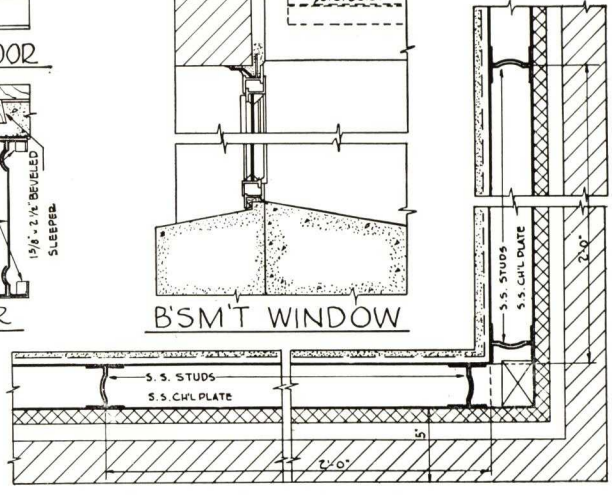
WOOD FLOOR



CONCRETE FLOOR

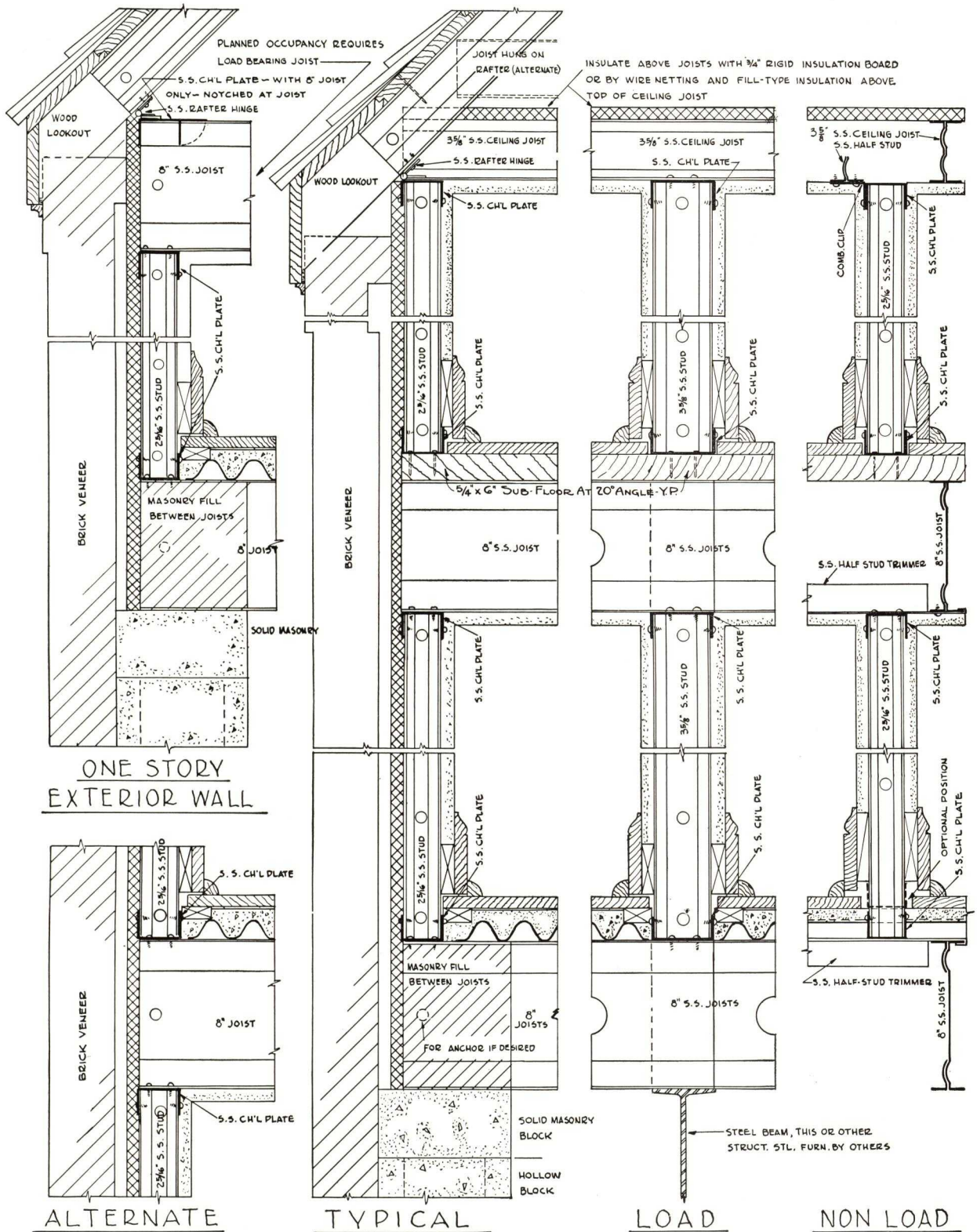


B'SM'T WINDOW

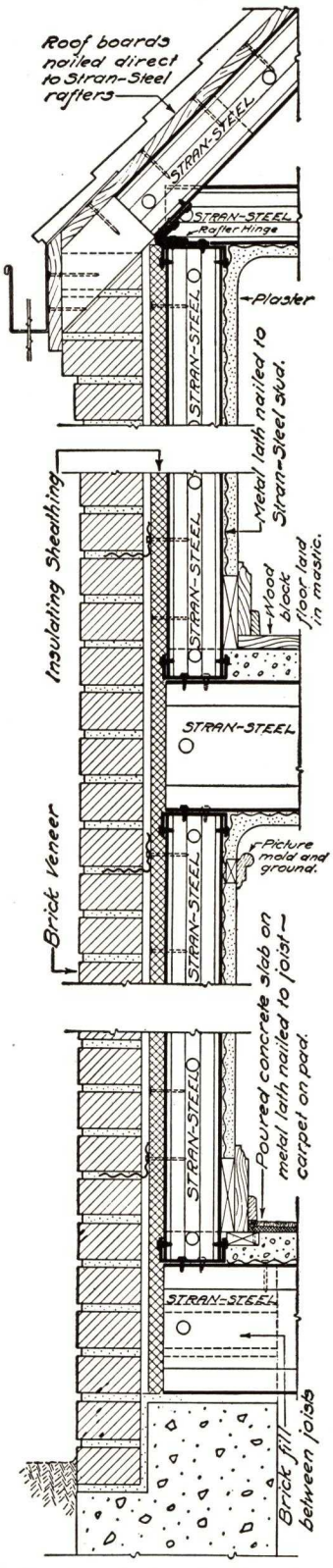


TYPICAL CORNER LAYOUT

TYPICAL STRAN-STEEL DETAILS



TYPICAL STRAN-STEEL WALL SECTION



● The above drawing shows how closely STRAN-STEEL framing parallels ordinary construction. Standard practice is followed in the application of all collateral materials.

TABLE OF GENERAL PROPERTIES *of* STRAN-STEEL MEMBERS

Member / Properties		8" Joist	$3\frac{5}{8}$" Stud	$2\frac{5}{16}$" Stud	Half Stud	Std. Channel Plate	Narrow Channel Plate
Over-All Dimens.		2 x 8	2 x 8	2 x 8	2 x 8	2 x 8	2 x 8	2 x 8	2 x 8	$3\frac{13}{16} \times 1\frac{5}{8}$	$2\frac{1}{2} \times 1\frac{5}{8}$
U.S.S. Gauge No.		11	12	13	14	16	16	16	16	16	16
Gauge Thickness		0.1250	0.1094	0.0938	0.0781	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Area of Section		1.801	1.573	1.369	1.140	0.918	0.660	0.500	0.313	0.368	0.286
Weight per Ft.		6.122	5.327	4.654	3.870	3.121	2.244	1.700	1.062	1.461	1.182
Axis 1-1	I	15.850	14.0	12.112	10.178	8.219	1.163	0.393	0.098	0.842	0.305
	s	3.963	3.50	3.028	2.545	2.055	0.641	0.340	0.089	0.442	0.247
	r	2.963	2.970	2.977	2.984	2.992	1.327	0.886	0.561	1.504	1.030
	x								0.589		
Axis 2-2	I	0.188	0.163	0.138	0.113	0.090	0.090	0.090	0.045	0.080	0.070
	s	0.185	0.160	0.135	0.112	0.089	0.086	0.085	0.043	0.063	0.059
	r	0.323	0.320	0.317	0.315	0.313	0.368	0.423	0.378	0.465	0.491
	x									0.343	0.431

STRAN-STEEL READILY AVAILABLE FROM STOCK

STRAN-STEEL members are available in all standard lengths as shown in the table below. (See STRAN-STEEL handbook for longer spans.) Stud lengths are determined by conventional ceiling heights. More complete data on STRAN-STEEL is available on request. Your inquiries are invited.

STANDARD LENGTH OF TYPICAL STRAN-STEEL MEMBERS

8" 16 gauge joist ..... 8' to 16' in 6" increments
16' to 20' in 1' increments

8" 14 gauge joist ..... 8' to 12' in 1' increments
12' to 16' in 6" increments
16' to 20' in 1' increments

8" 13 gauge joist ..... 11' to 13' in 1' increments
13' to 16' in 6" increments
16' to 20' in 1' increments

8" 12 gauge joist ..... 12' to 20' in 1' increments

8' 11 gauge joist ..... 11' to 20' in 1' increments

$3\frac{5}{8}$" stud (rafter) 7'0", 7'2", 7'3", 7'6", 8'0", 8'4", to 9'0" in 2" increments
9'4", 9'6", 9'8", 10'0" to 16' in 6" increments
16' to 20' in 1' increments

$2\frac{5}{16}$" Stud—Lengths the same as $3\frac{5}{8}$"

Channel Plate ($3\frac{3}{4}$" and $2\frac{1}{2}$")—20' lengths

Half Stud —20' lengths

STRAN-STEEL *Specifications*

AND RECOMMENDATIONS SUGGESTED AS A GUIDE TO SPECIFICATION WRITERS

WORK INCLUDED—Shall be the furnishing and erection of the entire building frame composed of steel members manufactured by the Great Lakes Steel Corporation, STRAN-STEEL Division, 607 Shelby Street, Detroit, Michigan, as described in their hand book.

STRUCTURAL STEEL AND LINTELS—Where required shall be supplied, fully fabricated by general contractor as a separate item, not included in the STRAN-STEEL bill of material.

ERECTION OF FRAME—Shall be done by skilled mechanics in a substantial, workmanlike manner, true to line, lever and plumb, in accordance with the manufacturer's specifications and recommendations.

SHOP PUNCHING—All framing members shall be delivered punched in accordance with the manufacturer's standard practice.

FIELD PUNCHING——All holes in addition to the standard shop punching necessary for the proper erection of the framing shall be hand-punched or drilled in the field by the erection contractor.

SHOP PAINTING—All framing members shall be given a coat of special rust-resisting paint at the shop.

FIELD PAINTING—The erection contractor shall touch up in one-coat work all spots where shop coat has been damaged.

TEMPORARY BRACING, FLOORING, ETC.—The erection contractor shall furnish and erect all necessary temporary bracing to brace and hold the framing true to line, level and plumb until the permanent bracing and complete fabrication is completed. He also shall furnish all necessary temporary floor or walkway planking required for the convenience and protection of all workmen.

JOISTS—Joists throughout shall be of sizes and spacing specified by the manufacturer. Spacing in general shall be 24″ on centers. Joists shall have a wall bearing of not less than 4 inches.

TRIMMERS AND HEADERS—Double all joists or provide heavier gauge single joists of proper carrying capacity under partitions and around all floor openings for stairs, chimneys, etc. Double joists shall be fastened together with "C" clips.

JOIST HANGERS—Provide joist hangers for the support of headers and trimmers and for the support of all tail joists over 5′ 0″ long at headers and similar positions unless these members are coped between the flanges of the supporting beams.

CROSS BRIDGING—Provide special channel type bridging spaced 6 ft. apart on centers for all joist spans exceeding 8 ft. Bridging shall be locked by bending ends over joist flanges.

PARTITION SUPPORTS—Where partitions running parallel to the joists are not directly supported by a joist, provide half stud partition supports with coped and crimped ends spanning between two joists centered under and supporting each stud of the partition (24 in. apart on centers). Bend ends of partition supports over and screw to the top flange of the joist.

CHANNEL PLATES—Channel plates to fit studs shall be provided as sills and plates for all exterior wall studding, all interior partitions, and elsewhere where required. Channels shall be lapped and fastened with two (2) screws at all corners.

ANCHOR BOLTS—Sills for exterior wall studding on masonry walls shall be secured to masonry with ½″ diameter hook bolts spaced 4 ft. apart on centers; anchor bolts to be furnished and built in by the masonry contractor.

STUDDING—Studs spaced, generally 24″ apart on centers shall be provided for all exterior walls and interior partitions secured to sills and plates with four (4) screws each, two at top and two at bottom through diagonally opposite stud flanges. Provide jack studs between main wall sills and plates and window sills; between window and door lintels or headers and main wall plates above; for all gable walls; and wherever else required to provide nailing for enclosing exterior and interior wall material or finish. Where sills and plates with flanges are not provided to which to secure jack studs, provide stud clips. At gable end rafters provide rafter clips—nail clips to both studs and rafters and bend wings around stud flanges. Double studs at the jambs of all openings where the loads cannot be safely carried by a single stud. Secure double studs together with "C" Clips spaced approximately 3 ft. apart on centers.

JAMB STUDS—Provide studs to serve as jamb studs at all openings where main wall or partition stud spacing does not fulfill requirements.

OPENING SILLS AND HEADERS—Sill and headers shall be provided as required for all exterior and interior wall and partition openings, and headers shall be secured by header brackets.

PARTITION FURRING—To increase the thickness of partitions to accommodate pipes, ducts, etc., furr the main partition with half studs or standard 2 5/16″ studs secured to narrow plates. Brace furring to main studding at center.

STAIR CARRIAGES—When specified, provide stair carriages for all stairs in pairs or threes as the width and character of the stair runs require. Frame also for all stair landings or platforms. Carriages shall be formed of stud or joist members substantially framed and secured to stairwall headers, and secured to studs with combination clips.

RAFTERS—Rafters shall be spaced 24″ apart on centers. For pitched roofs, rafters shall consist of stud or joist members depending on the span and loads supported. For flat roofs, rafters shall consist of joist members. The heel of each rafter shall be secured at the wall to the wall plate with an adjustable rafter hinge screwed to both rafter and plate. Rafters shall be secured to the ridge by cutting away adjacent lower flanges and bolting together through webs of rafters. Jack rafters shall be secured at heels as specified for main rafters and at hip and valley rafters with rafter sleeve and rafter plates.

HIP AND VALLEY RAFTERS—Shall consist of stud or joist members as best adapted to spans and loads supported.

COLLAR TIES—Shall be provided to brace and tie rafters together where required. They shall consist of stud members having the flanges abutting rafters cut and bent to the plane of the webs or secure collar ties to rafters with collar tie brackets—bend wings of brackets around rafter flanges and bolt ties to brackets.

DORMERS—Where and if specified, dormers shall be constructed of STRAN-STEEL framing. Frame in the same manner as specified for similar parts of the main structure.

RECOMMENDATIONS

FLOORS (Concrete)—All subfloors shall be of 2″ thick 2000 lb. 1-3-4 mix concrete, reinforced. Reinforcement shall be ¼″ diameter plain rods placed not more than 6″ on centers, or ⅜″, 4 lb. rib lath. Reinforcement, lath, or mesh should be stapled directly to tops of STRAN-STEEL joists. For finish wood strip floors provide 1⅝″x2½″ bevelled sleepers not more than 14″ o.c. attached to lath and raised about ¼″ above rough concrete floor slab. Metal corrugated decking may be used as forms for 2″ concrete slabs reinforced as above.

FLOORS (Wood)—In some instances under some building codes, wood subfloors may be used. Subfloors to be 5/4″x6″ T&G or square edged boards laid at an angle of not over twenty degrees across the joists and nailed to the tops of the STRAN-STEEL joists.

WALLS—As a plaster base secure to each stud ⅜″ thick approved Gypsum board for side walls or 2.5 lb. mesh sheet lath. Gypsum board to be nailed directly to the STRAN-STEEL members with 1″ diameter disc-headed cadmium plated nails spaced not over 6″ o.c. If board be 16″ wide, use four nails at each stud bearing.

CEILINGS—As a plaster base secure to each joist ½″ thick approved gypsum board or a ⅜″ 3.4 lb. rib lath. Gypsum board shall be secured in manner and with same nails as specified under "Walls."

EXTERIOR WALL INSULATING SHEATHING—Not less than ½″ approved insulating board shall be nailed to each stud on exterior face of exterior wall with same nails as specified under "Walls."

Typical Non-Residential jobs where Stran-Steel has been used with success.

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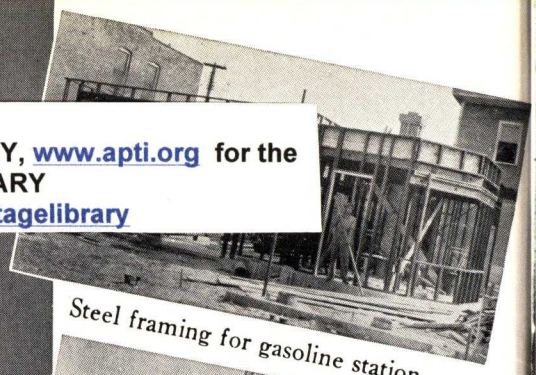
https://archive.org/details/buildingtechnologyheritagelibrary

Shrine of The Little Flower, Royal Oak.

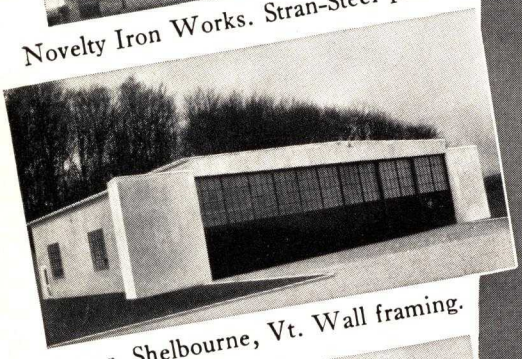


Steel framing for gasoline station.

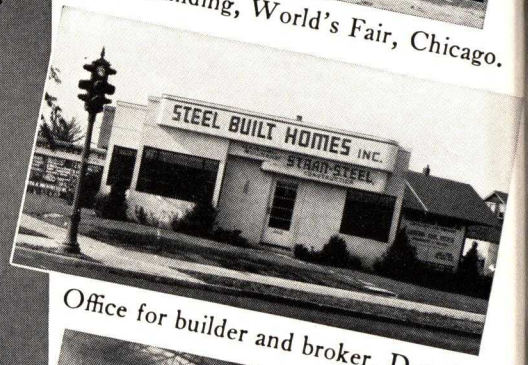
Novelty Iron Works. Stran-Steel purlins.

Italian Building, World's Fair, Chicago.

STRAN-STEEL for INDUSTRIAL USES

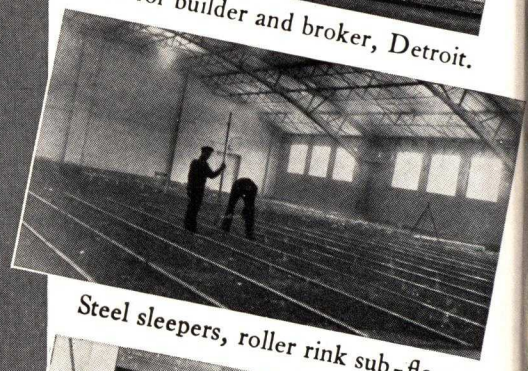


Hangar, Shelbourne, Vt. Wall framing.

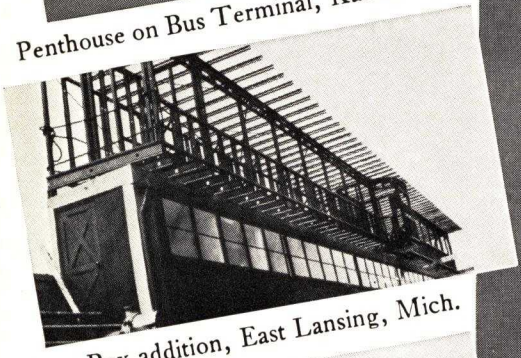


Office for builder and broker, Detroit.

Penthouse on Bus Terminal, Kansas City.

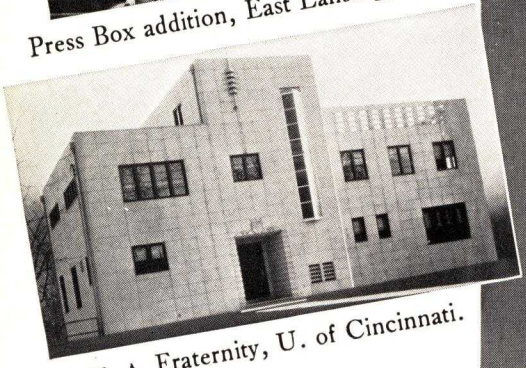


Steel sleepers, roller rink sub-floor.

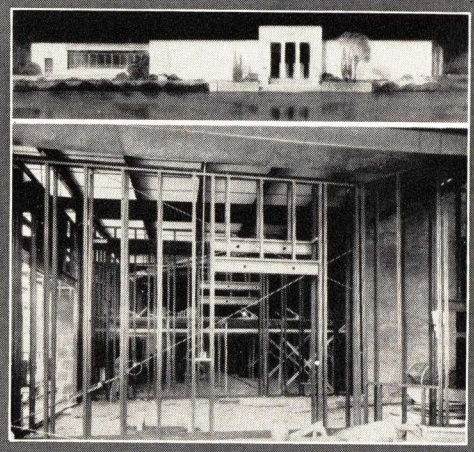


Press Box addition, East Lansing, Mich.

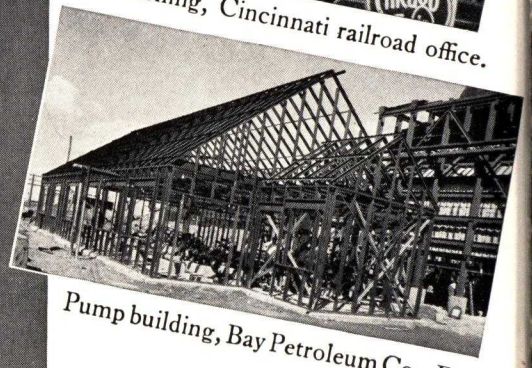
Remodelling, Cincinnati railroad office.



Δ. T. Δ. Fraternity, U. of Cincinnati.



Stran-Steel partitions, Texas Centennial, Fine Arts Building, Dallas, Texas.



Pump building, Bay Petroleum Co., Denver.

CREX PATENT COLUMN CO.

GENERAL OFFICE AND WORKS
2300-2310 South Springfield Avenue
CHICAGO, ILL.

TELEPHONE
Lawndale 2633-4-5

BRANCHES
MILWAUKEE, WIS., 2545 No. Thirtieth Street
DECATUR, ILL., Box 299
LOUISVILLE, KY., 420 Baxter Avenue

CREX PATENT COLUMNS

Construction

Crex Patent Columns consist of an outer shell of steel filled with concrete, and only the best materials are employed in their manufacture. Especial care is taken in filling these columns so that the concrete filling shall be perfectly solid and uniform throughout, thus obtaining the full strength of a solid concrete interior.

The caps and connections are made of steel, of sufficient strength to receive the superimposed loads.

Crex Patent Column Co. holds the original patent for an all-steel cap. The cap being entirely of steel, its strength can be reliably computed.

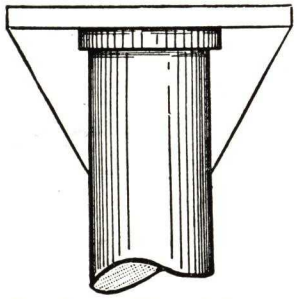
The connections are made in such a manner that only a steel plate separates shaft of lower column from the one above, securing the full strength of column at the connection. Crex Columns can be furnished in about one-fifth the time required for other columns.

Adaptability

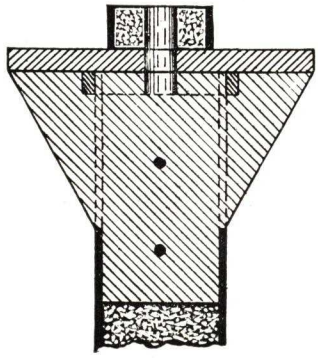
Crex Patent columns are used extensively in factories, apartment buildings, stores, etc.

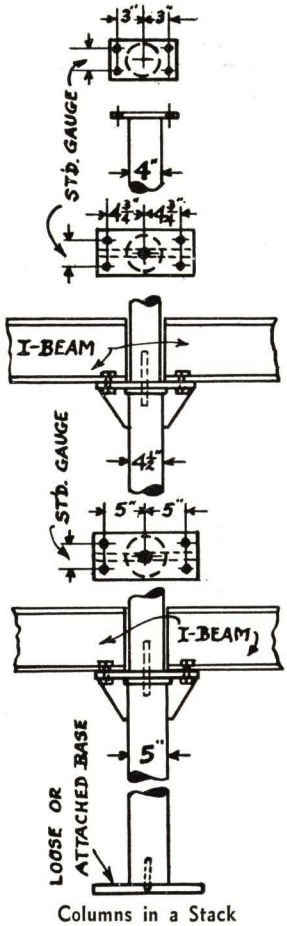
Safe Loads

Tables of safe loads in thousands of pounds for Crex Light Weight and Heavy Weight Patent Columns are shown below.



Crex Patent All-steel Two-way Brackets





Columns in a Stack

SAFE LOADS COMPILED BY THE PITTSBURGH TESTING LABORATORIES FROM ACTUAL TESTS MADE BY THEM OF CREX PATENT COLUMNS

Outside diam. pipe, in.	Radius of gyration, in.	Thickness of steel shell, in.	Area of steel shell, sq. in.	Wgt. of steel shell, per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe load in thousands of pounds for unbraced length of column, ft.								Maximum length of column
							6	8	10	12	14	16	18	20	
Light Weight Crex Columns															
3½	.875	.120	1.27	4.33	8.34	13.02	26.0	22.1	18.3						11′-8″
4	1.00	.134	1.63	5.53	10.94	16.9	35.6	31.2	26.8	22.4					13′-4″
Heavy Weight Crex Columns															
3½	.875	.216	2.23	7.58	7.39	15.27	37.8	32.2	26.5						11′-8″
4	1.00	.226	2.68	9.11	9.88	19.40	49.1	43.1	37.0	30.9					13′-4″
4½	1.125	.237	3.17	10.79	12.73	24.05	61.7	55.2	48.7	42.3	35.8				15′-0″
5	1.25	.247	3.69	12.54	15.95	29.15	75.6	68.6	61.7	54.8	47.8	40.9			16′-8″
5½	1.39	.258	4.30	14.62	20.00	35.45	92.2	84.8	77.4	70.0	62.6	55.2	47.7		18′-6″
6⅝	1.656	.280	5.58	18.97	28.89	49.07	128.4	120.0	111.7	103.4	95.0	86.7	78.3	70.0	22′-0″
7⅝	1.906	.301	6.92	23.54	38.74	63.89	167.3	158.0	148.8	139.6	130.5	121.4	112.1	102.8	25′-5″
8⅝	2.156	.322	8.40	28.55	50.02	80.65	211.1	201.1	191.0	180.9	170.8	160.8	150.7	140.6	27′-11″
9⅝	2.406	.342	9.97	33.91	62.79	99.31	259.2	248.2	237.3	226.4	215.4	204.5	193.5	182.6	31′-3″
10¾	2.687	.366	11.94	40.59	78.82	122.69	319.7	307.8	296.0	284.0	272.1	260.2	248.2	236.4	35′-10″
12¾	3.187	.375	14.58	49.56	113.10	167.36	421.7	408.7	396.0	382.8	369.8	356.9	343.9	330.7	42′-6″

Safe loads shown above are derived from the formula:

$$\text{Safe Load} = \left(\frac{Ac}{12} + As\right)\left(19200 - 72\frac{L}{R}\right)$$

Where Ac = Sectional area of concrete in sq. ins.
As = Sectional area of steel pipe in sq. ins.
L = Length of column in ins.
R = Radius of gyration of combined sections

$\frac{L}{R}$ is never to be greater than 160

Weight of concrete to be 150 lb. cu. ft.

ESTABLISHED 1897

LALLY COLUMN COMPANY

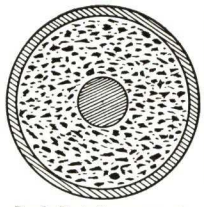
CAMBRIDGE, MASS.

FACTORIES

CHICAGO, ILL., 733 West 64th Street — CAMBRIDGE, MASS., Erie and Albany Streets — BROOKLYN, N. Y., 211-249 Lombardy Street

CONCRETE FILLED COLUMNS

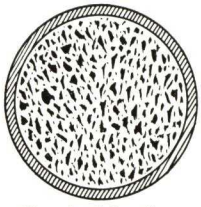
Lally Column Company Are Originators and Patentees of Genuine Lally Columns



Rod Reinforcement

Specification

Lally Columns—All Concrete Filled Steel Columns indicated on the plans shall be genuine Lally Columns as made by the LALLY COLUMN COMPANIES.



Standard Section

Patents

Various improvements in Lally Columns are covered by numerous patents under different dates extending from 1898 to the present time. Genuine Lally Columns are made only by the LALLY COLUMN COMPANIES. Infringements will be prosecuted.

Fireproofed Column

The Product

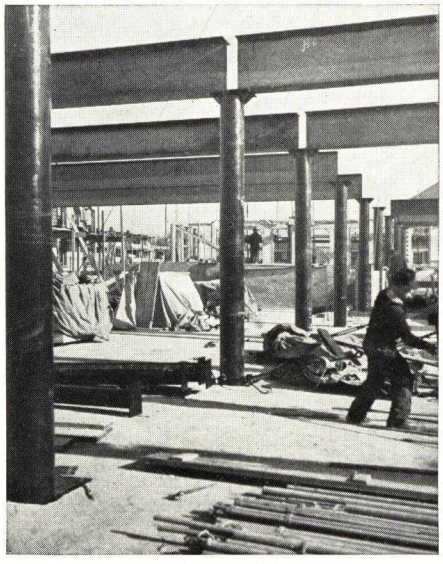
Lally Columns are special shop made units, cut to lengths required, fitted with specially designed connections for wood, steel or concrete beams and delivered on the job ready for erection. The shell is mild black steel pipe. The filling is 1–1½–3 concrete, with a proper water content, and is deposited and electrically agitated in the most approved modern manner. We are pioneers in the manufacture of concrete filled columns and our manufacturing processes are the result of 40 years' experimenting.

Resistance to Fire

The best test of any material is its performance under actual working conditions. After the most serious conflagrations in Eastern United States of recent years, Lally Columns have been observed standing straight and unharmed.

We are justly proud of the performance of Lally Columns in these cases and of the fact that Lally Columns are specified for use by architects and engineers in both public and private practice throughout Eastern and Central United States.

Columns have also been tested under Standard Time-Temperature Fire Curve Conditions while supporting loads in excess of the recommended design loads. As a result of these tests the comparative fire resisting ratings of Lally Columns were determined as 25 minutes for the unreinforced, which was 11% overloaded in the test and 45 minutes for the reinforced section which was 3% overloaded during the test. The actual test runs were 36 minutes and 1 hour 11¾ minutes, respectively. Compared to these ratings, unprotected structural steel and round cast iron columns were granted tentative ratings of only 10 and 20 minutes, respectively.



Fireproofed Store Columns

Fireproofed Columns

The standard section Lally Column is often fireproofed as illustrated by enclosing it in an outer shell generally two or more sizes larger, according to local building laws. The area between the shells one inch or more, is then filled with concrete in the regular manner. This type of column is very extensively used where free standing columns are required to be fireproofed, as in stores, warehouses, schools, or fireproof garages. This is the only complete fireproofed column furnished ready for erection.

Multi-story Construction Using Lally Continuous Columns

Genuine Lally Columns are becoming increasingly popular for use in buildings of over one-story height, and of the type usually referred to as "wall-bearing" of either fireproof or non-fireproof construction. In these cases they are chosen for their ready adaptability to conditions. Our patented *web-plate* connections are customarily used on this type of work. The *web-plates* pass completely through the shell and concrete and, in addition, are thoroughly welded to the shell. Bolts of special steel with hot pressed heads and short thread to allow for a full bearing on the shank are furnished for this type connection.

Safe Loads

This safe load table was developed from official tests made at Columbia University and Watertown Arsenal. The tests show that the strength of the composite section far exceeds the sum of the strengths of the two elements and that the column behaves as a true laterally restrained composite concrete-steel section.

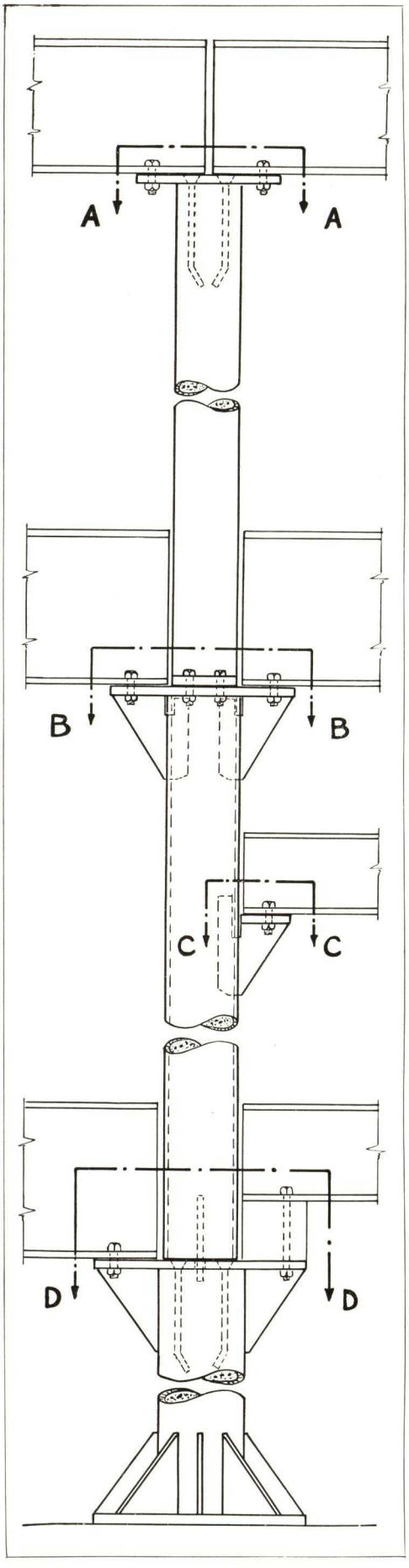
When a project is designed for Lally Columns according to the strength table shown below no other concrete filled columns should be substituted unless the sizes are increased to a diameter that will be equal in capacity to the genuine Lally Column.

SAFE LOADS FOR LALLY CONCRETE FILLED COLUMNS IN THOUSANDS OF POUNDS

Limit of Length = 40 Diameters ($l'/r = 120$) $P = (A_c + 12\ A_s)\ (1600 - 24\ l/a)$

Diam. of col., in.		Weight per ft., lb.	Area of steel, sq. in.	Area of concrete, sq. in.	Unbraced length of column in feet														*Max. length, ft
					6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Light weight	3½	13	1.27	8.35	26.1	24.2	22.2	20.3	18.3	16.4	14.5									11.91
	4	17	1.63	10.94	35.6	33.4	31.2	29.0	26.8	24.6	22.4	20.2								13.71
Heavy weight	3½	15	2.23	7.39	37.9	35.1	32.3	29.4	26.7	24.0										11.64
	4	20	2.68	9.89	49.2	46.1	43.1	40.1	37.0	33.9	30.9	27.9								13.37
	4½	24	3.17	12.73	61.8	58.5	55.3	52.0	48.8	45.5	42.3	39.0	35.8	32.5						15.10
	5	29	3.69	15.95	75.6	72.0	68.6	65.2	61.7	58.2	54.7	51.3	47.8	44.3	40.9	37.4				16.83
	5½	36	4.30	20.01	92.1	88.3	84.6	80.8	77.1	73.3	69.6	65.8	62.1	58.3	54.6	50.8	47.1	43.3		18.78
	6⅝	49	5.58	28.89	128.3	124.2	120.0	115.8	111.7	107.5	103.4	99.2	95.0	90.9	86.7	82.6	78.4	74.2	70.1	22.45
	7⅝	64	6.92	38.74	166.0	161.4	156.9	152.3	147.8	143.2	138.6	134.1	129.7	125.0	120.5	115.9	111.4	106.8	102.3	25.92
	8⅝	81	8.40	50.03	211.1	206.1	201.1	196.1	191.0	186.0	181.0	175.9	170.9	165.9	160.8	155.8	150.8	145.8	140.7	29.38
	9⅝	100	9.97	62.79	259.2	253.8	248.3	242.8	237.4	231.9	226.5	221.0	215.6	210.1	204.6	199.2	193.7	188.3	182.8	32.84
	10¾	123	11.91	78.86	319.1	313.1	307.2	301.3	295.4	289.4	283.5	277.6	271.6	265.7	259.7	253.8	247.9	241.9	236.0	36.74
	12¾	169	14.58	113.10	421.9	415.4	408.8	402.3	395.8	389.2	382.8	376.2	369.7	363.2	356.7	350.1	343.6	337.1	330.6	43.77

*Radius of gyration equals $\frac{1}{10}$ quantity in this column.



CONSTRUCTION DETAILS OF LALLY COLUMNS

A-A
Standard Fastened Steel Plate Caps

A steel plate fastened to the column, using long bolts with countersunk heads, embedded in the concrete. This plate is also electrically welded to the shell of the column. The plate is practically immovable and is used for concentric loads. Fastened steel plate caps are made any size or thickness to meet requirements.

B-B
Continuous Column Connection with Base Above Bolted to Cap

Used where greater rigidity is required than in the pintle type connection.

C-C
Side Bracket

Used for intermediate beams. The bracket is hooked into a slot in the pipe at any desired height and is thoroughly welded to both pipe and beam seat.

D-D
Continuous Column Connection

This connection consists of a crown plate fastened to the column with counter sunk head bolts welded to the plate and embedded in the concrete. Steel brackets are inserted through slots in the column shaft, and a pintle in the column above fits into a hole in the plate below.

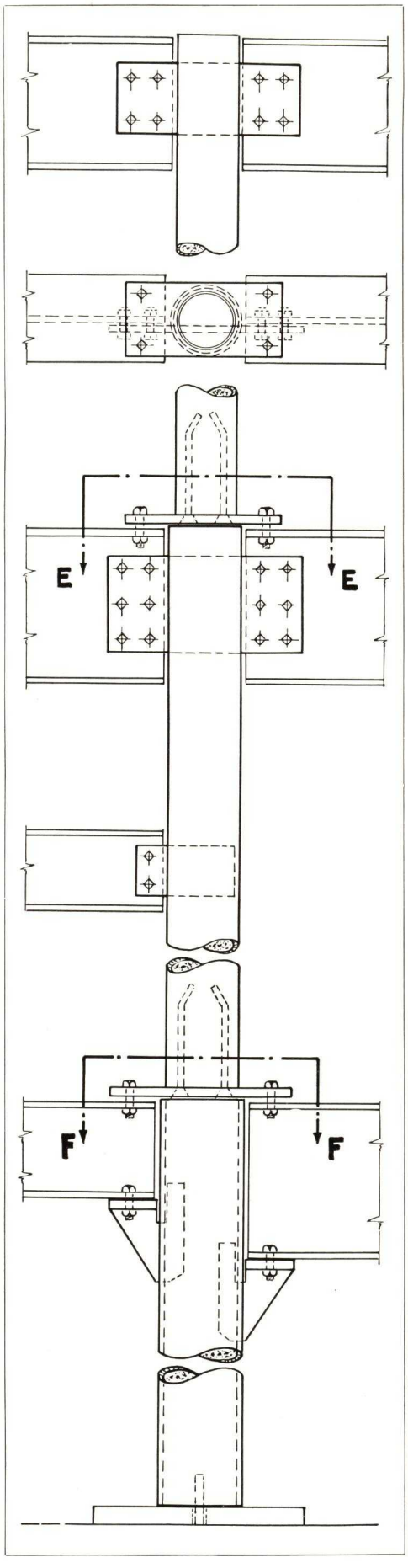
Where beams are different depths, fillers are provided.

E-E
Continuous Column Connections with Web Ties

This type of column is specified wherever it is desired to eliminate the brackets ordinarily used because of their protrusion below the ceiling line. Note that we provide for a web tie rather than a flange tie and that a steel base is fastened to the upper column. When erected, this base is bolted to the upper flanges of the beams.

F-F
Continuous Column Connection with Double Flange Tie and Side Brackets

A very strong and rigid connection where double flange ties are necessary.



CECO STEEL PRODUCTS CORPORATION

FORMERLY CONCRETE ENGINEERING COMPANY

GENERAL OFFICE

OMAHA, NEB.

SALES OFFICES AND WAREHOUSES

CHICAGO, 176 W. Adams Street
CICERO, 1926 So. 52nd Avenue
DALLAS, Construction Building
DES MOINES, Hubbell Building
DETROIT, Guaranty Trust Building
HOUSTON, 2814 Pease Avenue
INDIANAPOLIS, 423 Berkley Road
KANSAS CITY, Waltower Building
LOS ANGELES, 1450 Mirasol Street
MILWAUKEE, Bartlett Building
MINNEAPOLIS, 2801 E. Hennepin Avenue
NEW ORLEANS, 1737 Jackson Avenue
NEW YORK, Foot of New York Avenue, Jersey City, N. J.
OKLAHOMA CITY, Insurance Building
ST. LOUIS, 4165 Duncan Avenue
SAN ANTONIO, Builders Exchange
SAN FRANCISCO, 1280 Indiana Street
WASHINGTON, D. C., 31 Girard Street, N. E.

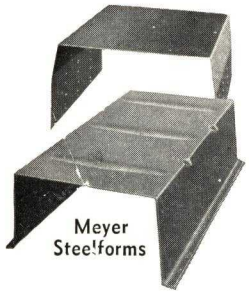
Many Strategically Located Offices and Warehouses Guarantee Quick Delivery of Ceco and Meyer Products to the Job

Products

Ceco Reinforcing Bars; Meyer Removable Steelforms; Ceco Steel Joists; Wire Fabric Reinforcement; Metal Lathing Materials; Bar Chairs and Spacers; Adjustable Shores and Column Clamps; Road Building Materials; Steel Windows; Steel Doors; Metal Weatherstrips; Metal Frame Screens; Detention Windows.

Ceco AND MEYER PRODUCTS

Meyer Steelform Construction



Meyer Steelforms

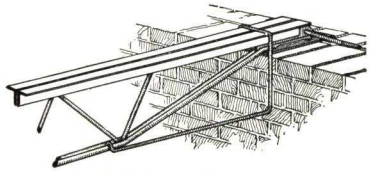
A standard system that represents the highest type of concrete joist floor construction in present day use. It consists of rows of heavy gauge removable steelforms, separated by reinforced concrete joists, and covered by a thin slab of concrete. Metal lath furring may be used beneath to provide a flat ceiling for plastering.

Meyer Steelforms are handled on a rental basis only. Ordinarily labor of installing and removing steelforms by our skilled workmen is included with the rental charge. Economy in the re-use of Meyer Steelforms on a rental basis is readily apparent.

Ceco Reinforcing Bars

Bars are rolled from new billet steel and are furnished both as plain rounds and as deformed rounds and squares. They can be furnished promptly, cut to length and bent, or in stock lengths. Reinforcing bars rerolled from steel rails are used in some localities and are also available at our warehouses in the plain and deformed sections.

Ceco Steel Joists



Steel joists are commonly used to support a concrete slab poured on a self-centering form on top of the joist and protected with a fire-resisting ceiling construction attached to the bottom of the joist. This system of floor and roof construction is light in weight, quickly installed and of a fireproof nature. Ceco Steel Joists are of an open web type so that heating and plumbing pipes can be easily installed and concealed.

Wire Fabric Reinforcement

Ceco Electrically Welded and Triangle Fabric consists of cold drawn wires welded or woven together, forming a closely spaced mesh of square, rectangular and triangular shape, and is particularly adapted for many uses as tension reinforcement for concrete.

Ceco Metal Lathing Material

Includes expanded metal lath, rib lath, all types of corner bead, base bead and picture mould, hot or cold rolled furring channels, pencil rods, angles, tees, flats and tie wire.

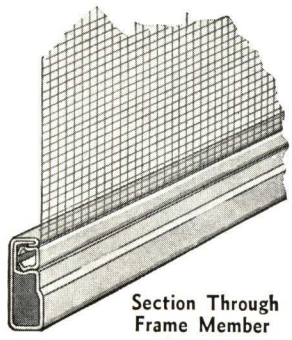
Ceco Accessories

Include all types of metal or wire beam, joist and slab bar spacers, screed chairs, bar ties, reed clips and anchor slots.

Ceco Metal Window Screens

These are made for all types of windows, both steel and wood, and are individually fabricated to assure perfect installation. All frames are easily rewired.

Steel Sash Screen—Ceco Screens are designed for all types of steel sash. Satisfactory and efficient results are obtained due to simplicity of all installations.



Section Through Frame Member

Materials Used—Ceco Screens are made of heavy electro galvanized copper bearing steel finished in enamel, baked on. Also manufactured in heavy rolled bronze, or from aluminum extruded or tubular sections. Bronze screen cloth, 16-mesh, is the standard for Ceco Screens. Other mesh furnished when required.

Ceco Steel Windows, Doors and Mechanical Operators

Ceco Architectural Projected Windows—Large glass lights attractively arranged. Screened type as well as standard type. Excellent for schools and hospitals.

Ceco Pivoted Windows—A sturdy, weatherproof window for general industrial use.

Ceco Commercial Projected Windows—Standard and screened type available. Easily and economically screened.

Ceco Casements—For residential buildings. Flat screens and under screen operators. Neat and attractive hardware.

Ceco Continuous Windows and Tension Operators—For use where large areas of light and ventilation are required.

Ceco Basement Windows—Brighten the basement. Do not stick, warp nor swell. Weathertight.

Ceco Industrial Doors—Heavy channel frame construction. Built to stand the wear and tear of industrial use. A permanent investment.

Ceco Rack and Pinion Operator—For long lines of ventilators. Cold rolled steel rack and pinions with machine cut teeth.

Ceco Torsion Operator—For group control of pivoted or projected ventilators. Machine cut cast gears and cut steel worms—a lifetime operator.

Section Through Jambs

Ceco "Slide Lock" Weatherstrip

A proven product, offering many important new advantages in design and operation. When installed, Ceco "Slide Lock" is fully concealed. Metal-to-metal contact—metal sliding on metal—insures easy operation of windows at all times. Good, weathertight installations assured, regardless of warpage, because of maximum flexibility. Highest efficiency assured.

Ceco Weatherstrips are installed by authorized Ceco Dealers or direct factory branches.

Ceco Calking Cement

A scientifically prepared plastic calking compound which never dries, runs, cracks, hardens or pulls away. Forms a perfect bond with any surface.

Catalogues

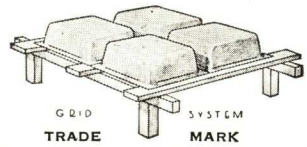
Complete descriptive catalogues on above subjects furnished free of charge.

GRID FLAT SLAB CORPORATION

Constructors of Flat Slab Floors and Roofs

761 Dudley Street, BOSTON, MASS.

Grid System

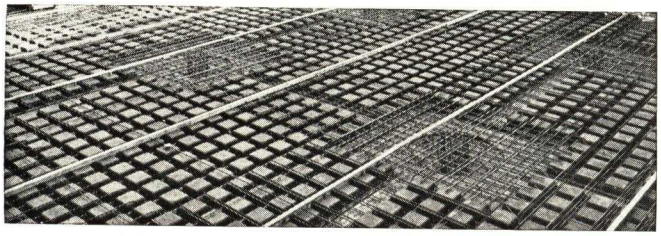


New and economical flat slab form of constructions for floors and roofs, made upon removable steel domes. This method is a two-way rib section of reinforced concrete acting to support a lighter floor slab. By cutting out useless concrete between the ribs there is considerable concrete and reinforcing steel saved. This saving cuts the dead weight materially and permits wider spans and column spacings—bays have been constructed up to 32 ft. square.

Calculations for Grid System—Calculations are identical with those of the usual two-way flat slab. Standard specifications for concrete and reinforced concrete for flat slabs apply to Grid Flat Slabs.

These formulas are recommended for use where there are no definite building laws. Where architects or engineers design without set codes, the method taken with usual two-way flat slab designs can be taken with Grid Flat Slab.

Thickness of Slab and Depth of Dome to Be Used—The thickness of the Grid Slab and depth of dome required for any structure are determined by weight to be carried and span or spacing of the columns. The same method of determining the



thickness of the ordinary flat slab should be employed. The rule is that slab should be $\frac{1}{32}$ of column span. Depth of dome plus thickness of the slab above should usually be at least 1 in. greater than the usual flat slab. The slab should never be less than 2 in. on top of the dome, depth depending on the concentrated load.

Steel Domes—The size of the removable steel domes is shown in the illustration. Each 8-in. dome displaces 1½ cu. ft. of concrete.

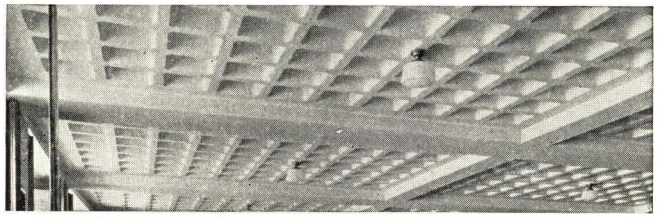
To meet a popular demand by the trade the GRID FLAT SLAB CORPORATION is prepared to furnish a 4-in. dome in conjunction with their 8-in. dome. This dome is pressed from one sheet of 16-gauge steel and is 22 in. square from outside to outside of flanges. They are made with a 2-in. flange on four sides and are cut perfectly square (see Fig. 1).

Domes are placed on wooden formwork and butted together, forming ribs 4 in. wide in both directions, giving an attractive coffered ceiling in the underside of the slab. Each 4-in. dome displaces .7 cu. ft. of concrete.

Wood Forms — Domes require support by narrow boards 2 ft. apart extending in *one direction only*. In the majority of designs bottoms of plinths are flush with bottoms of ribs, thus doing away with expense and delay of form-dropped panels.

Placing Reinforcing Steel—*Reinforcing steel can not be misplaced or left out.* The steel is placed, one or two bars in the ribs and the steel man can not misplace it or leave it out, by mistake, without it being noticed.

Inserts and Electric Conduit—All inserts and conduits can be placed in the Grid Flat Slab the same as regular slab. Outlet boxes in ribs, large junction boxes in slab. Inserts can be placed as desired and held firmly in place with a small device. Floor drainers, if large, by leaving out a dome—extra concrete will support it.



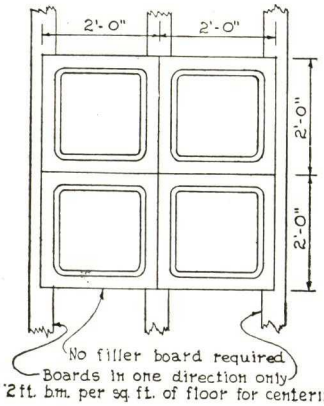
Pouring of Concrete—The domes are 16-gauge steel. Tops are flat and stiff enough to support a runway to wheel concrete to place of placing. Screeds can be placed on domes to assure correct and equal thickness of concrete in placing.

Availability of Steel Domes—Steel domes for the Grid System are available in quantities large enough for any job and can be supplied on short notice.

Domes Patented—Steel domes for the Grid System are patented and patents owned by the GRID FLAT SLAB CORPORATION.

Service

The GRID FLAT SLAB CORPORATION will act as Consulting Engineers with architects and engineers on any Grid design and will furnish, place, oil and remove domes.



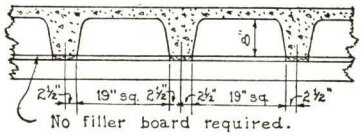
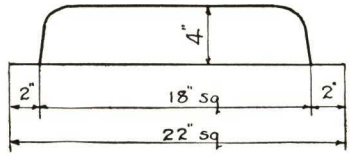


Fig 1



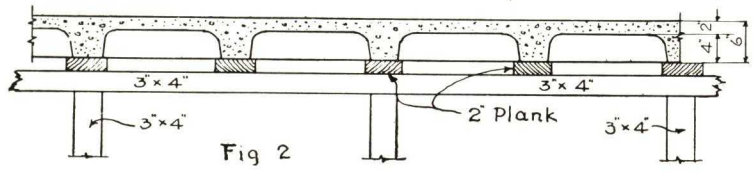


Fig 2

Recent Installations of the Grid System

Building 40-N, Highlandtown Plant, Crown Cork & Seal Co. Inc., Baltimore, Md.—Lucius R. White, Jr., Archt.

Intermediate School, Washington Irving District, Roslindale, Mass.—Sturgis Associates, Inc., Archts.

Newburyport High School, Newburyport, Mass.—Edwin S. Dodge, Archt.

Addition to Quincy Market, North Market Street, Boston, Mass.—McLaughlin & Burr, Archts.; John M. Gray Co., Assoc. Archts.

Phillips Elementary School, Watertown, Mass.—Frank Irving Cooper Corp., Archts.

Office Bldg., Boston Automatic Fire Alarm Co., Boston, Mass.—Blackall, Clapp, Whittemore & Clark, Archts.

Intermediate School, Phillips Brooks District, Dorchester, Mass.—Funk & Wilcox, Archts.

Headquarters Fire Station, Greenfield, Mass.—James A. Britton, Archt.

New Williamsburg Inn., Williamsburg, Va.—Perry, Shaw & Hepburn, Archts.

Addition to Hanchett Memorial Bldg., Lowell General Hospital, Lowell, Mass.—Appleton & Stearns, Archts.

Dormitory Building, Augusta State Hospital, Augusta, Me.—Stevens & Stevens, Archts.

Elementary School, Shirley Street, Winthrop, Mass.—Frank Irving Cooper Corp., Archts.

Hospital Unit, Glenside Sanatorium, Robinwood Ave., Jamaica Plain, Mass.—Leland & Larsen, Archts. and Engrs.

High School, Delmar, Md.—Edwin Wilson Booth, Archt.

Warehouse, Burdine's Department Store, Miami, Fla.—Sturgis Associates, Inc., Archts.

Bristol County Agricultural School, Dighton, Mass.—E. M. Corbett, Archt.

Church of The Annunciation, Ilion, N. Y.—Jas. J. O'Shaughnessey, Archt.

Municipal Garage, Kendall and Cypress Streets, Town of Brookline, Mass.—Strickland & Strickland, Archts.

Building No. 1—B. B. Chemical Co., Memorial Drive, Cambridge, Mass.—Coolidge, Shepley, Bulfinch & Abbott, Archts.

Warehouse and Store, H. J. Gettemuller & Co., Inc., Baltimore, Md.—J. E. Moxley, Archt.

THE LITH-I-BAR COMPANY

LICENSERS

THE DEXTONE CO.
NEW HAVEN, CONN.

KALAMAZOO HAYDITE TILE CO.
KALAMAZOO, MICH.

FORMIGLI CORPORATION
PHILADELPHIA, PA.

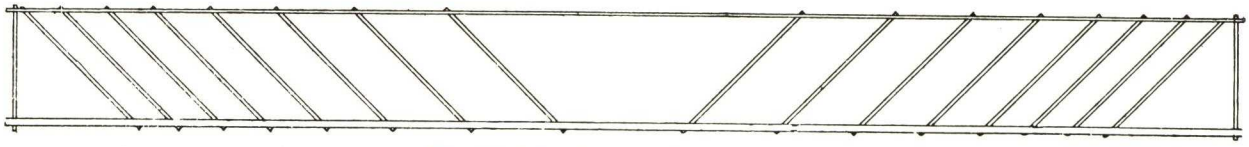
LITH-I-BAR PREFABRICATED, REINFORCED, FIREPROOF, CONCRETE JOISTS

Lith-I-Bar joists are designed to replace field cast joists and result in reduced cost and improved construction. A rigidly controlled production process insures a more uniform and reliable joist than can be formed under average field conditions.

The Lith-I-Bar joist is an assembly of a scientifically designed reinforcing member encased in concrete made with Haydite, the ideal light weight aggregate. This assembly is machine rolled under a pressure of 2000 lbs. per sq. in., producing a uniform dense mass perfectly bonded to the reinforcing unit.

Lith-I-Bar machine rolled concrete shows a compressive strength of over 4000 lbs. per sq. in. Haydite aggregate is used in most installations though the smaller sized joists are available in other materials.

The Lith-I-Bar Balanced Reinforcing Unit, illustrated below, is the result of intensive engineering research. Electrically welded throughout, the tension members conform to "standard specifications for billet-steel concrete reinforcing bars" (A.S.T.M. A-15-30), and the diagonal shear members to "standard specifications for cold drawn steel wire for concrete reinforcement" (A.S.T.M. A-82-34).



The Lith-I-Bar Balanced Reinforced Unit

LITH-I-BAR FEATURES

Economy

Lith-I-Bar construction shows a marked saving over other methods of fireproof construction because of the lower dead loads, the elimination of expensive centering and lower story height. Costly forms are not required and the cost of supervision may be reduced. With the wide range of standard Lith-I-Bar sizes and complete freedom possible in joist spacing, maximum economy and efficiency are attained. For many installations the finished appearance of Lith-I-Bar construction calls for no additional plaster finish.

Simplicity in Design

The work of the designer is simplified and safeguarded by the use of standardized units of predetermined strength. Because he is working with units of tested capacity and uniform dependability, the designer faces no hazard of field conditions which may limit the strength of his design, owing to improper steel placement or poor concrete.

Rigidity

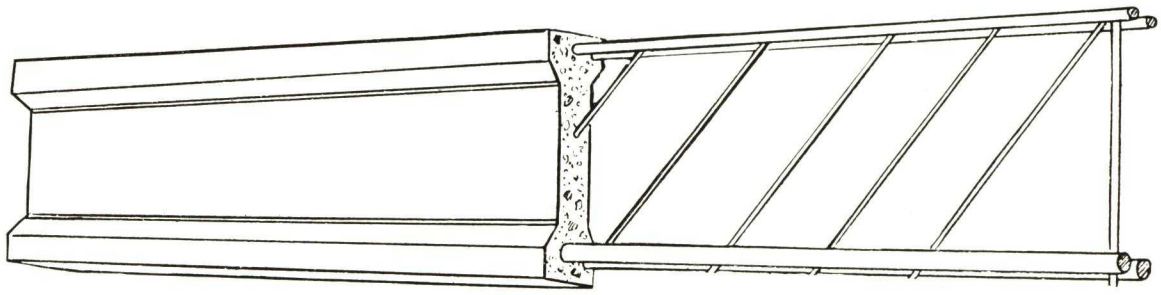
Lith-I-Bar slabs, in laboratory tests and in completed buildings, show the smallest deflection and freedom from vibration inherent in reinforced concrete construction, giving more rigid floors with a saving in story height.

Appearance

The perfection of finish and alignment achieved by machine fabrication of the joists eliminates the necessity for plastering in many classes of buildings.

Dependability

Lith-I-Bar joists afford a new measure of reliability in fireproof construction, replacing the uncertainties of field pouring and steel placement with the dependability of factory controlled production. Furthermore greater strength is developed by the rolling process during fabrication than is possible in field construction.



The Safe Economical Joist for Fireproof Construction

LITH-I-BAR IS ADAPTABLE TO A WIDE RANGE OF CONSTRUCTION

Lith-I-Bar joists are recommended for use as intermediate carrying members in all types of fireproof construction. Its adaptability has been demonstrated over a wide range of installations, including city halls, hospitals, schools, churches, public auditoriums, garages, factories, stores, warehouses, office buildings, apartments and residences. Installations have been made ranging from light residential construction to warehouses designed to carry loads of 600 lbs. per sq. ft. The pleasing appearance of Lith-I-Bar constructions recommends it for use in many installations where additional finishing cannot be afforded.

Fireproof Construction

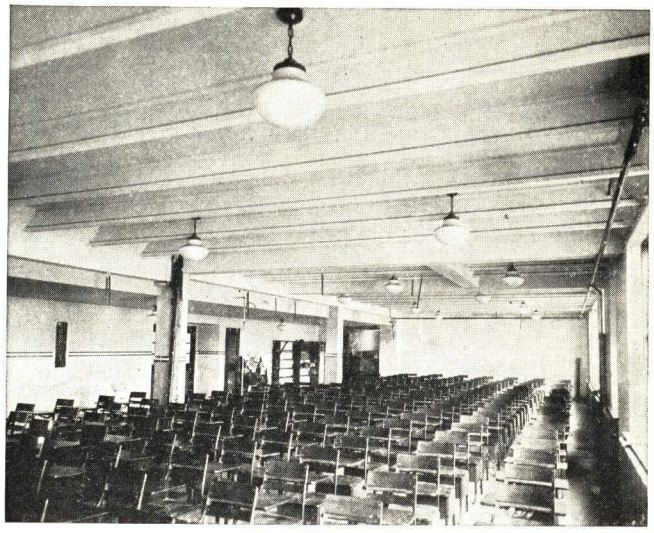
Lith-I-Bar light weight concrete provides fireproofing of the highest possible rating. The type of light weight aggregates used have been thoroughly tested and passed upon by the Bureau of Standards.

Engineering Service

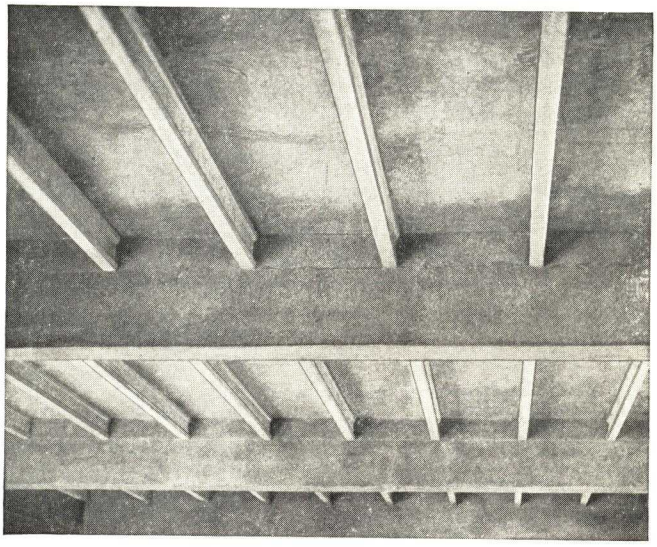
The manufacturer offers the experience of his engineering staff for assistance to the designer in the solution of new or unusual problems in slab design, and in the supervision of installations. Complete setting drawings are furnished for the architect's approval and for the guidance of the foreman on the job. Every joist is marked to indicate its type, length and location.

Availability

Stocks of materials are maintained by the companies shown on page 1, and fabrication and shipments are ordinarily made 10 days after receipt of order. Correspondence and orders should be addressed to the company nearest you.

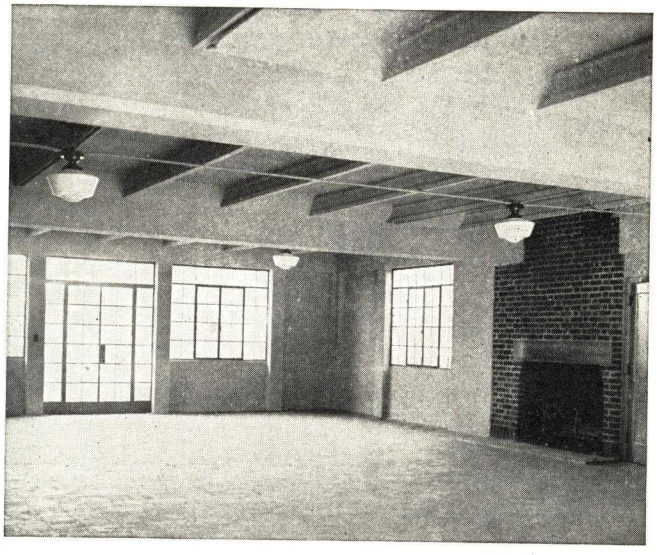


Everett School, Lansing, Mich.



Fifth Regiment Armory, Baltimore, Md.

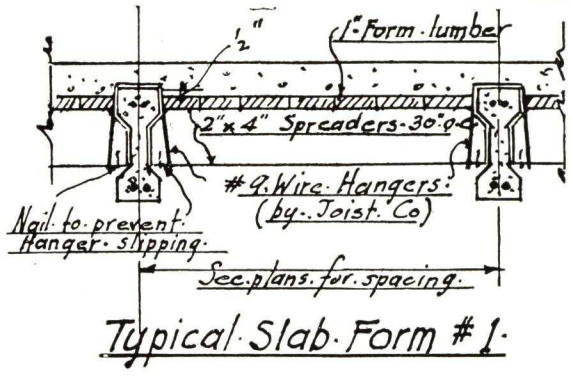
Blockson Mfg. Co., Michigan City, Ind.



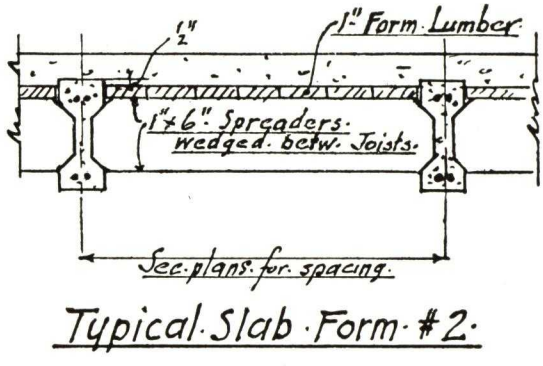
Club House, Pretty Lake, Mich.

For Construction Details and Selection Data, see Next Page

LITH-I-BAR FORM DETAIL



Typical Slab Form #1



Typical Slab Form #2

NOTES ON PLACING

(1) Set Lith-I-Bar joists according to setting plan on accompanying sheet.

(2) Place blocks or wall forms between joists at supports.

(3) Place suitable spreaders, as shown above between joists at approximately 30 in. o.c. and wedged in at ends and bottom to line up for floor form.

(4) Lay floor form lumber on top of spreaders—top to be ½ in. below top of joists—*See typical sections* above.

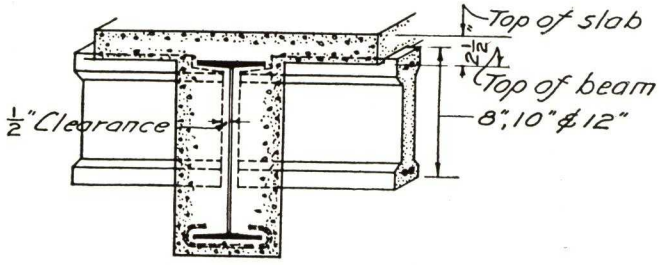
(5) Where joists and slabs are left exposed lay Masonite on 1 x 2-in. furring strips instead of form lumber or spreaders for smooth finish.

(6) Box out heat ducts and service connections. Place slab reinforcing of either welded wire mesh or deformed bars as specified. Place line of shores under center of spans 16 ft. or over when using 8-in. Lith-I-Bar joists—or 20 ft. and over when using 10- and 12-in. joists.

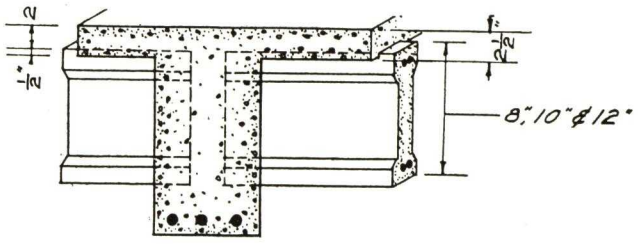
(7) Place concrete for slab.

(8) Strip slab forms after concrete has moist cured for 5 to 7 days. Shores to remain in place 7 to 10 days as decided by the architects.

DETAILS OF JOIST FRAMING INTO BEAMS



Detail of Fireproofed Steel Beam



Detail of Concrete Beam

SPECIFICATION FOR FLOOR CONSTRUCTION

Lith-I-Bar Joists—Shall consist of machine rolled lightweight 4,000-lb. concrete, containing a reinforcing unit consisting of necessary bars of steel, top and bottom; of sizes as called for on drawings with stirrups spaced as required, the whole to be electrically welded into one unit.

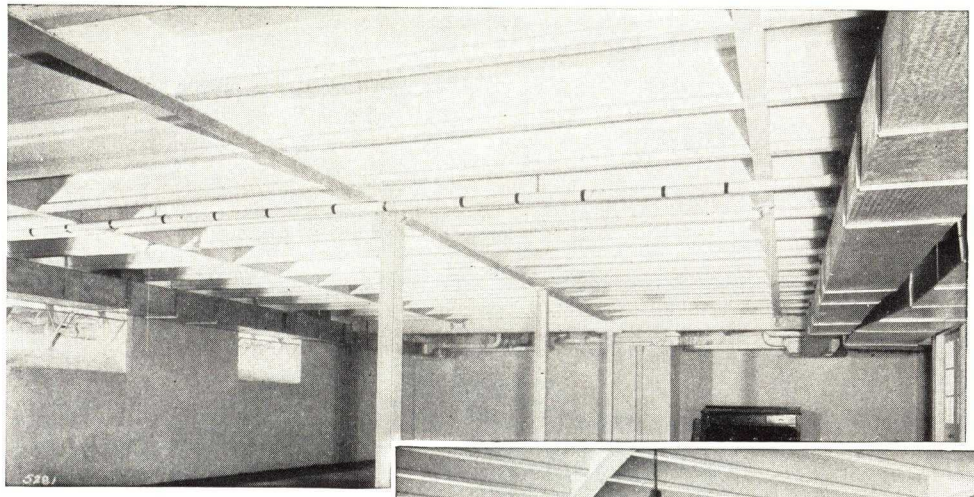
Placing Joists—Lith-I-Bar joists of lengths as required by floor panels, shall be laid plumb, having full bearing under each joist and spaced on centers as indicated on drawings.

Hangers for Ceilings—Where ceiling is indicated, place wire hangers over joists, cast tie-to inserts in bottom of joists or perforate joists with ¼-in. holes above bottom flange.

Forms—Forms shall be constructed as shown on plans using a 1-in. board for spacers and decking. Where no ceiling is indicated, use Masonite or other similar material for decking so as to obtain a smooth finish between joists.

Concrete—Slab shall be of thickness as called for on drawing with proper reinforcements of size and centers as indicated. Concrete slab to be finished straight and true, to be floated smooth to properly receive the type of floor finish specified. The floor slab to be poured integrally with beam concrete or steel beam fireproofing and wall supports and shall be a 1:2:4 concrete mixture.

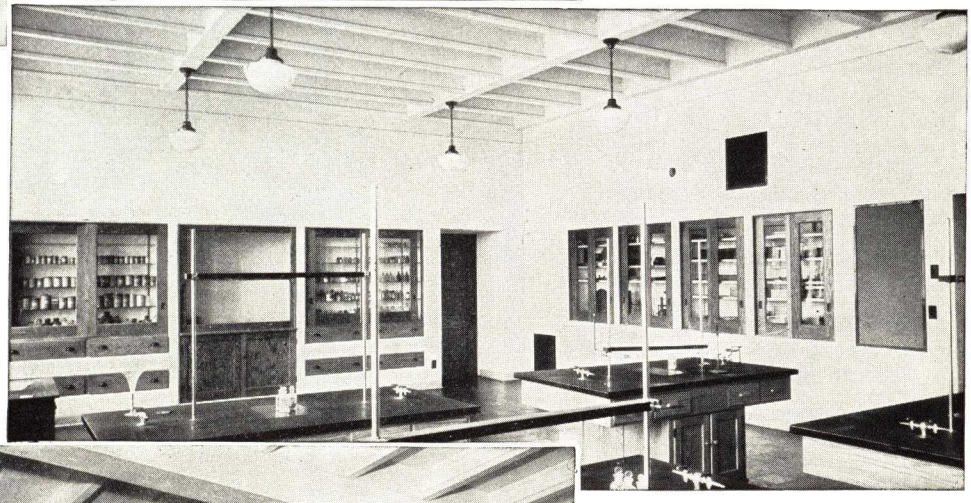
Slab Reinforcing Steel—Place ¼-in. bars or equivalent electric welded mesh reinforcement as specified on drawings.



Left:

First Church of Christ, Scientist, Jenkintown, Pa.

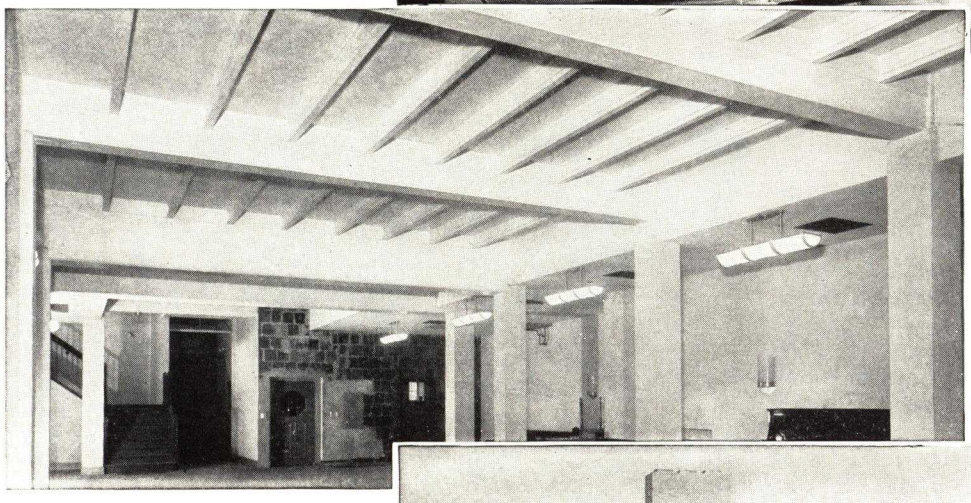
W. Pope Barney, Architect.



Right:

School, Matawan, Mich.

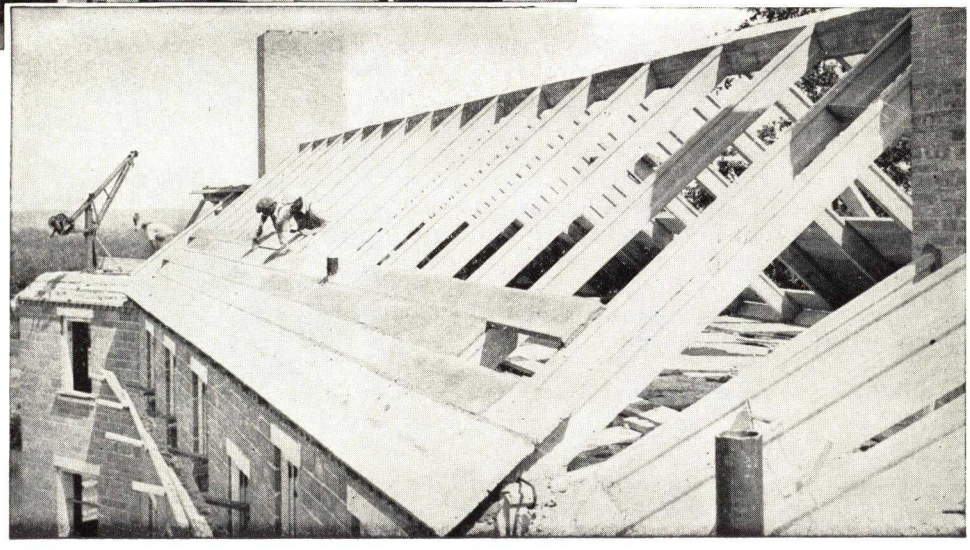
Stewart & Kingscott, Architects



Left:

St. Joseph's Home Meadowbrook, Pa.

Eugene Stopper, Architect



Right:

Residence for L. N. Upjohn, Kalamazoo, Mich.

H. F. Young, Architect

JNO. T. McCOY, INC.

Structural Hollow Clay Tile Floor and Roof Construction

551 Fifth Avenue
NEW YORK, N. Y.

A TYPE OF CONSTRUCTION COMBINING EVERY FEATURE OF THE PERFECT FLOOR

One and Two-way Systems—For use in all types of buildings and installed in thousands of structures because of the following outstanding features:

Strength—Approved for load carrying capacities by leading building departments throughout the country.

Durability—Composed of masonry materials, not affected by water or acids.

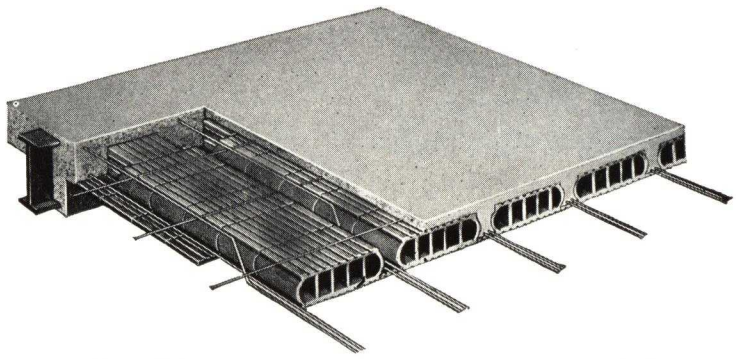
Lightness—Minimum depth with cellular construction reduces dead weight as compared to other floors.

Fireproof—Hollow tile being a product of fire cannot readily be destroyed by fire.

Soundproof—Being of cellular composition they are soundproof and afford thorough insulation against heat and cold.

Flat Ceilings — Two-way construction eliminates all intermediate beams in rooms and leaves flat ceilings from wall to wall.

Installation—Simple and speedy.



One-Way (Wide Center) with Concrete Top, Using Blocks of 16 and 20-inch Widths

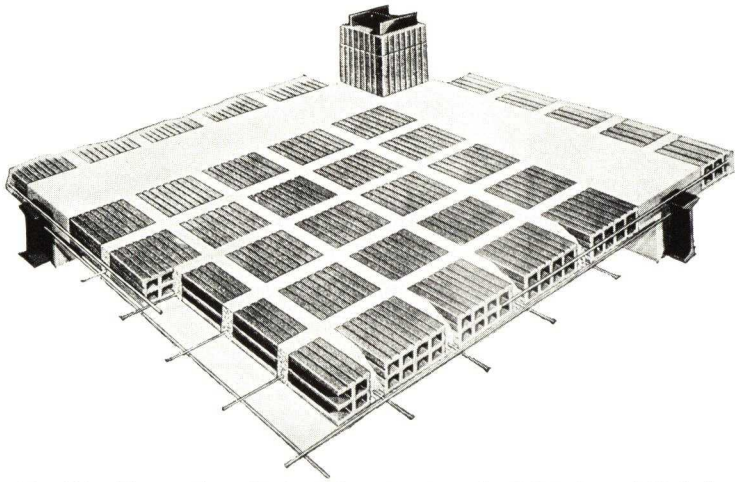
NASSAU SYSTEM

Nassau One-way Hollow Tile Floors, developed for us by Elwyn E. Seelye, prominent structural engineer, represent the last word in one-way hollow tile floor construction. This type can be used with or without a concrete top as tiles are used in compression. Conduits can be placed on depressed rows of tiles.

This construction has been used in the New Nassau Tavern, eight apartment buildings and the Play House, comprising part of the $4,500,000 development for the Princeton Municipal Improvement Corporation at Princeton, N. J., Thomas Stapleton, Architect, Elwyn E. Seelye & Co., structural engineers.

Either directly or indirectly we have been identified with approximately 2,500 installations, among which are numbered some of the finest Government, State, City and private structures in this country. Repeat business with one nationally known architectural firm numbers 40 contracts.

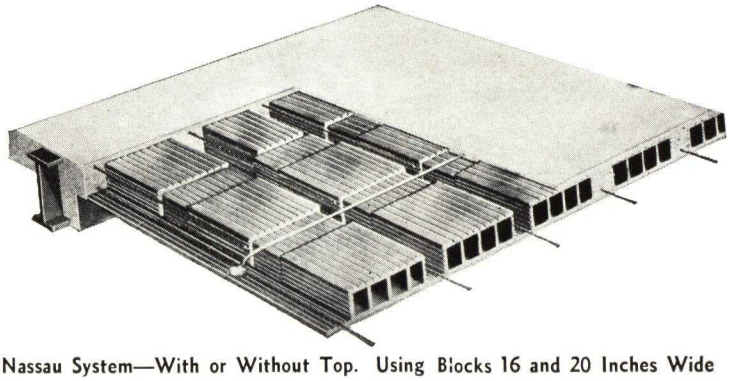
If you are planning a new job specify hollow clay tile floors. Let us furnish you with preliminary layouts and costs. Ours is a high class construction at low construction costs.



Two-Way Floor, with or Without Concrete Top. Steel Bars Spaced 20 Inches on Centers

REFERENCES

We will be glad to furnish a list of Architects and Engineers who have specified our type of floor construction, together with a list of buildings in which millions of square feet of our floors have been installed.



Nassau System—With or Without Top. Using Blocks 16 and 20 Inches Wide

REPUBLIC FIREPROOFING COMPANY, INC.

Slagblok Fireproof Floor Construction

GENERAL OFFICES
31 Union Square, NEW YORK, N. Y.

Product

REPUBLIC SLAGBLOK FLOOR SYSTEM, consisting of Slagblok units and steel bar reinforcement for concrete fireproof floor construction.

Experience

Service and materials have been furnished in connection with Republic Slagblok Floors for more than 1500 buildings.

REPUBLIC SLAGBLOK FLOOR SYSTEM

Construction

Republic Slagblok Floors consist of pre-cast slag-concrete units in combination with poured reinforced concrete ribs for use both as floor and roof slabs.

Units composed of two blocks (see detail below) placed with open sides together, measure 16x16 in. and are placed on forms, usually on 20-in. centers allowing for ribs 4-in. wide to run parallel to the supports in both directions.

The detail shows the simplest form of slab construction in which concrete ribs are poured flush with the top of the blocks. Factors entering into the design, however, frequently necessitate a topping of concrete, poured with the ribs, over the entire slab surface. A monolithic topping of this description may be left rough for fill and finish or trowelled smooth to receive carpets, linoleum or other finished floor surfaces.

Design

The Slagblok units, made of slag-concrete, are produced under a special patented process giving them a high compressive strength and a perfect bonding quality with the concrete poured around them. In the design, therefore, the net area of the blocks is considered as a structural part of the slab for both "one-way" and "two-way" construction. The latter, under ordinary conditions, is the more economical.

Complete design information will be furnished on request.

Approval

Slagblok construction has been approved by the principal cities in the East, including New York, Boston, Washington, New Haven, Hartford, Albany, Syracuse, Rochester.

Advantages

Flat Ceilings—The wide variety of panel sizes which may be designed economically with Slagblok construction include all the usual room sizes ranging upward to spans encountered in the large classrooms of school buildings. Clear spans within the rooms are assured by locating beams at the partitions.

Reduced Story Heights—As all materials entering into the construction of Slagblok floors perform actual work, the System will allow for as shallow a slab as can be employed for a given span. Compared to other types of construction, Slagblok floors provide either increased ceiling heights or decreased story heights with proportional economies in masonry, stairs and mechanical work. In a tall building, the gain is frequently sufficient to allow for an additional story within the same building height.

Saving in Plaster—Slagblok floors offer a definite saving of plaster, in comparison with short span construction, by eliminating the intermediary beams and the corresponding arrises and beam sides and, in comparison with ribbed slab construction, by the omission of metal lath and the use of thinner plaster applied directly to the underside of the slab without any special provision for bonding. A two coat plaster gives satisfactory results on Slagblok ceilings.

As the Slagblok is of the same nature and color as the concrete ribs, the finished ceiling will always present a uniform appearance when the standard requirements of good plastering are followed.

Flexibility in Providing for Mechanical Work—Because the System is well adapted to the use of a monolithic finish, pipes, conduits, underfloor ducts, etc., may be easily installed in the slab by incorporating them in the concrete ribs which run in both directions or by substituting shallower blocks or omitting blocks entirely to provide additional depth as required.

Rigidity—The two-way reinforcement of Slagblok floors both provides for the lateral distribution of loads and forces and increases the capacity for concentrated loads.

Equal Resistance to Negative and Positive Moments—As a distinctive feature of the Slagblok System, equal resistance to negative and positive moments is obtained through the use of equal wall thicknesses for the tops and bottoms of the blocks.

No Uncertainty of Concrete Quantities—All Slagblok units being completely closed, the quantities of poured concrete are independent of the consistency of the concrete.

Cost

Installed costs per square foot will vary with spans, loads, etc., but compare very favorably with other types of fireproof floor construction.

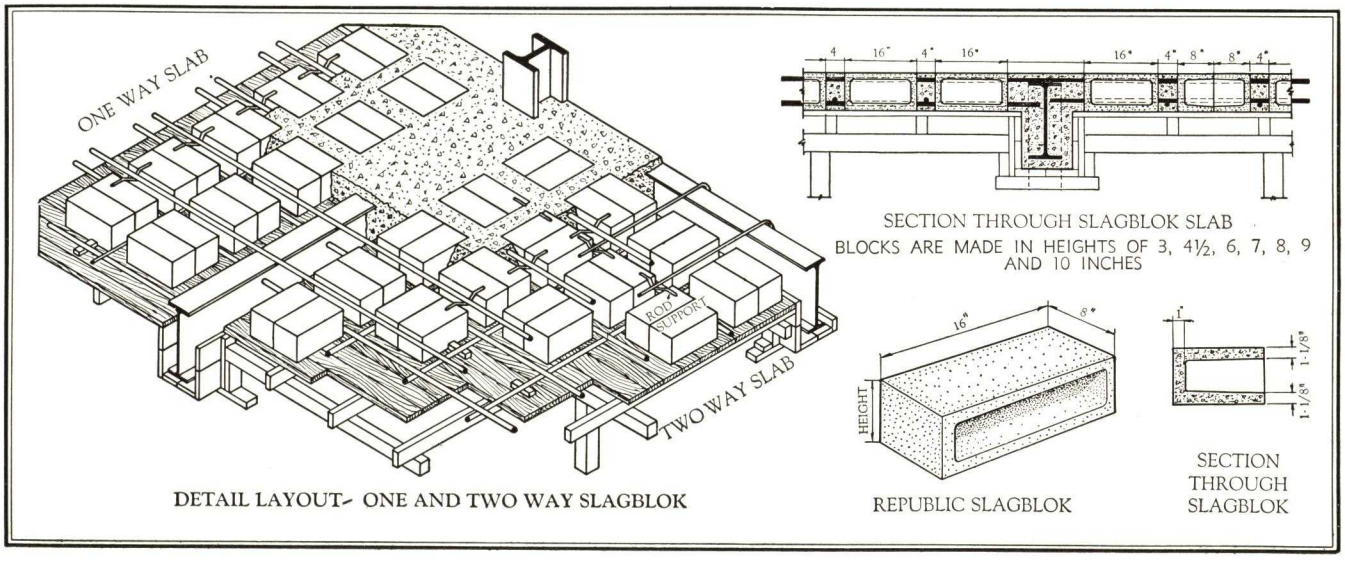
Service

The REPUBLIC FIREPROOFING COMPANY, INC., does not contract for installation. The company sells the Slagblok units and the reinforcing bars for slabs, beams, and columns; provides, without extra charge, all working drawings in connection therewith, and also furnishes such inspection service in the field as may be deemed necessary for the satisfaction and protection of all concerned.

The engineering staff is available at any time for consultation regarding the use of the Slagblok System and will furnish estimates on prospective operations.

Recent Operations

BUILDING	ARCHITECT
Waldorf-Astoria Hotel, New York, N. Y.	Schultze & Weaver
City Bank-Farmers Trust Co., New York, N. Y.	Cross & Cross
New Haven Hospital, New Haven, Conn.	Henry C. Pelton
Adelphi College, Garden City, N. Y.	McKim, Mead & White
S. H. Kress Store, New York, N. Y.	Edward F. Sibbert
Greenwich High School, Greenwich, Conn.	Guilbert & Betelle
One Beekman Place Apts., New York, N. Y.	Sloan & Robertson
Federal Office Building, New York, N. Y.	Cross & Cross
Dudley District School, Boston, Mass.	M. A. Dyer Co.
Medical College, Syracuse University, Syracuse, N. Y.	John Russell Pope and Dwight James Baum



DETAIL LAYOUT- ONE AND TWO WAY SLAGBLOK

SECTION THROUGH SLAGBLOK SLAB

BLOCKS ARE MADE IN HEIGHTS OF 3, 4½, 6, 7, 8, 9 AND 10 INCHES

REPUBLIC SLAGBLOK

SECTION THROUGH SLAGBLOK

H. H. ROBERTSON COMPANY

Robertson World-Wide Building Service

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CANADA; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES, AGENCIES AND BRANCH OFFICES

ALLENTOWN, PA., H. N. Crowder, 446 Union Street
ATLANTA, GA., H. H. Robertson Company, 413 Bona Allen Building
BALTIMORE, MD., H. H. Robertson Company, 1635 Baltimore Trust Building
BIRMINGHAM, ALA., H. H. Robertson Company, 2019 Sixth Avenue, No.
BOSTON, MASS., H. H. Robertson Company, 14 High School Avenue (Quincy, Mass.)
BUFFALO, N. Y., H. H. Robertson Company, 602 Jackson Building
BUTTE, MONT., Archie W. Adams, 618 Metals Bank Building
CHARLESTON, W. VA., Fireproof Products Co., 422 Professional Building
CHARLOTTE, N. C., Edwin C. Boyette, Jr., 1025 Arosa Avenue (Box 27)
CHICAGO, ILL., H. H. Robertson Company, 360 No. Michigan Avenue
CINCINNATI, OHIO, H. H. Robertson Company, 1315 American Building
CLEVELAND, OHIO, H. H. Robertson Company, 1526 Hanna Building
DENVER, COLO., J. Q. Lalor, 1125 So. Vine Street
DETROIT, MICH., H. H. Robertson Company, 635 New Center Building
EAST ORANGE, N. J., H. H. Robertson Company, 25 No. Harrison Street
EASTON, PA., H. N. Crowder, 103 No. Fourth Street
JACKSONVILLE, FLA., H. H. Robertson Company, P. O. Box 4523
KNOXVILLE, TENN., R. G. Jeffries, 409 W. Clinch Avenue (P. O. Box 2023)
LITTLE ROCK, ARK., Wherry & Company, 115 Center Street
LOS ANGELES, CALIF., H. H. Robertson Company, 816 W. Fifth Street
MARQUETTE, MICH., C. H. Cooper
MINNEAPOLIS, MINN., Hauenstein & Burmeister, 614 Third Avenue, So.
NEW HAVEN, CONN., H. H. Robertson Company, 207 Orange Street
NEW ORLEANS, LA., H. H. Robertson Company, 736 Whitney Bank Building
NEW YORK, N. Y., H. H. Robertson Company, 475 Fifth Avenue
PHILADELPHIA, PA., H. H. Robertson Company, 1307 Real Estate Trust Building
PITTSBURGH, PA., H. H. Robertson Company, 2000 Grant Building
PORTLAND, ME., W. O. Hutchins, 193 Middle Street
PORTLAND, ORE., Mercer Steel Company, 838 N. W. 13th Avenue
RICHMOND, VA., R. M. Nolting, 1103 E. Main Street (P. O. Box 1011)
ST. LOUIS, MO., H. H. Robertson Company, 1218 Olive Street
SALT LAKE CITY, UTAH, L. Brandenburger, 153 W. Second South Street
SAN FRANCISCO, CALIF., H. H. Robertson Company, 50 Hawthorne Street
SCRANTON, PA., F. H. Coffin, 210 Brooks Building
SEATTLE, WASH., Arthur A. Dally, 332 Pioneer Building
SOUTH BOSTON, MASS., Northeastern Metals Co., 307 Dorchester Avenue
SYRACUSE, N. Y., F. J. Ludwick, 1126 Chimes Building
TULSA, OKLA., Murray R. Womble, 316 Atco Building
WASHINGTON, D. C., J. R. Nichols, 428 Woodward Building

FOR ENGLAND: H. H. ROBERTSON CO., MERSEY IRON WORKS, ELLESMERE PORT, CHESHIRE

FOR CANADA: H. H. ROBERTSON CO., LTD.
TORONTO (MAIN OFFICE), 611 Metropolitan Building
MONTREAL OFFICE, 526 Confederation Building

Products

ROBERTSON STEEL FLOOR.

For Robertson Protected Metal (RPM), corrugated roofing, siding, building trim and steel decks; Robertson Ventilators, gravity and fan types; Robertson Louvres, Hoods and Ducts; Robertson Weatherproof Skylights and Sash (puttyless type); and Floor Wiring Method, see File Index.

RPM TRADE-MARK

Patents: Robertson Steel Floor is protected by United States Patents Nos. 1,855,082; 1,867,433; 1,986,121; 1,986,122; 1,994,113; 2,029,393, 2,041,965, and 100,082. Other United States and foreign patents pending

ROBERTSON STEEL FLOOR, WALLS AND ROOFS

A complete unit building system of cellular structure, taking the form of hollow steel beams. Offers the architect the important advantages of *economy* and *speed* in construction together with an *electrical availability* hitherto unknown.

This product is the result of years of development work at the Mellon Institute of Industrial Research and the plant laboratories of the H. H. ROBERTSON COMPANY. Each unit is built by preforming two steel sheets and subsequently welding these two sheets together. The standard unit, as delivered to the construction job, is either two cells (12 ins. wide), or four cells (24 ins. wide), and with a 24-ft. maximum span. The maximum weight per unit, except in special cases, is about 400 lbs. Generally, the average unit weighs less than 250 lbs. The design is such as to develop maximum efficiency of the metal.

Used for All Floors

All floor requirements of modern buildings are met by Robertson Cellular Steel.

Strength — Robertson Cellular Steel has exceptional strength, and provides for all combinations of floor loads up to 500 lbs. or more per square foot, and for all required span lengths. Deflections under given load conditions can be predetermined. Load tables are available, based on tests made by the U. S. Bureau of Standards. *(Write for a reprint of the report which appeared in the August 1932 National Bureau of Standards Journal of Research.)*

Economy—This floor is more economical because it eliminates expensive electrical duct systems; speeds up construction 20 to 30 per cent (thus eliminating unproductive interest time on construction funds and making possible earlier occupancy and more revenue); has a high salvage value; provides flexibility for alterations in case of occupancy changes; and reduces first cost, because light weight and strength of floor cuts down amount of forms and structural steel necessary for construction.

Showing the Ease with Which the Floor Units Are Laid in Place

They are then welded, bolted or clipped to the supporting framework. Any type of floor finish or ceiling may be applied. Each cell provides a potential raceway for installation of electrical wiring required by tenants for present or future use

Electrical Availability—Overcomes the inadequacies of present-day floor duct systems at a minimum cost by combining the features of both a floor and an electrical duct system. Each parallel cell (with a 6-in. spacing) is a potential conduit or raceway for electrical wiring; straight and free from interior obstructions and readily accessible, so that wires need not

be drawn through until needed; but can be fished in at any time and place desired without necessitating the tearing up of floors or the disturbing of any arrangement not convenient for that purpose. Thus, this floor makes possible the installation of an electrical outlet wherever and whenever desired—and prevents the possibility of electrical obsolescence. The standard baked-on asphaltic enamel finish meets the requirements of the Underwriters Laboratories, Inc., for underfloor wire raceways.

Adaptability—Any type wearing surface desired may be applied to Robertson Cellular Steel Floors. The surface is level and does not vary more than 1/8 in. It is uniform in appearance on the underside and often requires no ceiling (attractive decorative schemes may be used on the underside of the floor). It is incombustible and often requires no fireproofing. However, ceilings of any kind can be applied to it at no more cost than for other types of floors.

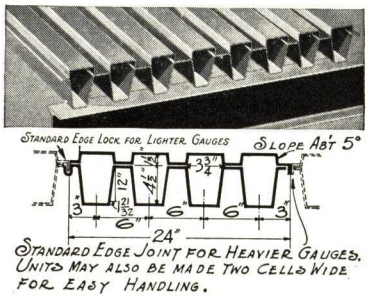
This floor is particularly adapted to service installations. If holes are cut through the floor the surrounding steel can be reinforced to restore original strength, if necessary.

Used for Residence Floors

The FK-type, inverted to provide a flat steel ceiling, is used successfully for any type of residence. Incombustible, strong, light weight, termite-proof, economical and practically soundproof.

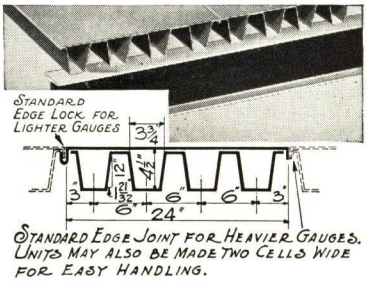
Robertson Cellular Steel Floor and Electrical Fittings are approved by the Underwriters Laboratories, Inc.

INDEX TO TYPES OF UNITS



K-Type Unit

Fundamental keystone-shaped unit for average loading on spans from 12 to 16 ft. Adaptable to all general floor construction and to installations requiring fireproofing or fill with lightweight concrete, etc. Any type of floor finish may be laid on the concrete surface. Gauges 16-16, 14-14, 12-12, 10-10, 7-7, or combinations thereof.



FK-Type Unit

Combination of flat plate with bottom element of the K-Type Unit. Used where loads are not in excess of 125 lbs. per sq. ft. and spans are 10 to 15 ft. Adaptable for installations not requiring fireproofing, and for floor finishes such as rubber tile, linoleum, mastics, wood parquetry, etc.

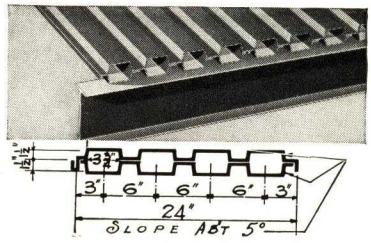
In the inverted position it is used for floors of industrial, commercial and residential buildings, as it thus provides a flat steel ceiling that can be painted. This unit is called FKX-Type.

DK-Type Unit (Not Illustrated)

Made by combining two bottom elements of the fundamental keystone structure.

For use only on special occasions, and subject to advice of the H. H. Robertson Company's Engineering Department.

RK-Type Unit

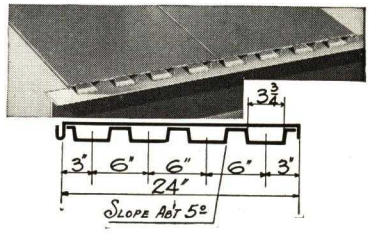


The combination of two of the U-shaped upper plates of the fundamental keystone structure, making a rectangular cell which is well adapted to the fishing through of electrical wiring, etc. Also desirable for apartment houses, schools, stores, etc., where loads are not excessive, and it is desired to limit floor thickness as much as possible. For loads from 75 to 400 lbs. per square foot on spans from 6 to 12 ft.

Adaptable to installations requiring concrete or similar materials for fill or fireproofing.

Any type of floor finish may be applied on the concrete surface. Gauges 16-16, 14-14, 12-12 or combinations thereof.

UK-Type Unit



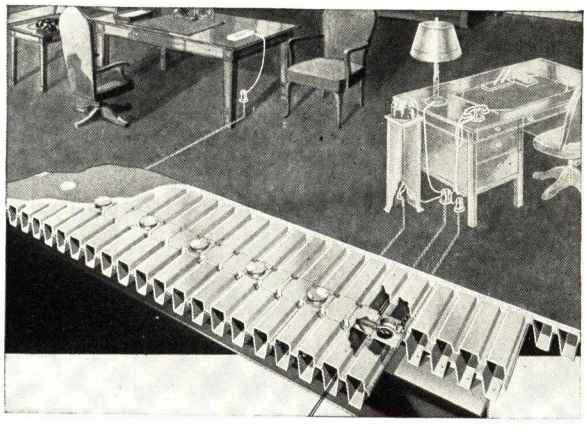
Combination of a flat plate with the U-shaped top plate of the fundamental keystone structure. Desirable where a flat floor finish is desired and the thickness of the floor surface must be limited. Is applicable for roof decks, floor for library bookstacks, balconies, etc. For loads of less than 200 lbs. per sq. ft. on spans of 4½ to 8 ft. Also used in inverted position, providing flat steel ceiling that can be painted.

Adaptable to linoleum, rubber tile, mastics, etc., for floor finishes. Gauges 16-16, 14-14 or combinations thereof.

It is used in the inverted position and is then called UKX-Type.

Note: Catalogue giving complete design data and load tables is available.

THE ROBERTSON ELECTRICAL DISTRIBUTION METHOD



In order to make full use of the wiring distribution properties of Robertson Steel Floor, two methods of wiring have been devised for the purpose of continuing wiring from source of feed to the cell in which it is desired to locate an outlet. One or more of the unit duct feeders illustrated herewith are placed for each type of distribution desired in the "Topside Header" method. Units are interchangeable, and access ports can be placed on any centers that are multiples of 6 in.

The adjustable covers act as screeds and are at the finish fill line. The floor covering conceals them. They are readily identified for future wiring by markers. When a unit must be used, the floor covering is removed at the particular location desired. After the installation of wiring, a floor covering adapter is placed. Both "Topside Header" and "Underside Header" methods (for this system and inverted FK units) are illustrated in the section devoted to "Robertson Steel Floor Wiring Method." See File Index for pages.

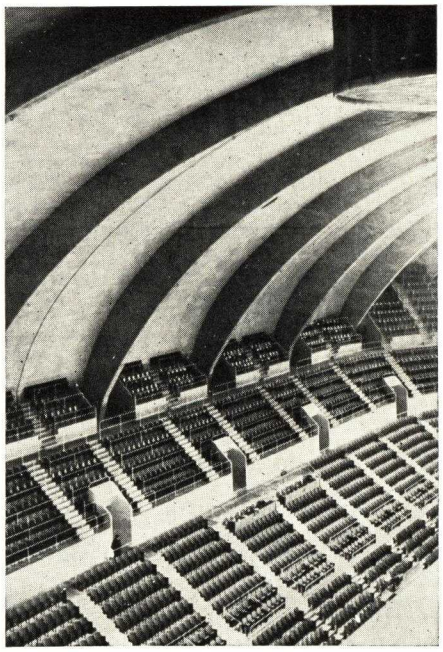
ROBERTS AND SCHAEFER COMPANY

Engineers and Contractors
Wrigley Building, CHICAGO, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA

"BARREL SHELL ROOFS" AND "SHELL DOMES"
"Z-D" SYSTEM OF
PERMANENT MONOLITHIC REINFORCED CONCRETE CONSTRUCTION

A Few Uses for "Z-D" Structures

Sports arenas
Auditoriums
Factories and garages
Storage halls
Airplane hangars
Market halls
Gymnasiums and grandstands
Train sheds
Reservoir roofs
Dock structures
Monumental buildings



Longitudinal Barrel Shell Roof, Sports Arena in Pennsylvania

A Few Reasons for "Z-D" Structures

Permanence—no maintenance
Fireproof—low insurance rates
Strength with light weight
Attractive appearance
Absence of trusses and bracing
Earthquake-proof
Built by local labor
Low cost

An increasing number of Concrete Shell Roofs is being built in this country. Shell Roofs have been in use in Europe and other continents for many years. Many striking examples of their large possibilities may be found.

"Shell Roofs" are so-called because of their similarity to the shells found in nature. A Shell Dome is comparable to a half of a gigantic walnut shell or egg shell, the strengths of which are well known. An idea of a Barrel Shell Roof can be obtained by imagining a long metal cylinder with closed ends, such as a steam boiler, cut longitudinally through the middle, and the half sections resting horizontally on columns at the four corners.

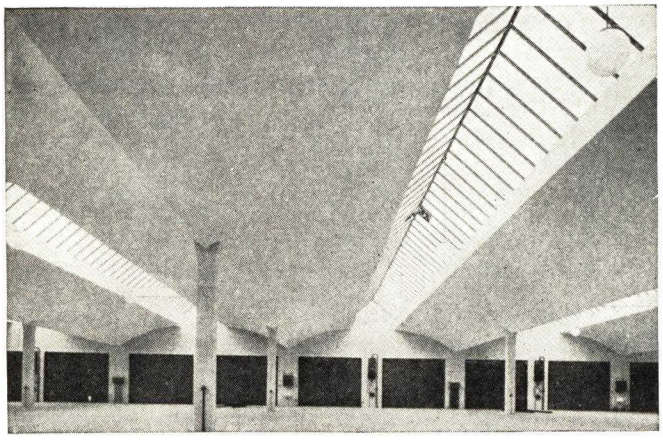
Such a structure would be found to possess great load-carrying power and rigidity, even though it were made of a thin plate. All thin, curved plates, when crowned properly, have excellent structural properties, which are explained by the fact that loads are transmitted largely by direct stresses; viz., tension and compression only.

The Z-D SYSTEM of construction makes use of the principles of thin, curved plates in widely spanned, reinforced concrete building constructions. The curved concrete plate or the shell has a thickness of from 2 to 3½ ins., and if properly designed and reinforced it can be used for building spans up to 300 ft.

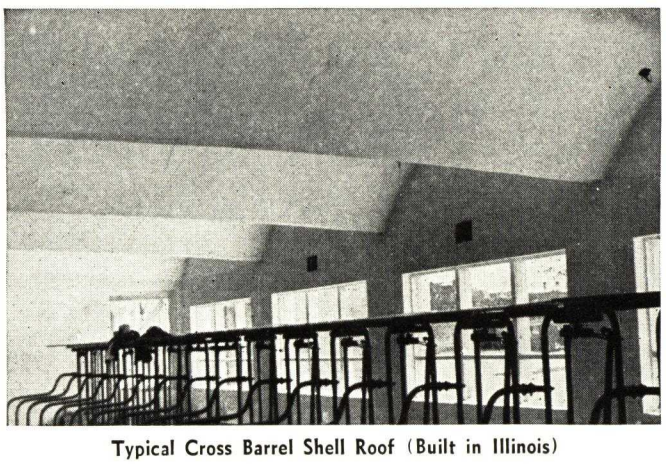
Z-D ROOFS have been subjected to a number of tests in this country. Among these were full-size loading tests in which a 3-in. slab spanning 36 ft. carried safely an unsymmetrical load of 200 lbs. per sq. ft.

ROBERTS AND SCHAEFER COMPANY will be pleased to furnish, without obligation, sketches showing the application of Z-D Roofs to different structures, and to co-operate with architects, engineers and contractors to develop plans for buildings suitable for Z-D construction, designed for specific requirements.

For further information, communicate with ROBERTS AND SCHAEFER COMPANY.



Typical Butterfly Shell Roof



Typical Cross Barrel Shell Roof (Built in Illinois)

SMOOTH CEILINGS SYSTEM

(U. S. Patents Nos. 1,950,422 and 2,000,543)

802 Metropolitan Life Building
MINNEAPOLIS, MINN.
REPRESENTATIVES IN PRINCIPAL CITIES

SOME ADVANTAGES OF "SMOOTH CEILINGS," ALL FLAT, BEAMLESS FLOOR-CONSTRUCTION FOR REINFORCED CONCRETE BUILDINGS or STRUCTURAL STEEL BUILDINGS

(1) The ceilings are flat in the construction itself.

(2) Floor slabs may be solid concrete or cellular, with light weight fillers or ceilings may be coffered. Plaster may be applied directly to the concrete ceiling, with or without bond coat, depending on conditions. Cost is thus reduced.

Construction View of "Smooth Ceilings" System

Installed in first story of a modern six-story factory building with steel interior columns and reinforced concrete wall columns. Long spans, relatively small columns, and all flat ceilings were gained at minimum cost.

(3) The ceilings may be finished and decorated on the solid concrete without plaster. Cost may thus be further reduced.

(4) This system will usually save several inches in the height of each story because less height is required by the floor construction. Several feet are saved in the height of the average building. Both construction and operating costs are thus reduced.

(5) Cost of forms for concrete is very low, and salvage on form lumber is exceptionally high, because a minimum amount of cutting and fitting is required.

(6) Cost of plastering, finishing, decorating and lighting the building is reduced because beams, girders, drop panels and flared column caps are omitted.

(7) Pipes and small ducts can pass through the slab around the columns without interfering with the construction. Pipes can run between flanges of steel columns. Furred columns can be smaller. See Fig. A.

(8) Cost of installing air conditioning is reduced by our all flat ceilings.

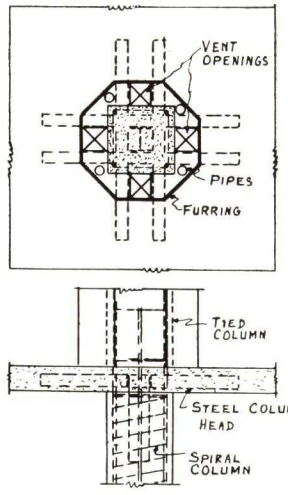
(9) Load tests on this construction show very small deflections, good recovery, low stresses in the concrete and steel.

This system has been used and approved by the U. S. Government. It was used in constructing the U. S. Appraisers' Stores Building, Baltimore, Md.

We Recommend This System for the Following Types of Buildings

Office buildings
Hospital buildings
School buildings
Garage buildings
Hotel buildings
Club buildings
Apartment buildings
Manufacturing buildings
Store buildings, warehouse buildings, etc.

Fig. A



Service

Prices will be quoted on the necessary steel column heads for any certain job. Estimates of quantities of concrete, reinforcing steel and structural steel will be made and furnished, based on architect's preliminary sketches or working drawings.

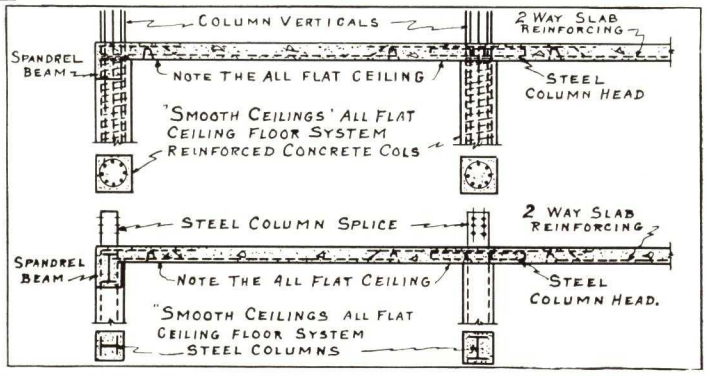


TABLE OF STANDARD SLAB THICKNESSES AND STEEL COLUMN HEAD DESIGNATIONS TO BE USED WITH STONE CONCRETE WEIGHING 150 LBS. PER CU. FT.

Span, ft.	Live load plus superimposed dead load 100 lbs. per sq. ft.		Live load plus superimposed dead load 125 lbs. per sq. ft.		Live load plus superimposed dead load 150 lbs. per sq. ft.		Live load plus superimposed dead load 200 lbs. per sq. ft.		Live load plus superimposed dead load 250 lbs. per sq. ft.		Live load plus superimposed dead load 300 lbs. per sq. ft.	
	Rough slab thickness, ins.	Column head desig.	Rough slab thickness, ins.	Column head desig.	Rough slab thickness, ins.	Column head desig.	Rough slab thickness, ins.	Column head desig.	Rough slab thickness, ins.	Column head desig.	Rough slab thickness, ins.	Column head desig.
For Concrete Having Strength 2000 Lbs. per Sq. In. at 28 Days												
14x14	5½	14-100	5¾	14-125	6	14-150	6½	14-200	7	14-250	7½	14-300
16x16	6	16-100	6¼	16-125	6½	16-150	7¼	16-200	8	16-250	8½	16-300
18x18	6¾	18-100	7	18-125	7½	18-150	8¼	18-200	9	18-250	9½	18-300
20x20	7½	20-100	7¾	20-125	8¼	20-150	9¼	20-200	10	20-250	10½	20-300
22x22	8¼	22-100	8¾	22-125	9¼	22-150	10¼	22-200	10¾	22-250	11½	22-300
24x24	9	24-100	9¾	24-125	10	24-150	11¼	24-200	12	24-250	12¾	24-300
26x26	10	26-100	10¾	26-125	11	26-150	12	26-200	13	26-250	13¾	26-300
28x28	10¾	28-100	11¾	28-125	12	28-150	13	28-200	14	28-250	14½	28-300
30x30	11¾	30-100	12¾	30-125	13	30-150	14	30-200	15	30-250	15¾	30-300
For Concrete Having Strength 2500 Lbs. per Sq. In. at 28 Days												
14x14	5¼	14a-100	5½	14a-125	5¾	14a-150	6	14a-200	6¼	14a-250	6½	14a-300
16x16	5¾	16a-100	5¾	16a-125	6¼	16a-150	6¾	16a-200	7	16a-250	7½	16a-300
18x18	6½	18a-100	6½	18a-125	7	18a-150	7½	18a-200	8	18a-250	8½	18a-300
20x20	7	20a-100	7¼	20a-125	7½	20a-150	8¼	20a-200	8¾	20a-250	9¼	20a-300
22x22	7¾	22a-100	8	22a-125	8¼	22a-150	9	22a-200	9½	22a-250	10¼	22a-300
24x24	8¼	24a-100	8¾	24a-125	9	24a-150	9¾	24a-200	10½	24a-250	11	24a-300
26x26	9	26a-100	9½	26a-125	9¾	26a-150	10¾	26a-200	11½	26a-250	12	26a-300
28x28	9½	28a-100	10	28a-125	10½	28a-150	11½	28a-200	12½	28a-250	13	28a-300
30x30	10¼	30a-100	10¾	30a-125	11¼	30a-150	12½	30a-200	13½	30a-250	14¼	30a-300

WHEELING CORRUGATING COMPANY

Steel Floor and Roof System

WHEELING, W. VA.

ATLANTA, GA.
BUFFALO, N. Y.
CHICAGO, ILL.
COLUMBUS, OHIO
DETROIT, MICH.
KANSAS CITY, MO.
LOUISVILLE, KY.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.
PHILADELPHIA, PA.
RICHMOND, VA.
ST. LOUIS, MO.

For Tri-Rib Steel Roof Decks, see File Index

WHEELING LONG-SPAN Steel Floor and Roof System is a lightweight, long-span system of steel floor and roof construction, which combines high strength with low cost.

THE UNIT

The basic unit of the WHEELING LONG-SPAN Steel Floor and Roof System is a channel-shaped joist whose top flange is considerably wider than the bottom flange. These joists are available in depths of 5, 6, and 8 ins. and 14-gauge steel.

A shelf, about 1½ in. in width and equal in depth to the thickness of the metal, is provided at the top of all joists directly over the web, for the purpose of providing a shelf for the reception of the edge of the top flange of adjacent joists.

As each joist is laid, the edge of the top flange is supported by the above mentioned shelf of the adjacent joist, and welded to it with welds ½ in. long, and spaced at 6-in. intervals for the entire length. The result is a series of correctly spaced joists, completely welded together to form an integral unit. A smooth, level floor or roof surface of solid steel is provided, ready to receive any desired type of floor or roof finish.

ECONOMY

The use of WHEELING LONG-SPAN Steel Floor and Roof System shortens the time required to complete a particular project due to the fact that a safe floor is provided for other trades immediately after the floor or roof has been installed. Ordinary delays, such as those caused by the use of temporary planking or waiting for concrete to set, are entirely eliminated. Manufactured in lengths capable of spanning the distance from girder to girder or from truss to truss, the use of intermediate beams and purlins is entirely eliminated, reducing the cost of the structural steel framework considerably.

The cost of WHEELING LONG-SPAN Steel Floor and Roof System will be found to be lower than other types of fireproof floor and roof construction.

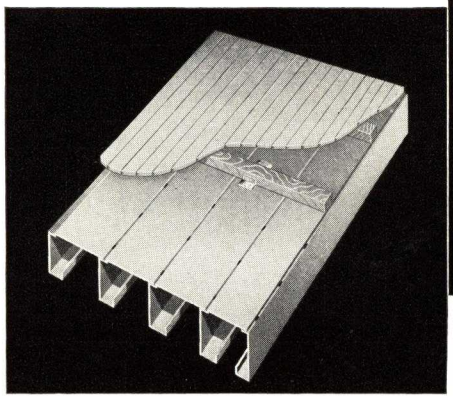
ADAPTABILITY

Any type of finished floor may be applied to the WHEELING LONG-SPAN Steel Floor and Roof System. Metal lath may be applied directly to the underside of the joists for ceiling construction by means of lath clips furnished for this purpose by the WHEELING CORRUGATING COMPANY.

SAFEGUARDED AGAINST CORROSION

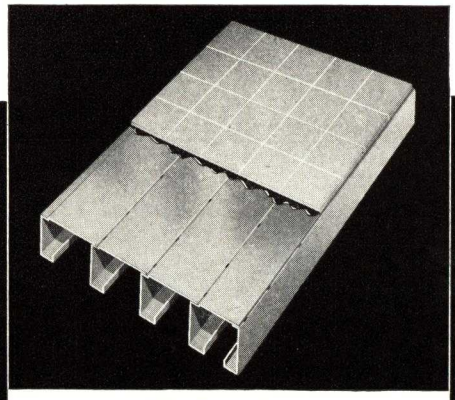
After fabrication, each unit receives a dip coat of high-quality protective asphalt paint as a protection against corrosion.

The following page illustrates a few typical installations of the WHEELING LONG-SPAN *Steel Floor and Roof System, and contains all the technical data necessary to properly design a floor or roof.*



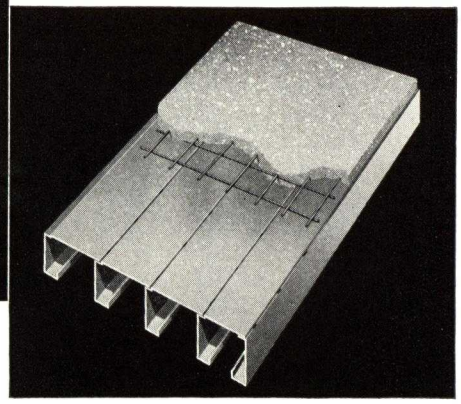
Wood Floor

Screed clips are welded or attached to steel floor plate with self-tapping screws. The wood screed is then nailed to projecting (O.S. flange) flange of the clip, and flooring is then nailed to the wood screed



Tile Block Floor

A composition filler is first applied to the steel floor plate in accordance with tile manufacturers' specifications. After filler is screeded to produce a smooth level surface the floor tile is laid



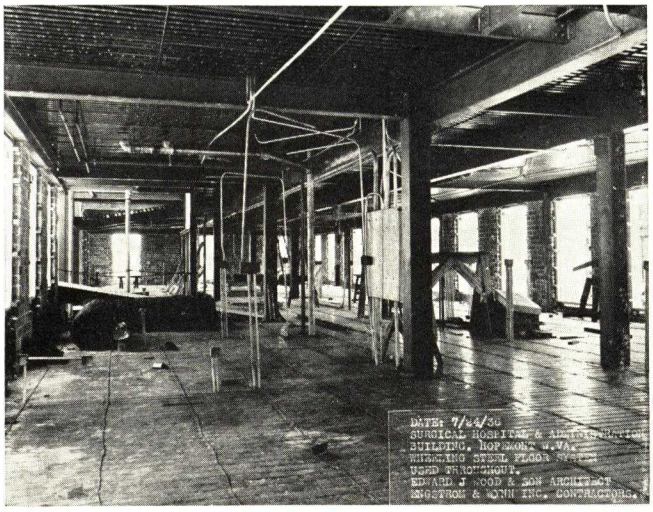
Concrete and Terrazzo Finish

The concrete is poured on the steel floor plate and screeded to a smooth level surface. Floor hardener or composition is then applied in accordance with the manufacturer's specification

WHEELING LONG-SPAN System is used as a working platform and material storage space for the masons' storage of brick, stone, windows, etc. Work of all trades proceeds uninterrupted.

This working platform can be made ready almost as fast as the steel frame of the building is erected.

Joists are hoisted to the proper floor and distributed to their various locations. Joists are first welded to the main supporting members, then welded together at the seams, thus permitting the operator to work from the top at all times. The speed with which this operation is done permits the other trades to move in and start work immediately, speeding up the whole job.

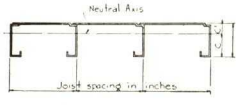


Plumbers, steamfitters, electricians, and others can set up their benches and proceed with roughing-in work immediately after the joists are welded in place.

Complicated detailed erection drawings are not necessary. All parts are factory-made, resulting in a finished job which does not depend entirely on the skill of the individual workman.

SAFE UNIFORM LOADS PER SQUARE FOOT INCLUDING DEAD LOAD OF DECK

D	Gauge	Joist spacing, In.	M	CS	SPAN IN FEET													Wt. Per Sq. Ft.		
					10	11	12	13	14	15	16	17	18	19	20	21	22	Lbs.	C	C′
5″	14	6	46000	30700		252	191	152	122	98								8.10		
		8	34500	23000		189	143	104	91	73								6.84		
		10	27600	18400		151	115	91	73	58								6.10	2.73″	2.27″
		12	23000	15300		126	96	76	61	49								5.61		
		14	19700	13100		[95]	82	65	52	42								5.35		
5″	12	6	63000	42000		346	266	208	168	136								11.28		
		8	47200	31500		259	200	156	125	101								9.54		
		10	37800	25200		206	160	124	100	81								8.51	2.74″	2.26″
		12	31500	21000		173	133	104	84	68								7.81		
		14	27000	18000		148	114	89	72	58								7.47		
6″	14	6	59400	39500				232	186	152	124	104	82					8.60		
		8	44600	29700				174	139	113	93	78	61					7.21		
		10	35700	23700				139	111	91	74	62	49					6.43	3.22″	2.78″
		12	29700	19700				116	93	76	62	52	41					5.86		
		14	25500	17000				[95]	79	65	53	44						5.59		
6″	12	6	82400	54900					258	208	172	144	114					12		
		8	62000	41400					193	155	129	108	85					10.1		
		10	49500	33000					155	124	103	86	68					8.95	3.22″	2.78″
		12	41200	27500					129	104	86	72	57					8.18		
		14	35400	23600					110	89	73	61	48					7.80		
8″	14	6	90000	60000							234	208	176	158	136	118	102	9.62		
		8	67600	45100							176	156	132	118	102	88	76	8.03		
		10	54000	36000							140	124	105	94	81	70	61	7.04	4.55″	3.45″
		12	45000	30000							117	103	88	79	68	59	51	6.39		
		14	38600	25700							[95]	89	75	67	58	50	43	6.05		
8″	12	6	124600	83000							324	287	244	220	188	162	140	13.44		
		8	93500	62300							243	215	183	165	141	121	105	11.17		
		10	74600	49700							194	172	146	132	112	97	84	9.81	4.55″	3.45″
		12	62300	41500							162	143	122	110	94	81	70	8.90		
		14	53400	35600							139	123	104	94	80	69	60	8.43		



M=Resisting moment per foot width of floor (fs=16000#□″)

CS=Coefficient of strength per foot width of floor.

Loads underscored in with heavy line thus 176 are determined by maximum bending stress.

Loads enclosed in heavy lines thus [95] are governed by strength of top plate in bending. All other loads are calculated to produce a maximum deflection of $\frac{1}{360}$ of the span length.

Where deflection is not a governing factor, safe load per square foot may be obtained by dividing CS by (span in ft.)^2

TILECRETE FLOORS, INC.

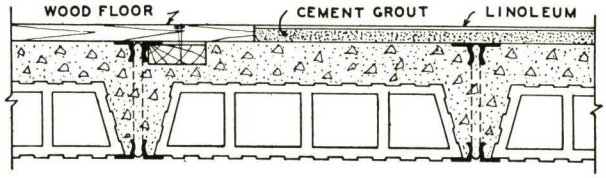
Fireproof Floor and Ceiling Construction

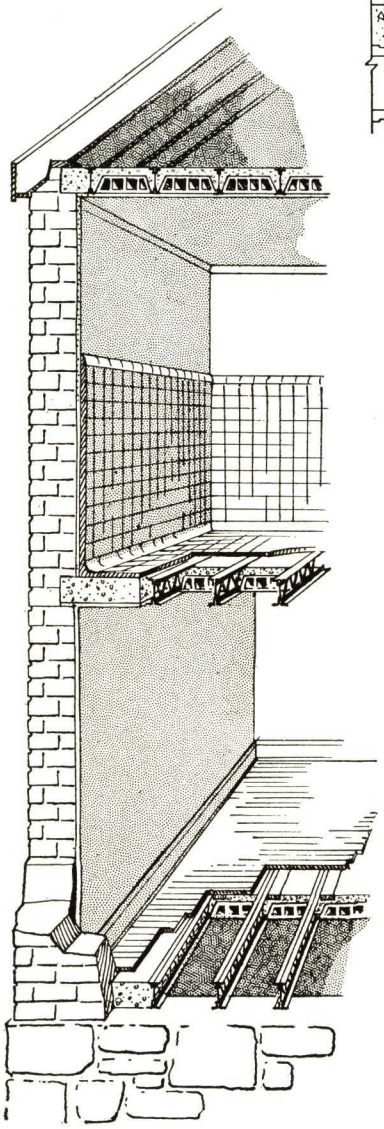
GENERAL OFFICES

ST. LOUIS, MO.

SALES OFFICES IN PRINCIPAL CITIES

TILECRETE—FIREPROOF, ECONOMICAL FLOOR CONSTRUCTION COMBINING CONCRETE, HOLLOW TILE AND STEEL





Tilecrete

Tilecrete is a new development in low cost reinforced concrete construction. The economy of this method makes it possible to produce permanent fireproof floors and ceilings for residences, apartment and industrial buildings at a final cost comparable to that of wood construction.

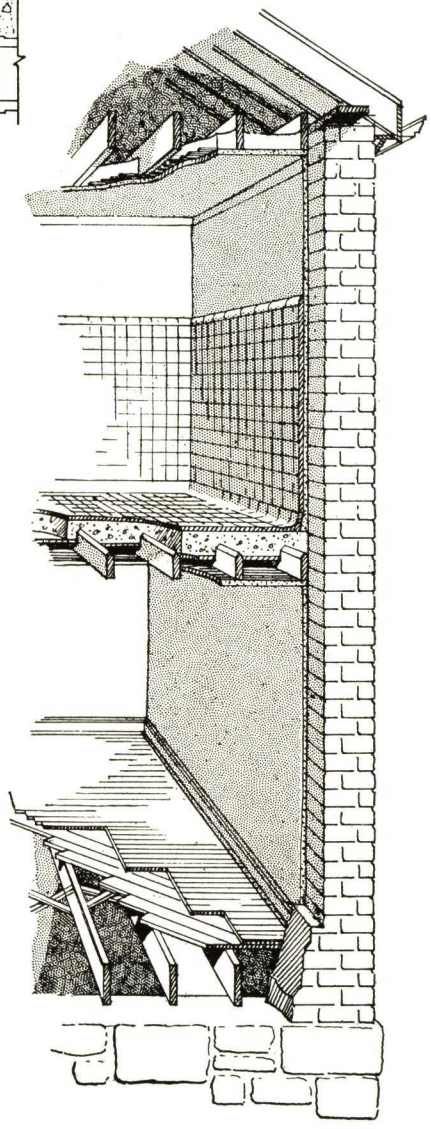
This concrete floor system *eliminates all slab forms.* The concrete (1-3-5 mix) is floated to the truss top level; 1 cu. yd. covering 150 sq. ft. of floor area. The trusses support the construction load. The concrete placed around the rib-trusses and tile introduces a reinforced concrete floor. The "V" shape between the tile creates a reinforced concrete beam which increases the carrying capacity and length of span.

The thickness of the structural slab being but 6 in. for the average floor means a saving of brickwork and other materials in proportion to each story height. No framing is needed for bathroom floors. Tile or any desired finish may be applied directly to *Tilecrete*. The cost of plastering is reduced.

The use of *Tilecrete* construction often reduces structural steel requirements, and in some cases eliminates structural steel entirely.

Any desired live load can be obtained by selection of correct size of rib-truss and tile fillers.

Floors range from 6 to 16 in. in thickness. Simplicity of installation requires no skilled labor. Sale and loan value is higher, and insurance is cheaper on residences.



Wood

Advantages of Tilecrete Construction

Low cost
Fireproof
Soundproof
Termiteproof
Good insulation
Quickly installed
No forms required
No lathing required
Less plaster required
Often reduces structural steel requirements

Service

Standard size tile are carried in stock by various tile manufacturers in different localities. Shipments are made from plants in closest proximity to job site. Our organization is prepared to render assistance in designing and estimating, as well as construction supervision.

Send for Catalog, Load Tables, Estimates, Prices and Delivery

ARCH ROOF CONSTRUCTION CO., INC.

TELEPHONE
CHickering 4-3516

Engineers and Contractors
55 West 42nd Street, NEW YORK, N. Y.

DISTRICT REPRESENTATIVES
CHICAGO, ILL., R. H. Finley, 332 So. LaSalle Street—Telephone Harrison 5628
LOS ANGELES, CAL., Bert E. Anderson, 9129 W. Adams Street
CLEVELAND, OHIO, The Carver-Behan Co., 1740 E. 12th Street
SAN FRANCISCO, CAL., Rolph, Mills & Co., Rialto Building

LONG SPAN ROOF ARCHES

Scope of Application and Service

Design, Construction and Erection of LONG SPAN ROOF ARCHES for theaters; auditoriums; convention, exhibition and fair buildings; garages; warehouses; factories; airplane and dirigible hangars; gymnasiums; skating rinks; bowling alleys, and all buildings where unobstructed space, maximum light and ventilation are desired.

ARCH ROOF CONSTRUCTION CO., INC., will design arches, supply all materials and do the erection, or ordinary materials can be supplied and erection done by local contractors. Co-operation is offered to architects, engineers and contractors in planning the most economical and efficient design for particular buildings.

A request will bring additional information.

Field Buildings

Our field or sports buildings can be erected so they can be used for auditoriums, theatres, gymnasiums, ice hockey, etc. Buildings are easily interchangeable (without structural changes) permitting daily varied activities in one efficient structure, eliminating the need for several infrequently used buildings.

Indoor Tennis and Badminton Buildings

Indoor tennis, or badminton buildings, containing one or many courts, with perfect natural daylighting and artificial light, without glare; playing in direction of the arches to conserve building height and produce perfect buildings at a minimum of cost.

Spans to Over 400 Feet

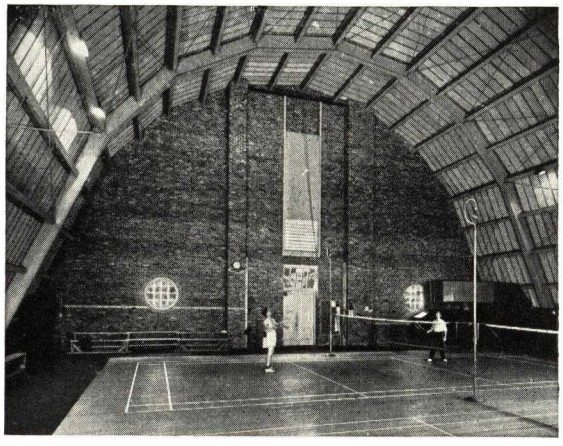
We use short lengths of the usual structural materials in the design and economical construction of buildings having spans up to *400 feet* or more, where unobstructed space (no columns, posts or trusses) is desired. Heights to suit.

Strength

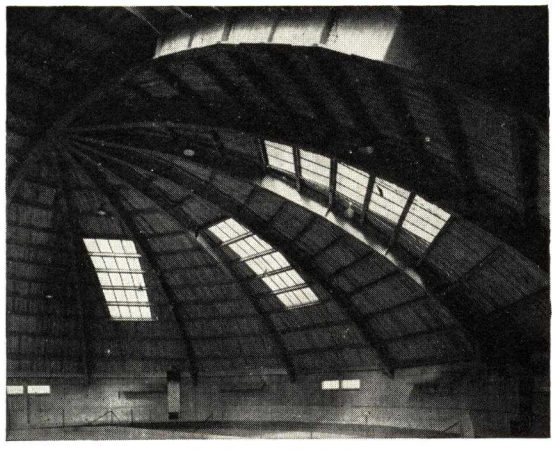
Arch roof construction can be of timber or steel or a combination of both. Standard structural shapes and sizes are employed in a patented design with patented connections to produce a roof of unusual strength. It may be fireproof, fire-retardant or non-fireproof.

Design

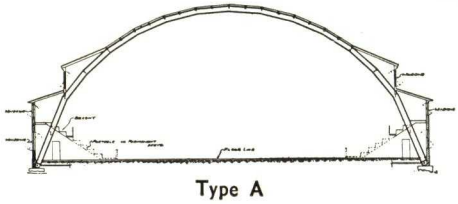
All our arches are scientifically designed as hingeless, one, two, or three-hinged arches, and any competent structural engineer can design and check our arches. In our design, ample provision is always made for all dead, live and unbalanced loads, rib shortening, temperature variation, etc.



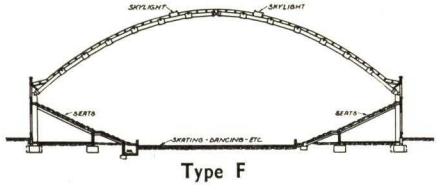
Badminton Courts Building, New Haven Lawn Club Association
DOUGLAS ORR, Architect



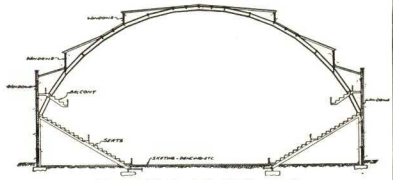
Swathmore College Field House
WALTER T. KARCHER and LIVINGSTON SMITH, Architects



Type A

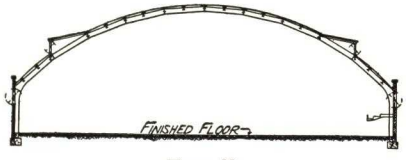


Type F

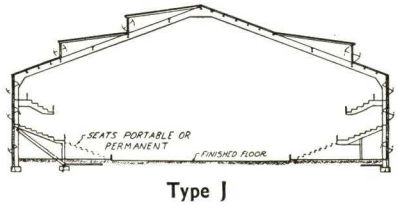


Type F (with Balcony)

Type G



Type K



Type J

United States Patents
1,480,882 January 15, 1924
1,639,930 August 23, 1927
1,783,958 December 9, 1930
1,795,331 March 10, 1931
1,891,346 December 20, 1932
2,021,480 November 19, 1935
2,031,937 February 25, 1936

TYPES OF ARCH ROOF CONSTRUCTION
for Every Requirement
Other patents pending

Canadian Patents
329,165 January 10, 1933
331,206 March 28, 1933

Great Britain Patents
382,138 January 18, 1932

LAMELLA ROOF SYNDICATE, INC.

45 West 45th Street, NEW YORK, N. Y.

(Holding Company for Lamella Patents in United States, Canada and Mexico)

AUTHORIZED LAMELLA LICENSEES

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Kruse & Co.

CHICAGO, ILL., 77 W. Washington Street,
Edward Hines Lumber Co.

ST. LOUIS-GLENDALE, MO.
Lamella Roof Co.

OMAHA, NEB., 1324 Pierce Street
Lamella Roof Co.

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Fred E. Remmers

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Maintenance & Erection Service

SAN ANGELO, TEX.
West Texas Lumber Co.

DALLAS, TEX., 630 Wilson Building
J. L. O'Hearn

McALLEN, TEX., 518 No. Main Street
E. A. Noser

TWIN FALLS, IDAHO, P. O. Box 1052
Lamella Roof Co.

PHOENIX, ARIZ., 806 W. Madison Street
The Lamella-Summerbell Co.

LOS ANGELES, CALIF., 754 E. 29th Street
Summerbell Roof Structures

OAKLAND, CALIF., 405 Builders Exchange Building
The Trussless Roof Co.

SALT LAKE CITY, UTAH, 333 W. First South Street
Utah Pioneer Roofing Co.

SAN DIEGO, CALIF., 30th and University Streets
Klicka Lumber Company

KLAMATH FALLS, ORE., P.O. Box 271
Swan Lake Moulding Co.

SEATTLE, WASH., 2411 Eighth Avenue W.
Sommerbell Roof Structures of Washington

MONTREAL, QUE., 1226 University Street
Lamella Trussless Roof Co., Ltd.

VANCOUVER, B. C., 1551 Granville Street
Pacific Coast Pipe Co., Ltd.

LAMELLA

Reg. U. S. Pat. Off.

LAMELLA TRUSSLESS ROOFS

Trussless Roofs

Lamella Trussless Roofs are arch structures of wood or steel consisting of a series of short sections arranged in a diamond pattern to form a continuous arch. They are designed according to accepted engineering practice in conformance with local climatic conditions and specific requirements of local building codes.

Hundreds of Lamella Trussless Roofs, comprising millions of square feet of roof area, have been designed and erected in the United States in spans up to 165 ft.

Fire Resisting Qualities

Fire resisting qualities are rated in all localities at least equal to unprotected steel with open rafters.

A Typical Lamella Roof (Bent Type)
The tie rods are used if the walls are not braced by Bents

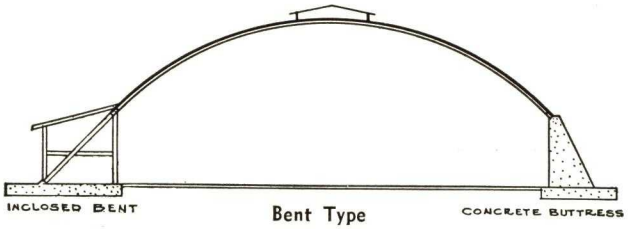
Acoustical Qualities

Lamella Trussless Roofs have proven their acoustical qualities by their repeated installation in auditoriums, churches and community center buildings. The diamond network reflects sound without causing reverberations.

Service

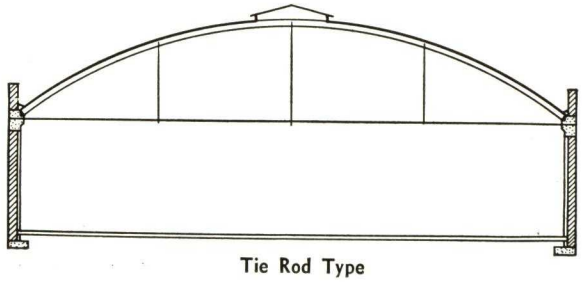
The licensees maintain trained engineering staffs to assist the architect in the detailed design of the roof and its connections to other parts of the building.

Detailed drawings, together with the necessary stress analysis, are promptly furnished.



Bent Type

Lamella Trussless roofs may be curved down at the ends, thereby forming a cloistered roof of four or more sides. Lamella roofs have been built in many types and shapes and can be designed to suit almost any building.



Tie Rod Type

ROOF STRUCTURES, INC.

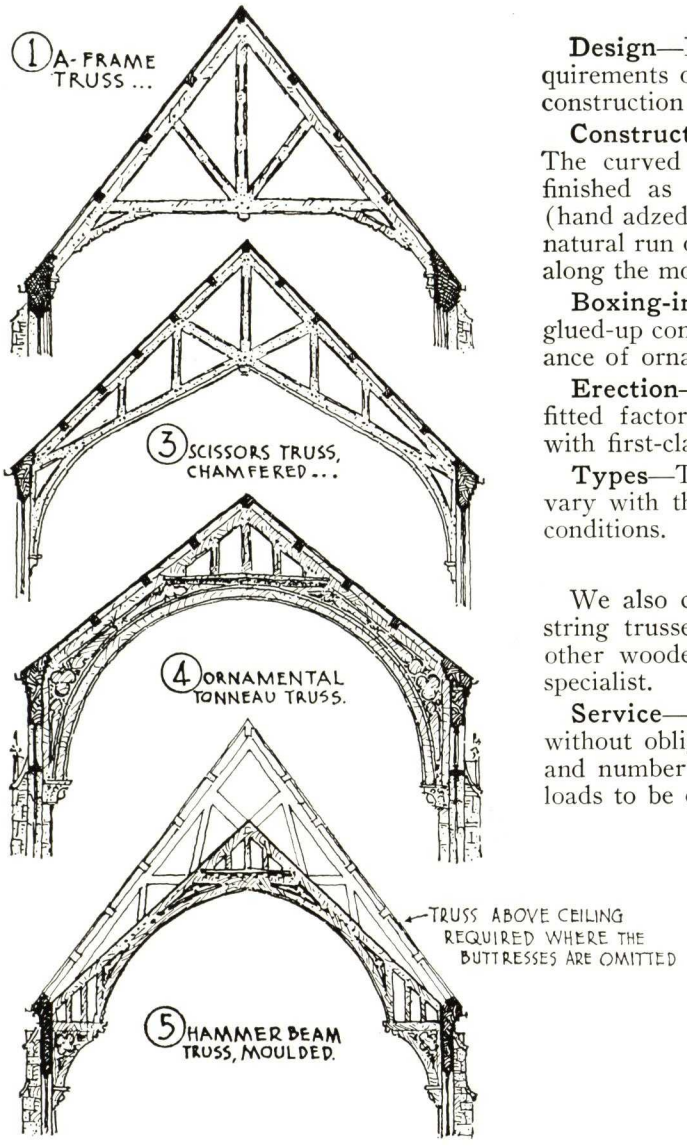
Specialists in Ornamental and Commercial Wooden Structures

TELEPHONE
BRyant 9-8532

45 West 45th Street, NEW YORK, N. Y.

Affiliate: Roof Structures, Inc., St. Louis-Glendale, Mo.

LICENSED BY TIMBER ENGINEERING CO. FOR MODERN TIMBER CONNECTORS



Custom Built Wood Trusses

Design—Designed by registered engineers familiar with the requirements of building departments and experienced with glued-up construction and modern timber connectors.

Construction—Constructed with structural grades of lumber. The curved chords are glued-up and bolted in laminations and finished as one piece. Surfaces are smooth (sanded) or rustic (hand adzed). Mouldings on the continuous laminations follow the natural run of the grain and the unsightly opening of joints or tears along the mouldings are prevented.

Boxing-in of Steel Trusses—This is accomplished by the same glued-up construction, with moulded laminations, giving the appearance of ornamental wood trusses.

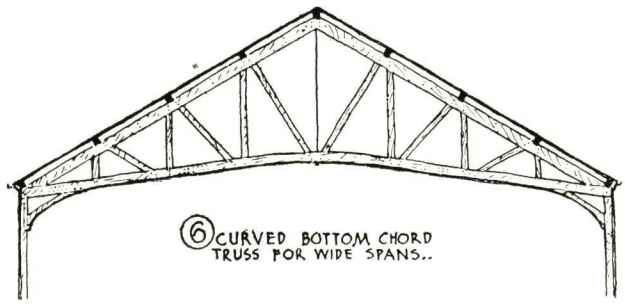
Erection—Is handled by experienced crews assembling the prefitted factory-built sections or members, and finishing each truss with first-class workmanship.

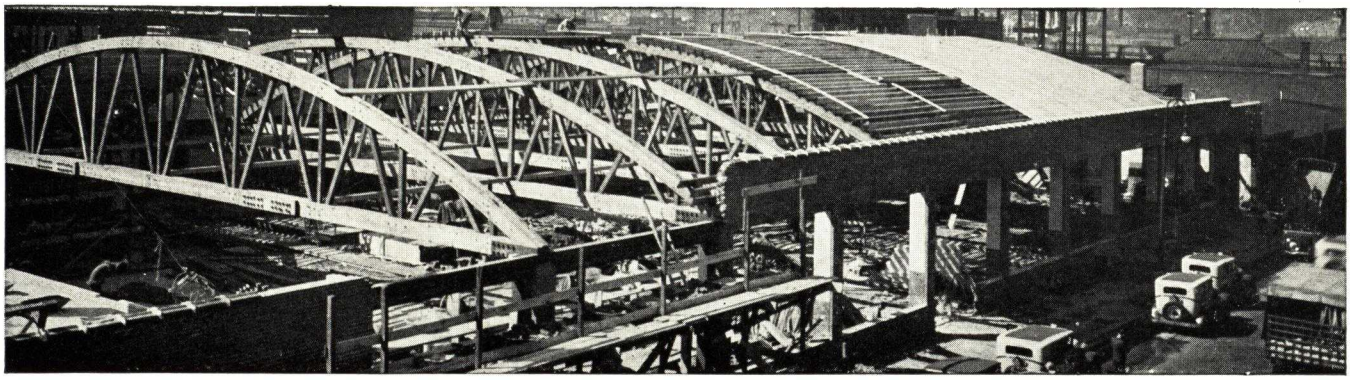
Types—Truss Types are not restricted to those shown but may vary with the individual designs of the architect and special load conditions.

Scope of Activities and Service

We also construct and design—in addition to commercial Bowstring trusses—arch centerings, radio towers, timber bridges and other wooden structures requiring the skill and knowledge of a specialist.

Service—Tentative designs and estimates of cost are furnished without obligation. To facilitate this, state (a) type, pitch, finish and number of trusses; (b) span and spacing; (c) live and dead loads to be carried; (d) location of building.





Type ⑦ Commercial Truss Installation, Garage, International Mack Truck Company, 625 West 42nd Street, New York, N. Y.—100 Foot Span

ELWYN E. SEELYE, Engineers; TURNER CONSTRUCTION CO., General Contractors

3
21

ESTABLISHED 1894

McKEOWN BROS. COMPANY

Builders of Wood Trusses

TELEPHONE
Lafayette 8161

5235 South Keeler Avenue, CHICAGO, ILL.

Licensed by Timber Engineering Co. for Teco Timber Joint Connectors

Products

Wood Arches, Barn Ribs, Concrete Arch Centerings, Trussed Beams, Howe Trusses, Crescent Trusses, Lattis, Bowstring and Ornamental Timber Trusses — etc., built on site of job.

Factory built—shipped knocked down to any destination. Includes all bolts, nuts, washers, rods, plates, etc. necessary. Erection if desired.

Outstanding Feature

Glued lamination that makes solid construction in any desired shape. Commonly used in building arches and ribs, and for upper chords of factory built bowstring trusses and arch centerings. Entirely independent of any other truss member for shape.

Timber Truss Ornamentation

Timbers—Hand adzed, hand axed, sandblasted, planed, sanded, rough sawn, or charred.

Iron Work—Hand wrought, hammered, cut ends to design.

Mouldings—Worked to pattern on solid timbers, or applied.

Information Needed to Give Estimates

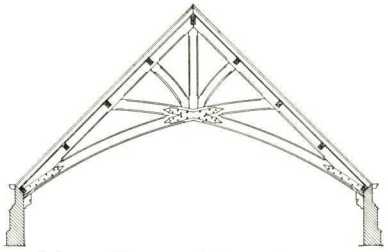
Plan of Project—If timber or special trusses are required.

Bowstring, Crescent Trusses, etc. — (1.) Number of trusses. (2.) Overall length. (3.) Spacing on centers. (4.) Load to be carried. (5.) Location of job.

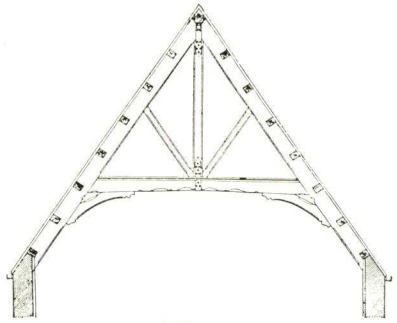
St. Francis DePaula Church, Chicago
McCarthy, Smith & Eppic, Architects

Interior of Fabricating Shop

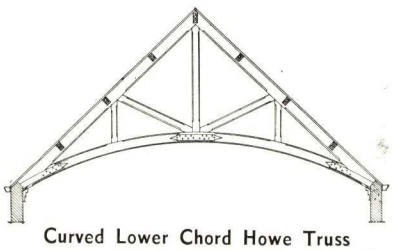
Gothic Arch with Hammer Beam



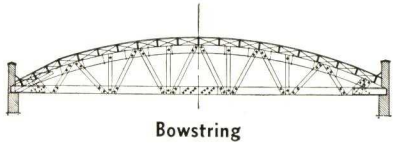
Scissors Truss with Curved Braces



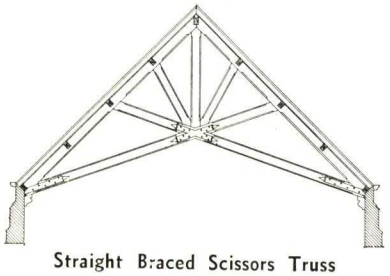
A-Frame



Curved Lower Chord Howe Truss



Bowstring



Straight Braced Scissors Truss

"UNIT" STRUCTURES, INC.

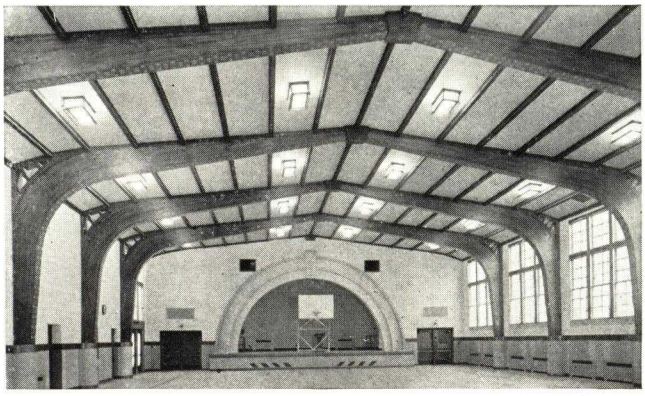
Manufacturers of Modern Wood Roof Structures

PESHTIGO, WISCONSIN

UNIT GLUED LAMINATED ROOF ARCHES

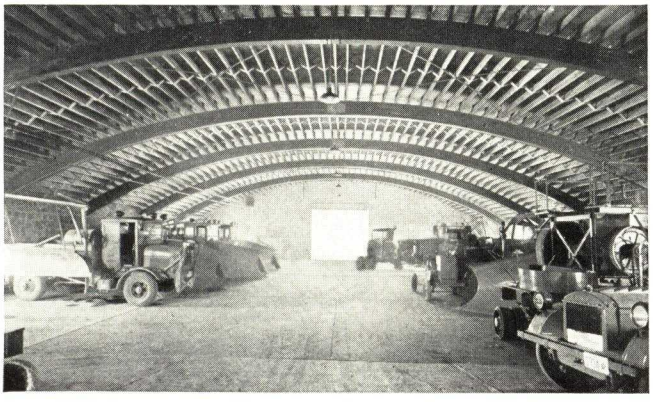
(Patents Pending)

Unit Arches are glued laminated wood roof structures, prefabricated of thin laminae united under high uniform unit pressure. The laminae are forcibly curved into solid timbers of required shape.

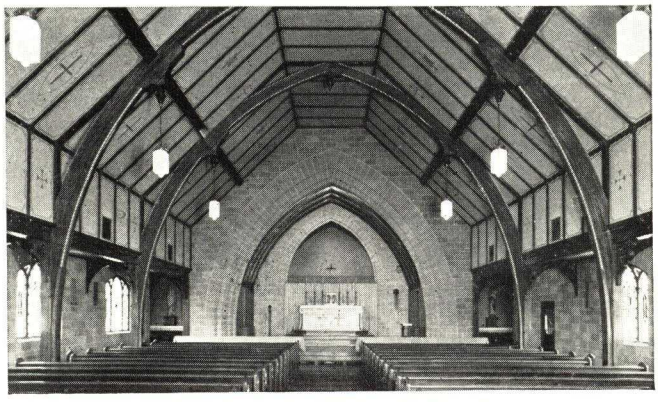


Arch Frame Installation for Gymnasium

Arch Frame Installation for Dance Hall



Segment Arch Installation for Highway Equipment Garage



Arch Frame Installation for Church

Arch Frames, Three Hinged

Replace conventional trusses and their supports. Each arch consists of two halves bolted directly to foundation. They are made in any shape to fit all types of buildings and possess unusual beauty because open joints and checks are eliminated with smooth surfaces stained and varnished. Pleasing appearance and variety of shapes make them desirable for auditoriums, gymnasiums and other types of sports buildings. Since the form of the arch follows the function of the building many economies are made possible through saving in space and materials.

Beams, Structural

Glued and laminated, using selected kiln dried lumber, are available for all spans, designed in proportion to span and spacing. With exposed surfaces finished, furring, plastering or casing becomes unnecessary.

Church Roof Framing, Ornamental

This is solved in a simple manner. Hammerbeam and scissor truss effects are more beautifully obtained by adding these or other decorative features to the structural arch sections.

Segment Arches

Tied—Consist of a main member of laminated wood whose ends are tied with a steel rod. One solid member of unsurpassed rigidity replaces the large number of web members of an ordinary truss; providing better distribution of light and ventilation. Erected and anchored in similar manner as trusses, these segments are recommended for garages, factories, warehouses, etc.

Not Tied—Dispose of bottom cords affording clear height throughout the entire length of the building, the same as with the arch frames. The members are of constant cross section making them very low in cost and may be used in all types of buildings especially where large and unobstructed floor space is desired.

Tentative Drawings and Detailed Sketches

These, showing different types of arches and illustrating their economies, will be gladly furnished to all architects. Fully illustrated catalogs demonstrating numerous practical installations will be promptly sent upon request.

DETROIT STEEL PRODUCTS COMPANY

Manufacturers of Holorib Steel Decks and Floor Forms and Sanacoustic Holorib Roof Units

2250 East Grand Boulevard
DETROIT, MICH.

FACTORIES
DETROIT, MICH. OAKLAND, CALIF.

For Fenestra Windows, Casements and Doors, see Index

FENESTRA HOLORIB INSULATED STEEL DECKS

The Detroit Steel Products Company maintains a Holorib Engineering Department thoroughly versed in all roofing problems. This department is at your service without obligation to assist in designing and specifying complete roof installations.

Specifications for the Holorib Complete Roof Unit, together with explanatory details showing the application of the product to various types of construction are free on request. Inquiries should be accompanied by information relative to: (1) Type of Structure; (2) Form of Roof desired; (3) Intended Operations within the building. Holorib Field Representatives in the major cities are equipped to aid Architects, Designers and Contractors and to furnish quotations if desired.

• • •

18 FENESTRA HOLORIB ADVANTAGES

(1) **Holorib Steel Roof Deck**—It is applied directly over purlins or rafters to form the roof sheathing or roof slab.

(2) Carries normal roof loads over usual purlin spacings with ample factors of safety.

(3) End laps are of telescoping type and always occur over the purlins.

(4) Side laps are of interlocking type with a complete rib to provide equal strength at all points.

(5) Fully provides for expansion and contraction.

(6) Methods of lapping prohibit the flow of asphalt to the interior of the building.

(7) Welded or clipped in place to form a rigid yet self-adjusting deck.

(8) Forms a smooth, firm, inherently dry mopping surface for the application of insulation and waterproofing felts which are included in the Holorib Complete Roof Unit.

(9) **Holorib Complete Roof Unit**—Is insulated to prevent condensation, thereby protecting the steel against corrosion.

(10) Is light in weight, often reducing structural requirements. (One square foot of Holorib, insulation and smooth surface waterproofing weighs approximately 5 lbs.)

(11) Is quickly erected. Speeds completion of the building.

(12) Can be laid in any weather men can work. Nothing to freeze, nothing to pour, nothing to dry out.

(13) Applicable to flat, pitched, sawtooth, monitor, bow-string or curved surfaces on all types of buildings.

(14) Can be finished with slate or shingles or tile to provide architectural appearance.

(15) Saves winter fuel. Provides cooler interiors in warm weather.

(16) Saves insurance. Takes fireproof rating when used over buildings that house incombustible contents.

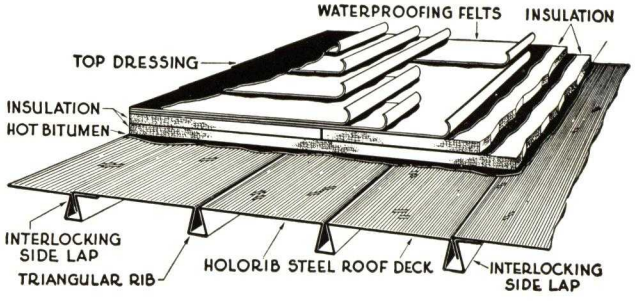
(17) Compares favorably in cost with all other types of roof construction having equal advantages.

(18) A long lived roof, requiring a minimum of maintenance.

THE HOLORIB COMPLETE ROOF UNIT

The Holorib Complete Roof Unit has as its base the famous Holorib Steel Roof Deck, superior to either concrete slabs or wood sheathing. Its triangular rib construction provides rigidity with the lightest possible weight, thus reducing structural steel costs and offering a saving both in initial expense and subsequent maintenance.

Its middle stratum is composed of pressure resisting insulating sheets which prevent heat loss, thus conserving fuel and providing protection from summer heat.



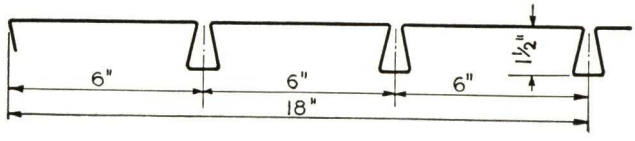
Its outer surface is long lived waterproofing designed for permanent protection against leakage.

These component parts: waterproofing, insulation and steel deck have a natural affinity, each for the others. They are bonded together and waterproofed by moppings of roofing asphalt and further secured by Holorib Expanding Nails. Thus united, they form a complete roof—permanent; proof against weather, fire or rot. Condensation on the underside is eliminated. Specified temperatures and humidities are easily maintained.

THE HOLORIB STEEL ROOF DECK

Holorib is made for standard roof deck construction in 18, 20 and 22 USS gauge steel sheets for spans up to 8 ft. 6 ins. Effective covering width is 18 ins. and sheets are furnished in proper lengths to make all end laps directly over purlins or rafters.

Each plate is so formed as to be reinforced by three self-contained triangular ribs extending longitudinally and spaced 6 ins. apart. When the plates are erected, the broad flat bases of these ribs rest directly on the purlins and are secured to them either by welding or by clipping. Thus they provide maximum rigidity with minimum deflection under normal loads.



MATERIALS

Holorib is made either from copper-bearing steel as standard or non-copper-bearing steel at slight saving in cost but with extended delivery. When the deck is properly insulated, condensation is prevented with a corresponding absence of corrosion regardless of the type of steel used. Non-copper-bearing steel can be used satisfactorily where economy is a factor.

(Copper-bearing steel includes from .20% to .25% copper.)

PAINTING

Holorib Sheets are given one dip coat of gray paint and thoroughly oven dried before shipment. One additional coat on the underside by the painting contractor is recommended after erection.

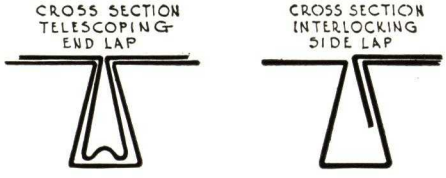
(Where processes within the building are of a nature to cause or require high temperatures or high humidities, consideration should be given to special paint as an additional factor of safety.)

END LAPS AND SIDE LAPS

One end of each sheet is "crimped" so that it "telescopes" into the end of the adjoining sheet. This method of joining leaves all ribs complete with practically full strength and affords a real protection against dripping asphalt in case of fire on the roof and against igniting the roof in case of fire inside the building.

The standard length of this telescoping end lap is 2½ ins. All end laps are made directly over purlins.

One lateral edge of each Holorib sheet is turned downward to form a "barge strip" 1 in. deep.



When erected, this barge strip nests or interlocks into the triangular rib of the adjacent sheet, forming an interlocking side lap which is tight, smooth and permanent but which allows the deck to conform to the movements of the material above it. Note that the outside rib of each sheet is complete, affording the same strength at all points of the deck. No side lap clips are necessary.

LAYING AND ATTACHING

The erection of Holorib is simple and may be done by the General Contractor or the Roofing Contractor with the aid of complete installation instructions and a thoroughly engineered roof diagram furnished on every operation. If desired, Detroit Steel Products Company will furnish superintendence to aid the contractor or the Fenestra Construction Co., a subsidiary of Detroit Steel Products Company, will undertake erection under a separate contract and assume full responsibility.

Where facilities permit, the Holorib sheets may be welded directly to the purlins. This method of attachment is well standardized on large operations and is increasingly popular on small operations (50 to 150 squares).

Where attachment of Holorib by means of welding is not feasible the standard method of attachment is by means of Holorib Steel Clips.

These clips are standardized and carried in stock to fit most of the commonly used structural steel members. They have been designed to make erection easy and "foolproof" and to anchor the deck firmly in place with an ample factor of safety in holding power.

Insulation should be applied directly on the Holorib Deck, laid in broken joint construction, in a full mopping of hot asphalt. Around the perimeter of the roof area, metal fasteners should be used, spaced about 2 ft. apart and about 12 ins. back from the edge, to hold the roof intact against the ravages of wind.

On practically flat roofs, no other fastenings are necessary, but on steep surfaced roofs (pitches greater than 2 ins. in 12 ins.) additional fasteners should be used; the number depending on the pitch of the roof. A fair average is 25 nails per square.

For Holorib on steep surfaces, special Holorib Expanding Nails and Washers are used. These are so designed that the nails may be driven through the insulation into the deck ribs and then, with a sharp blow, expanded within the ribs.

When specified, these Holorib Expanding Nails will be supplied at a small additional charge.

MAXIMUM SPAN RECOMMENDATIONS

Maximum recommended span	Gauge	Weight of deck per net square
5′ 6″	No. 22	200 lbs.
7′ 0″	No. 20	240 lbs.
8′ 6″	No. 18	320 lbs.

Note: The above Maximum Span Recommendations have been conservatively established after experience with many thousands of squares of Holorib Decks, keeping in mind that the satisfactory insulated roof unit must have a firm and rigid base. Building Codes in some metropolitan districts limit the gauge and spans for steel decks and we will be glad to furnish information on specific localities.

SANACOUSTIC HOLORIB

Sanacoustic Holorib, developed with the co-operation of Johns-Manville engineers, is a combination, in one unit, of a lightweight steel roof deck, with a sound absorbing facing which constitutes the ceiling of the interior, an efficient heat insulation and a waterproofing surface exposed to the weather.

It is applicable to theaters, auditoriums, gymnasiums, churches or factory offices, in fact, to nearly all buildings where suspended ceilings can be omitted.

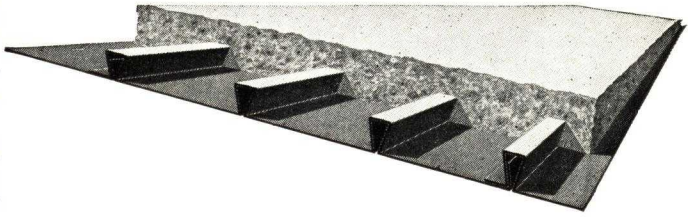
The outstanding feature of Sanacoustic Holorib is the fact that it can be guaranteed to have 70% sound absorption at a frequency of 512 cycles.

It has a heat transmission of only .15 B.t.u.'s per hour, per square foot per degree difference in temperature.

It provides this high degree of sound quieting and heat stop value at a cost far below that of other similar materials of equal efficiency.

Naturally, it has all the advantages in roof construction common to the standard Holorib Deck.

FENESTRA HOLORIB FLOOR FORMS



Fenestra Holorib Steel Sheets, with their reinforcing ribs turned up, are highly desirable as permanent floor forms and reinforcement for concrete. They have been satisfactorily used in poured concrete floors, on balcony steps, mezzanines and galleries, arena seats, basement ceilings, stair wells, pipe ducts and trenches and the sides and roofs of drying ovens. Holorib Forms are not removed but become a permanent and sightly part of the construction and where plastered ceilings are not required, the smooth steel sheets form clean attractive ceilings at a real saving in cost.

THE R. C. MAHON COMPANY

Manufacturers of the Mahon Steel Roof Deck

DETROIT, MICH.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

For Other Mahon Products, see File Index

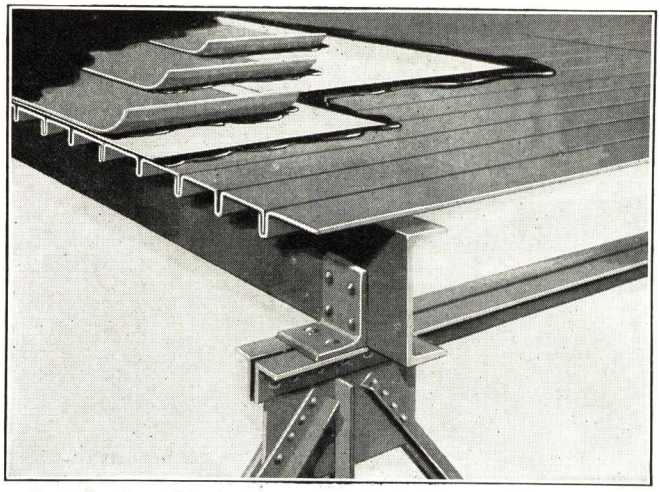
Mahon Steel Roof Deck for Every Type of Roof

The Mahon Steel Roof Deck, details of which are set forth in these pages, offers a roof suited to practically any type of building calling for either flat, pitched or arched roof construction. Mahon Deck Plates can be furnished curved to fit arched roofs—minimum radius 36 ft.

Material

Mahon Steel Roof Deck is furnished in 18 and 20-gauge, in special, tight-coated galvanized steel and requires no painting or maintenance whatsoever. It can also be furnished in copper bearing steel painted if desired.

Mahon has established 20-gauge as a minimum for roof deck plates as a result of exhaustive tests which indicate this as the lightest material that can be safely and economically utilized. Weight impacts would be likely to seriously affect roofs of lighter gauge.



Cross Section of Mahon Steel Roof Deck Showing Application of Insulation and Waterproofing

Standard Assembling Clips

The laying of a Mahon Steel Roof Deck requires only the installation of the steel clips by which the plates are fastened together as they are assembled, and by which they are fastened to the supporting structural steel. Mahon clips have been designed primarily for simplicity, and they have in every instance a strength more than adequate for the work they are called upon to perform.

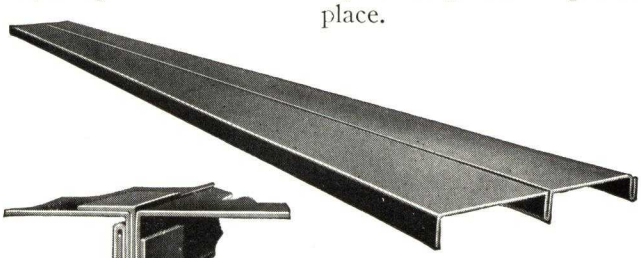
A special Mahon Clip can be furnished for welded construction, or Mahon Steel Roof Deck can be welded directly to the structural purlins eliminating thereby the use of part or all of the assembling clips.

There is not in the design of the Mahon Steel Roof Deck any part which can work up, become loose or in any way act to rupture the insulation or roofing material.

Installation

The Mahon Steel Roof Deck consists of one standard roof plate and three standard clips by which the plates are fastened together and to the supporting framework.

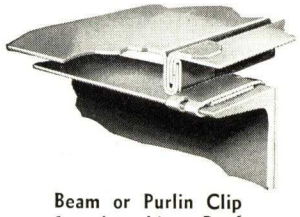
The laying of a Mahon Steel Roof Deck is a simple operation. The work, due to the ingenious design of parts, can proceed swiftly and is done entirely from the upper side of the roof. Every plate of a Mahon Steel Roof Deck interlocks with the preceding unit. There are no end fittings—the ends being lapped one over the other. All lap joints occur directly over purlins. All clips are installed from the top as the plates are put in place.



Mahon Standard Steel Roof Deck Plate

Intermediate Clip Locking Roof Deck Plates Together Midway Between Purlins

Installing Mahon Steel Roof Deck on the Latrobe Electric Steel Co. Plant, Latrobe, Pa.



Beam or Purlin Clip for Attaching Roof Deck Plates to Beam or Channel Purlins

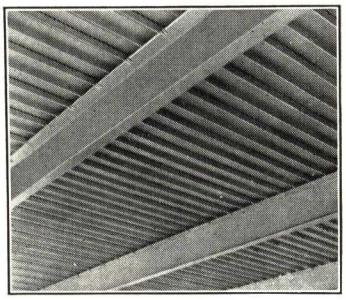
Special Clip for Use in Welded Construction

Note that the Steel Deck proper cannot be burned in the welding process

An Integral Unit Roof

Mahon Steel Roof Deck when installed functions as a single steel plate, the separate units becoming an integral part of one interlocking whole when assembled. A feature of the Mahon Steel Roof Deck which makes for extra rigidity and strength is the location of all end lap joints directly over purlins. The minimum end lap is 2 in. No unsightly laps or joints are visible from the underside of the Mahon Deck.

All plates in the Mahon Deck lay 12 in. wide when installed, ribs 1½ in. deep are 6 in. on centers. Every second rib where plates interlock provides three thicknesses of metal. Each deck plate is locked with special clips to the adjoining plates between purlins to prevent deflection of individual plates due to localized loading. This feature eliminates the possibility of loosening the bond between insulation or roofing material applied to the deck.

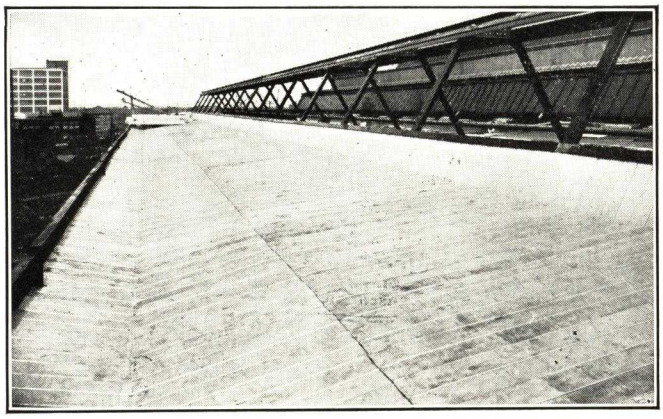


Underside of Mahon Steel Roof Deck

Note the clean, even appearance and the absence of end joints

Monitor Curb Walls

The projecting ribs on the plates of the Mahon Steel Roof Deck can be cut and the sheet turned up to form curb walls under sills in monitor or sawtooth construction.



Mahon Steel Roof Deck Installed on the Hupmobile Plant, Detroit, Mich.

Note the deck-formed saddles adjacent to the parapet wall

Saddles

On many types of buildings, where Mahon Steel Roof Deck is employed, built-up saddles are unnecessary. Saddles may be created by warping the roof deck. This is accomplished by setting purlins in drainage section at desired angle to produce ridges and valleys—usually an angle of ¼ in. to the foot is sufficient. No extra roof deck plates are required and it does not involve cutting or fitting. Saddles for either sloping or vertical face sawtooth buildings may be economically built from Mahon Steel Roof Deck plates cut to fit.

To meet conditions where the aforementioned methods are impracticable, saddles may be built from any material of a permanent nature—in which case we recommend the application first of a layer of asphalt or tarred felt on the steel deck proper.

Insulation

The Mahon Steel Roof Deck is a complete structural unit, and requires no insulation for stiffness or rigidity—these factors being amply provided for in the deck itself. In the case of unheated structures, such as loading docks, warehouses and the like, insulation is not necessary.

In buildings that must be heated or where condensation is a problem we recommend the use of insulation of any approved type—amount of insulation will be governed by the geographic location and type of occupancy.

Composition Roofing

Any standard composition roofing can be used over the Mahon Steel Roof Deck. Sheets should be mopped solid similar to roof construction over concrete.

Fire Safety

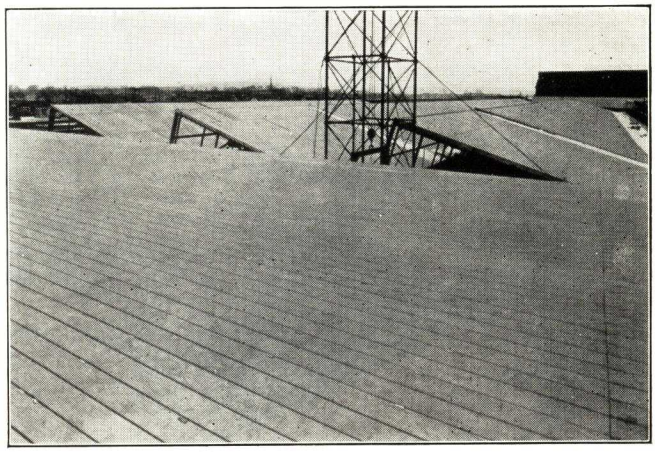
No matter what type of occupancy a building is designed for, building codes in centers of population demand fire safety. Mahon Steel Roof Deck provides the utmost in fire safe roof construction, and will obtain for the owner a low insurance rate.

Engineering Data

Light Weight—The weight of Mahon Steel Roof Deck is such that it permits considerable economies in construction. Mahon 20-gauge deck weighs 2.5 lb. per sq. ft. and the 18-gauge deck weighs 3.25 lb. per sq. ft. Total weight of roof will depend on type and amount of insulation and type of roofing material used.

Expansion and Contraction—These difficulties have been entirely obviated in the design of Mahon Steel Roof Deck. Note in the ribs an ample allowance for lateral expansion and contraction, and also that longitudinal expansion and contraction of the deck plate is provided for in the lap joints.

Deflection—Mahon Steel Roof Deck, due to ingenious arrangement of locking clips, and interlocking of plates when assembled, builds up a continuity of support throughout the entire roof surface which distributes and greatly reduces deflection caused by any localized loading. Deflection in Mahon Steel Roof Deck, installed with normal purlin spacings, therefore, becomes a negligible factor.



Mahon Steel Roof Deck (110,000 Sq. Ft.) Installed on the New Plant of Bowen Products Corp., Detroit, Mich.

MILCOR STEEL COMPANY

MILWAUKEE, WIS. CANTON, OHIO

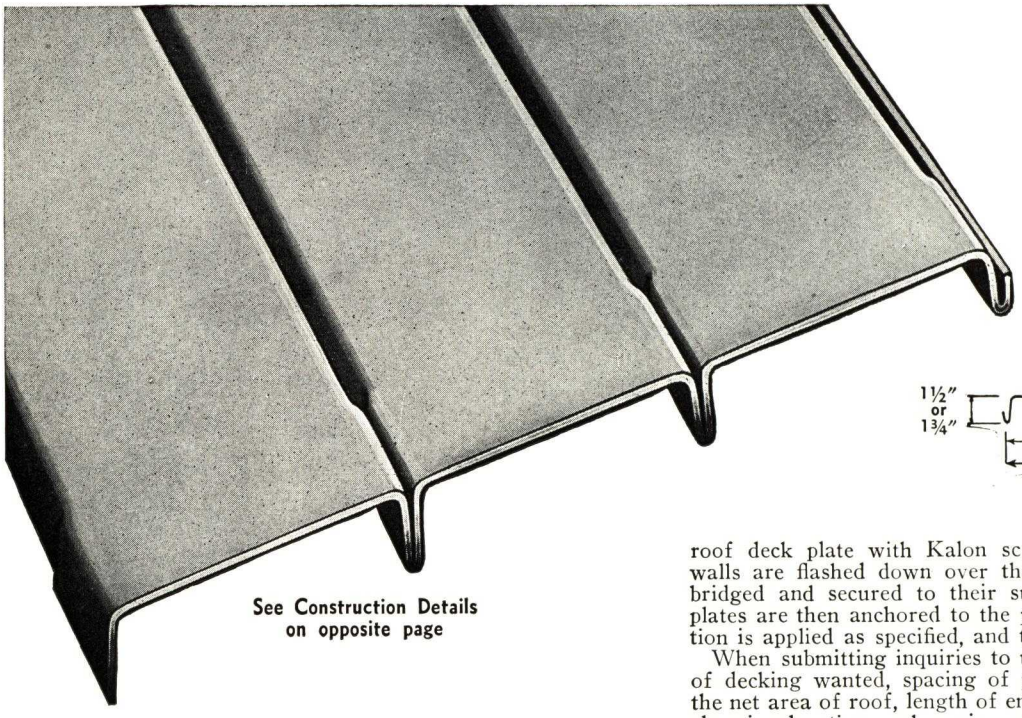
Send Inquiries to 4139 W. Burnham Street, Milwaukee, Wis.

PLANTS AT: MILWAUKEE, WIS.; CANTON, OHIO; CHICAGO, ILL.; KANSAS CITY, MO.; LA CROSSE, WIS.

SALES OFFICES IN PRINCIPAL CITIES

For Our Catalogs on Milcor Fireproof Products, Ventilators, Access Doors and Skylights, see File Index

MILCOR STEEL ROOF DECK



See Construction Details on opposite page

Unique offset for nesting ribs.

Depth of ribs—1½ or 1¾ in.

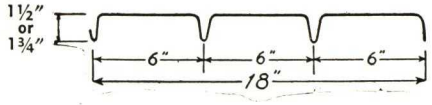
Spaced on 6-in. centers.

Width of plate—18 in.

Complete with screws and clips.

Fabricated from black annealed copper alloy, and tight coat galvanized steel.

In lengths to meet varying conditions.



Description—Milcor Roof Deck is furnished in lengths to meet unvarying conditions. The over-lapping ends and interlocking sides insure speedy installation.

Milcor Roof Deck is formed with ribs 1½ in. or 1¾ in. deep, spaced on 6-in. centers, and is furnished with 18-in. width of plate. The ribs are depressed at one end to permit easy nesting, where laps occur. Laps are always made directly over purlins, and are not less than 2 in. in length.

Materials—Fabricated from copper alloy steel, and tight-coat galvanized steel.

Engineering Service—We maintain an Engineering Department for your convenience in estimating. Send us roof plans and we will supply you with details.

Installation—On installations where a close fit to side and end walls is required, we furnish an end plate which is installed as shown. This end plate is fastened to the adjoining roof deck plate with Kalon screws. On all installations the walls are flashed down over the decking. Purlins are placed, bridged and secured to their support as specified. The deck plates are then anchored to the purlins as shown. Roof insulation is applied as specified, and the roofing installed.

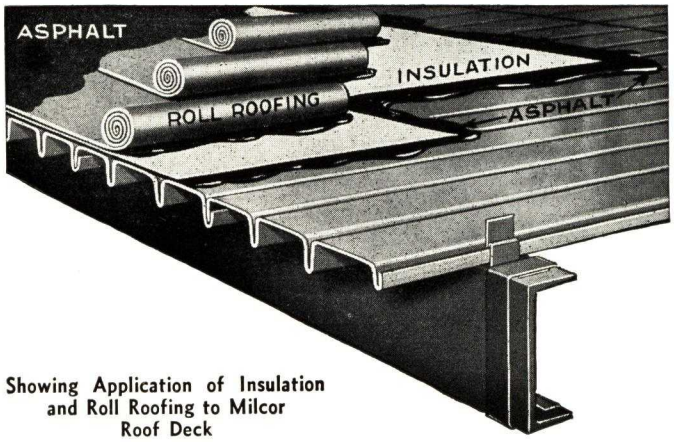
When submitting inquiries to us for estimate, stipulate gauge of decking wanted, spacing of purlins and required live load, the net area of roof, length of end wall, and length of side wall, also size, location, and spacing of supports.

Also indicate whether roof is of single or double pitch construction and if roof deck plates are to project beyond outside wall line or if a parapet wall carries above roof deck level. The specific anchor requirements are determined when making the lay-out.

TABLE OF SAFE LOADS FOR MILCOR ROOF DECK

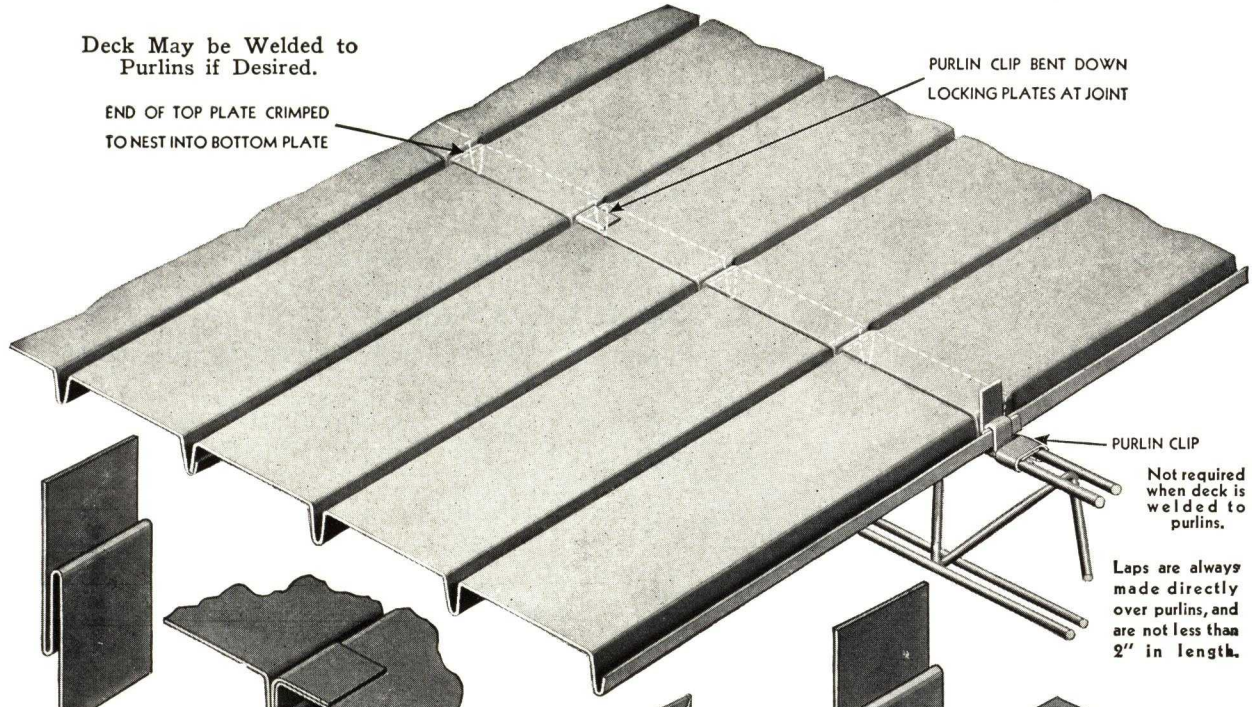
Total Safe Uniformly Distributed Loads in Pounds per Square Foot
Maximum deflection allowed is one two-hundred and fiftieth (1/250) of span in inches, based on a uniform load

Gauge	Spacing of Ribs, in.	Weight per 100 sq. ft.		Purlin Spacing, ft.-ins.													
				4-0		4-6		5-0		5-6		6-0		6-6		7-0	7-6	8-0
	Ribs, ins.	1½	1¾	1½	1¾	1½	1¾	1½	1¾	1½	1¾	1½	1¾	1½	1¾	1½	1¾	1½
22	6	180	210	79		62		50	65	41	53	35	45	30	38	27	33	29	26
20	6	215	250	95		75		62	80	50	65	42	55	36	47	31	41	35	31
18	6	285	330	125		100		81	103	67	87	56	73	48	62	41	53	47	43

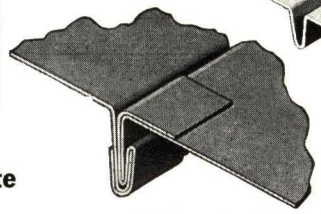


Showing Application of Insulation and Roll Roofing to Milcor Roof Deck

Milcor Roof Deck Is Easy and Economical to Install

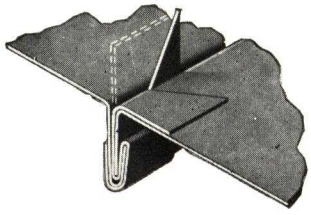


Intermediate Clip



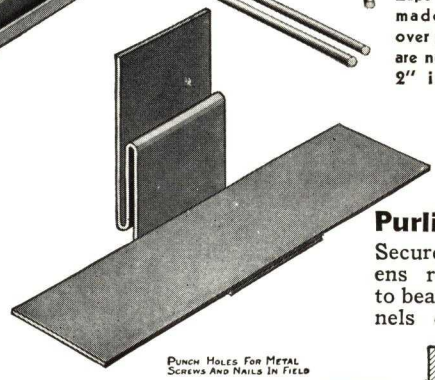
Intermediate Clip

Locking plates together midway between purlins —for Spans 5'6" and over.



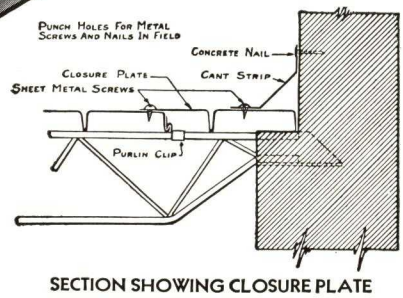
Intermediate Clip Locking Plates with Prong for Holding Insulation.

Intermediate Clip, Slit for Insulation Prong.



Purlin Clip

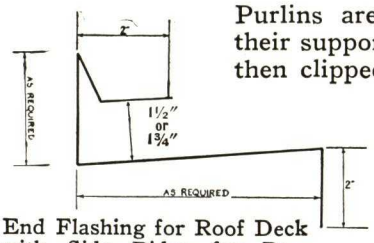
Securely fastens roof deck to beams, channels or joists.



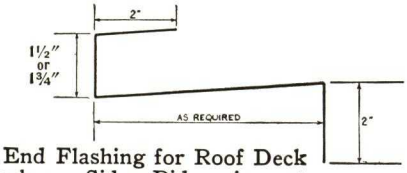
SECTION SHOWING CLOSURE PLATE AND CANT STRIP

CONSTRUCTION DETAILS

Purlins are placed, bridged and secured to their support as specified. The deck plates are then clipped or welded to the purlins.

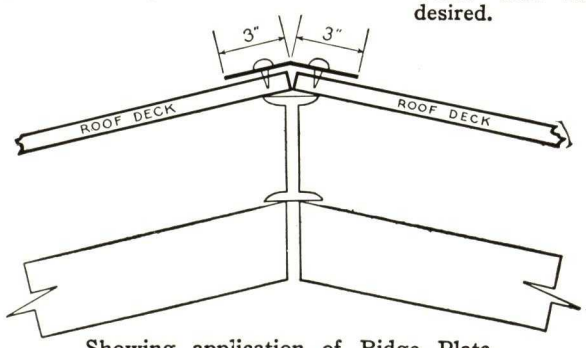


End Flashing for Roof Deck with Side Ridge for Prepared Roofing.

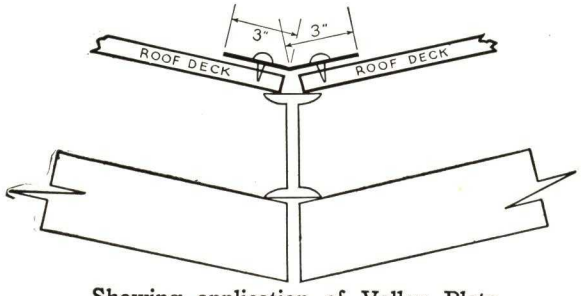


End Flashing for Roof Deck where Side Ridge is not desired.

On installations where a close fit to side and end walls is required, we furnish a closure plate which is installed as shown. This closure plate is fastened to the adjoining Roof Deck Plate with Kalon screws. On all installations the walls are flashed down over the decking.



Showing application of Ridge Plate to Steel Roof Deck



Showing application of Valley Plate to Steel Roof Deck

MEMORANDA

SAINT PAUL CORRUGATING CO.

Sheet Metal Fabricators for Fifty Years

Rib Type Steel Roof Decking

South End Wabasha Bridge, SAINT PAUL, MINN.

PRODUCTS

Saint Paul Rib Type Steel Decking.
Also Rib Type for Accoustical insulation, and Channel Type.

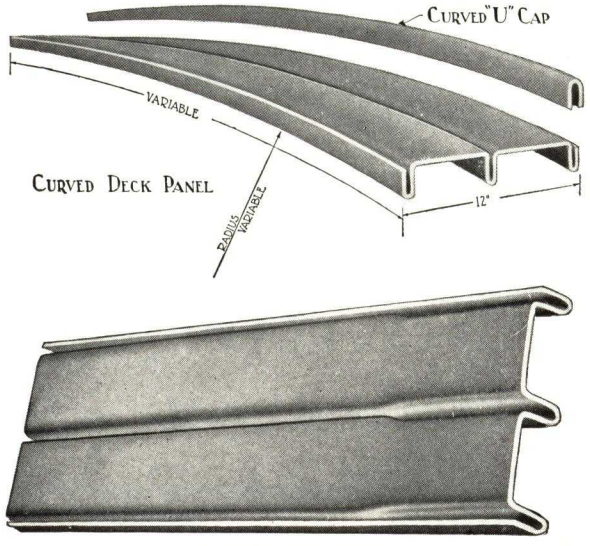
Write or wire for further details.
For other Sheet Metal Products, see File Index.

SAINT PAUL STEEL ROOF DECKING

One of the best bases for built-up roofing. Particularly light in weight.

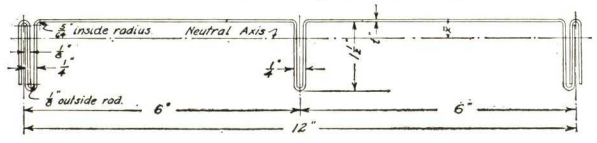
Resists Fire—Fire insurance companies understand the fire resisting qualities of Saint Paul Steel Decking, and may be expected to grant credits from standard rates when it is used.

Contraction and Expansion—Expansion and contraction are fully allowed for. Panels 12 in. wide are joined together by a U-rib which takes care of any expansion and contraction.



Straight Deck Panel

Properties of Sections and Table of Safe Loads for 12-inch panels—Tables for 14-inch panels on request.



PROPERTIES OF SECTIONS.

U.S. Gage	t in	Area sq.in	A_w* sq.in	$\bar{x}$ in.	I_x in.⁴	S in.³	wt. lbs per sq.ft.	M_{max}** in lbs.	V_{max}*** lbs.
18	.05	.0621	.5200	.421	.2814	.2492	4.0	3990	5200
20	.0375	.8708	.3896	.417	.2174	.1894	3.0	3030	3896
22	.0325	.1255	.3248	.413	.1767	.1580	2.5	2530	3248
24	.025	.5867	.2596	.405	.1393	.1243	2.0	1990	2596

*A_w = Area of web - straight portions only. **Based on f_t = 16000 lbs per sq.in.
***Based on f_t = 10000 " per sq.in. All above values for 12" section.

SAFE LOADS FOR SIMPLE SPANS UNIFORMLY LOADED.
BASED ON EXTREME FIBER STRESS OF 16 000 LBS. PER SQ.IN.

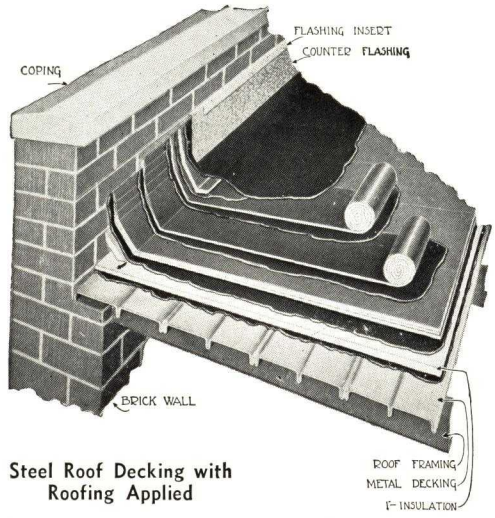
Span ft. - in.	Gage of Decking. 18	20	22	24.
	Safe Loads in lbs per sq.ft.			
3 - 0	291	222	185	146
3 - 6	213	162	135	107
4 - 0	162	123	103	81
4 - 6	127	97	81	64
5 - 0	102	78	65	51
5 - 6	84	64	53	42
6 - 0	70	53	44	35
6 - 6	59	45	37	30
7 - 0	50	38	32	25
7 - 6	43	33	27	22
8 - 0	38	29	24	19
8 - 6	33	25	21	16
9 - 0	29	22	18	14

Weight of decking (no insulation or covering) has been deducted in above values.

Ends lapped—Standard lappage allowed.

Construction—Every panel has reinforcing ribs 6 or 7 in. on center, adding greatly to the strength. A purlin clip is supplied at every point where a longitudinal joint crosses a supporting purlin. They tie the decking to the steel supports. Intermediate clips are spaced 20 to 24 in. on centers and tie adjoining panels and the U-ribs to each other. Enough intermediate clips and purlin cleats are furnished to tie all joints every 20 to 24 in., that is, purlin clips wherever joints cross purlin, and intermediate clips between purlin ties.

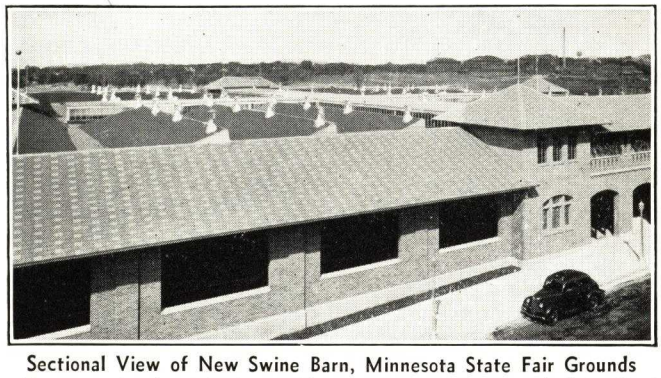
Decking is furnished in straight panels for flat roofs and can be curved to any radius for curved roofs. All members are die-formed, insuring true formation and uniformity in all parts. Curved sections are first formed straight and are then curved to the required radius. Laying curved sections requires no more labor than laying straight panels. Panels are interchangeable and uniform. Because of the thickness of the steel one end of each panel is formed enlarged to permit easy lapping.



Steel Roof Decking with Roofing Applied

Length of panels, either straight or curved, is determined by the spacings between roof purlins. Spacings of roof purlins not more than 6 ft. recommended.

Estimates—Supplied on the following classes of material:
(1) Hot rolled open hearth box annealed black steel copper bearing (dipped in gray metallic primer paint).
(2) Dead soft tight-coated copper alloy galvanized steel.
Where there is considerable interior moisture or smoke and acid fumes, material (2) is recommended.



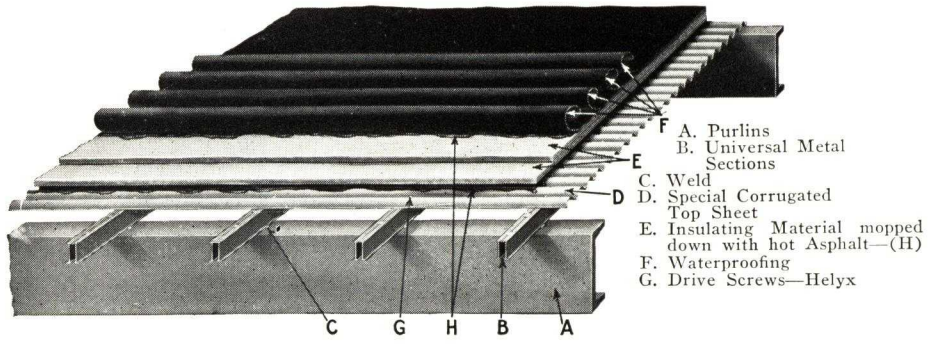
Sectional View of New Swine Barn, Minnesota State Fair Grounds

Largest swine barn in the world, 306x270 ft. Roofed with Saint Paul Rib-Type Steel Decking, 139 tons or 84,000 sq. ft., 22-gauge, tight-coated galvanized steel, 14-in. panels

THE UNIVERSAL METAL SECTIONS CO.

1740 East Twelfth Street, CLEVELAND, OHIO

UNIVERSAL STEEL ROOF DECK



Universal is an exceptionally rigid Steel Deck, and yet exceedingly flexible in its application to any type of building design.

Description

Universal Steel Roof Deck consists of Universal Sections of copper-bearing steel, acting as continuous supporting beams, welded to purlins, covered with special corrugated copper-bearing steel sheets. Insulation and waterproofing are applied on top of the sheets. Sections and sheets are dipped in Universal rust-resisting paint.

Sections are exceptionally rigid. They are cold rolled from one piece of 16-gauge hot rolled copper-bearing strip steel. They are 2 in. deep and 1½ in. wide over all. The lead bearing member is deeper and heavier than the rib in ordinary decks and the special 1¼x$\frac{7}{16}$-in. corrugations in the 24-gauge copper-bearing steel top sheet give additional rigidity.

Advantages

Flexible Application—Variation in spacing of Sections provides a means of carrying any normal roof load at any reasonable purlin spacing. *Purlins spaced at 10 ft. are entirely feasible.* Any size hole may be cut in the deck without additional structural supports, or section of deck may be given special strength.

Strong—The fixed continuous beam principle is used for both Sections and top sheets. Purlins can safely be spaced wider without decreasing rigidity or roof strength; 20-ft. sections welded to purlins act as cross bracing.

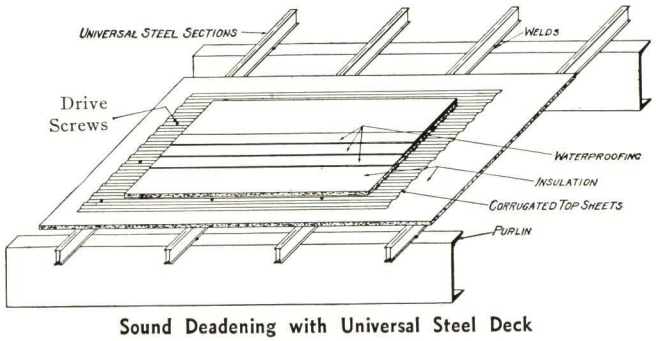
Light Weight—See Engineering Data for weight per square.

Simple to Install—Complicated Engineering layouts are unnecessary.

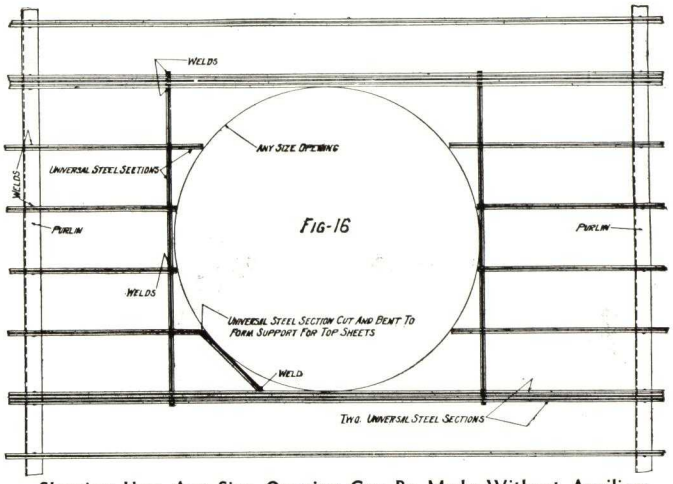
Non-combustible—Firesafe.

Heat Saving—Warmer in winter; cooler in summer.

Economical—The most economical design of trusses and other structural steel from the footings up is possible when Universal Deck is incorporated in the original building plans.



Sound Deadening with Universal Steel Deck



Showing How Any Size Opening Can Be Made Without Auxiliary Support

Insulation—Ideal surface for insulation or waterproofing material. Applicable to flat or pitched roof. Efficiently braces entire structure.

Installation Features of Universal Steel Decks

Universal Metal Sections are spaced according to engineering formula to carry any required load on the required purlin span. They are welded to the purlins easily and quickly without danger of burning through. Eave projections up to 2 ft. horizontal are feasible. Parapet walls need not be weakened by raggle, and a corbel is unnecessary, since Universal Sections may be inserted in holes in wall.

Copper-bearing steel covering sheets are corrugated 1¼ in. wide, $\frac{7}{16}$ in. deep, 10 ft. long with covering width of 2 ft.

Insulation material is usually applied by mopping the deck or the insulation with hot asphalt. On pitched roofs, Universal Darts are attached to top sheet to prevent slipping. The underside of a Universal Steel Deck may be covered with any suitable material for architectural effect or additional insulation, although the underside is attractive itself.

The panel points of most trusses may be used as purlin centers, thus eliminating the necessity of designing the top chord for bending.

Engineering Tests

Excerpts from the report of the James H. Herron Company Testing Laboratories, Cleveland, Ohio:

Test No. 1—"Deflections on a Universal Deck (under 40-lb. load per sq. ft.) on both 7′ 6″ purlin spans (end spans) average .277″, while that of 8′ purlin spans (center spans) average only .112″—well within requirements of .360″ and .384″, respectively."

Test No. 2—"On a 6-ft purlin span a Universal section was supported on rollers, load at center—results:

I_{1-1} (Moment of inertia)—.2467 in. 4

This corresponds extremely close to the computed moment of inertia—$I_{1-1} = .24644$ in. 4."

(The section modulus is the same as the moment of inertia for this beam.)

Test No. 3—"On a 10-ft. purlin span the Universal Deck was submitted to 3 beam loading conditions — single span (both ends free to rise), end span of at least two continuous spans (one end restrained, one end free to rise), interior span (both ends restrained)—concentrated loads used—average deflections are .421 in., .389 in., and .347 in. respectively, which are within (the allowable of) $\frac{1}{240}$ of 10 ft. or .480 in."

Complete reports of James H. Herron Company, and of Columbia University Testing Laboratories sent upon request.

Engineers' Reports

One of the best known and largest national engineering and contracting companies reports: "Very satisfactory type of construction."

A large, nationally known roofing company reports: "Entirely satisfactory for application of roof insulation and built-up roofing." (Original on file.)

ENGINEERING DATA

Section Modulus .246 *Moment of Inertia .246*

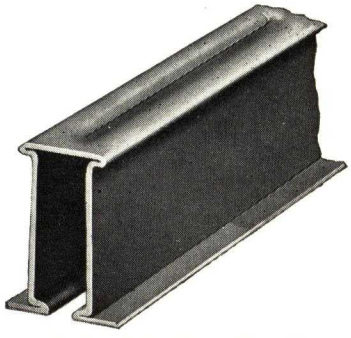
Live Load: 40 lbs. per sq. ft., 18,000 lbs. f.s.

Purlin span, ft. in.	Number of ft. of section per sq.	Section spacing, in.	Total deck wt. per sq.	Purlin span, ft. in	Number of ft. of section per sq.	Section spacing, in.	Total deck wt. per sq.
5 0	42	30	200	8 0	82	15	254
5 6	42	30	200	8 6	92	13¼	268
6 0	52	24	214	9 0	102	12	282
6 6	52	24	214	9 6	112	10¾	296
7 0	62	20	227	10 0	122	10	310
7 6	72	17	240				

Installed On

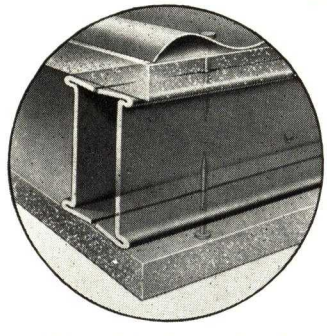
Gymnasiums	Schools	Railroad Stations	Factories
Garages	Clubs	Warehouses	Apartments
Stores	Hotels	Filling Stations	Theaters

and wherever a light weight long lasting roof is indicated. Particularly recommended for types of construction requiring long spans, such as gymnasiums.



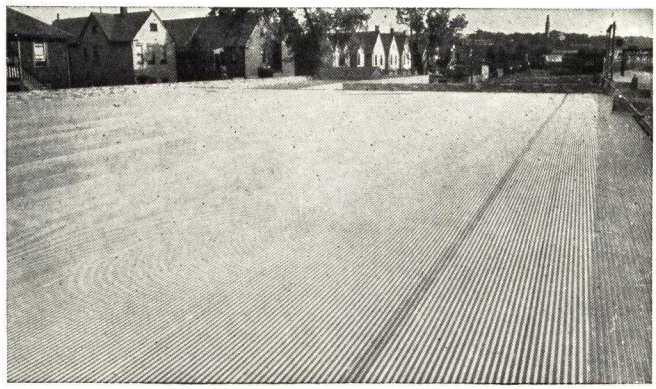
Universal Sections—Type A

Used wherever light, strong, low cost steel beams are desired; easily cut and handled on the job; used for roofs, sidewalls, ceilings, floors. Lengths up to 20 ft. in stock. Longer units can be furnished. Note top nailing feature



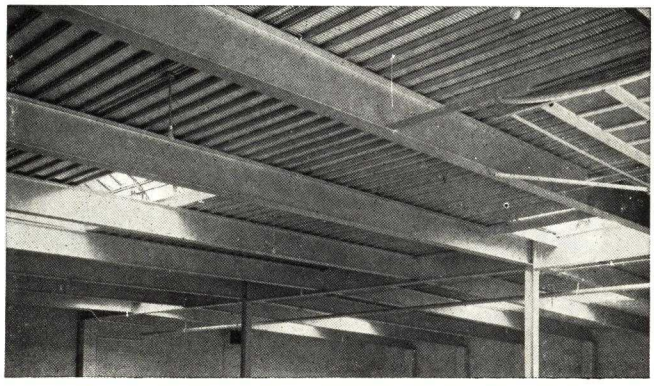
Universal Sections—Type B

Has a double nailing feature, so that any material may be quickly and easily fastened to both sides. Particularly useful as strong studding in modern thin sidewall and partition construction

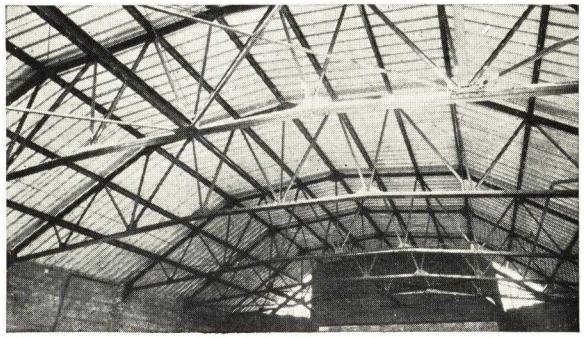


Pocahontas Oil Co., Warehouse, Cleveland

Herron-Zimmers Moulding Co., Detroit, Mich.
GIFFELS & VALLET, Architects



Commercial Garage Corp., 522 W. 21st St., New York



Center, Mayfield Theatre, Cleveland
G. B. MAYER and J. L. WEINBERG, Architects

WHEELING CORRUGATING COMPANY

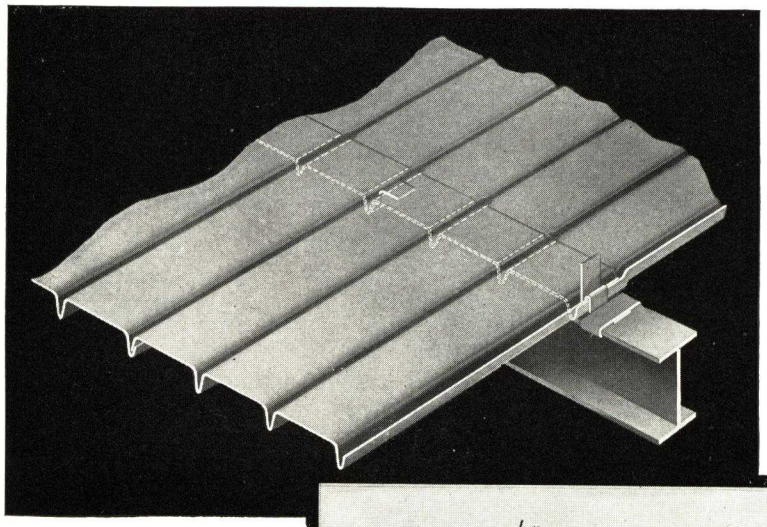
Steel Roof Decks

WHEELING, W. VA.

ATLANTA, GA.
BUFFALO, N. Y.
CHICAGO, ILL.
COLUMBUS, OHIO
DETROIT, MICH.
KANSAS CITY, MO.
LOUISVILLE, KY.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.
PHILADELPHIA, PA.
RICHMOND, VA.
ST. LOUIS, MO.

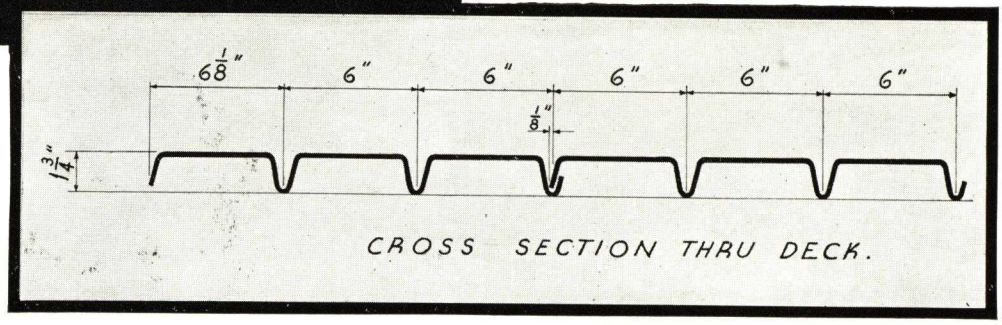
For Wheeling Steel Floor and Roof System, see File Index

Tri-Rib Deck is furnished in lengths to take care of any spacing of purlins. The plates are 18 ins. wide with 1¾ in. ribs spaced 6 ins. on centers. The deck is furnished in 18, 20 and 22-gauge.



Tri-Rib Roof Deck is fabricated from Cop-R-Loy and is given one shop coat of good grade paint. Can also be fabricated from galvanized sheets.

Tri-Rib Roof Deck may be welded to the purlins if desired, thus eliminating the use of purlin clips. Illustration on the left shows the purlin clip in place, also the intermediate clip.



CROSS SECTION THRU DECK.

(1) Engineered to the job, no cutting or fitting required.

(2) Easy and economical to erect. All erection operations are performed from the top of the deck.

(3) All deck units are 18 ins. wide, thus reducing to a minimum the number of units to be erected.

(4) Minimum end laps of 4 ins. insure a rigid even surface througout.

(5) Designed for easy assembly of all units, overlapping ends never have to be forced in place.

(6) Made from Cop-R-Loy painted or galvanized, thereby insuring extra long life to the steel deck.

SAFE, UNIFORM LOAD PER SQUARE FOOT

Span, ft.	22-gauge	20-gauge	18-gauge
4	110	125	..
5	72	85	110
6	48	57	75
7	..	40	55
8	..	..	40

LATHROP-HOGE GYPSUM CONSTRUCTION CO.

Gypsum Floors and Roofs

1426 Clay Street, CINCINNATI, OHIO

BRANCH OFFICES

ATLANTA, GA., 528 Hurt Building
BUFFALO, N. Y., 190 Delaware Avenue
CHICAGO, ILL., 111 W. Washington Street
DALLAS, TEX., Burt Building
DETROIT, MICH., 439 Penobscot Building
PHILADELPHIA, PA. 1600 Arch Street
MINNEAPOLIS, MINN., 700 National Building
NEW YORK, N. Y., Graybar Building
PITTSBURGH, PA., 419 Melwood Street
ST. LOUIS, MO., 859 Goodfellow Avenue

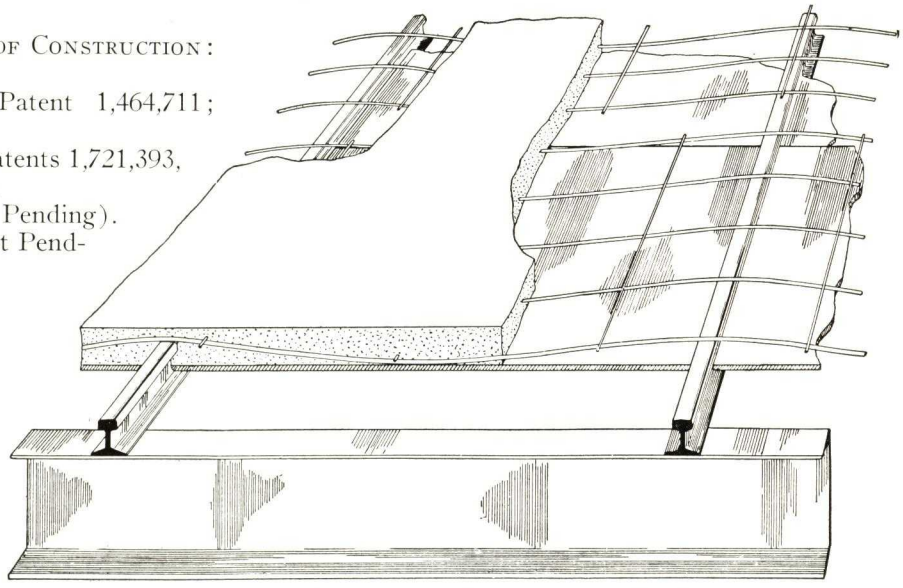
REPRESENTATIVES IN OTHER PRINCIPAL CITIES

Products

MONOLITHIC GYPSUM FLOOR and ROOF CONSTRUCTION:
Standard Suspension Type.
Hoge Subpurlin Type (U. S. Patent 1,464,711; Canadian Patent 241,477).
Enclosed Subpurlin Type (U. S. Patents 1,721,393, 1,814,387; Canadian Patent 254,632).
La-Ho-Co Precast Type (Patent Pending).
La-Ho-Co Monolithic Type (Patent Pending).

Construction Service

This company, backed by over 30 years' experience in gypsum construction, is at your service for advice and estimates for the above types of construction installed complete in any part of the world.



Hoge Type of Monolithic Gypsum Floor and Roof Construction

Advantages of Subpurlin Types

The subpurlin types of construction have all the advantages of light weight, rapid erection, high insulation properties, fire resistance, vibration resistance, permanence, strength and excellent undersurface appearance.

The simplicity of the subpurlin designs permits adaptation to any layout of supports by varying the size of subpurlin in accordance with standard structural design. Subpurlins bear on walls and no special bracing of purlins is required as with other designs.

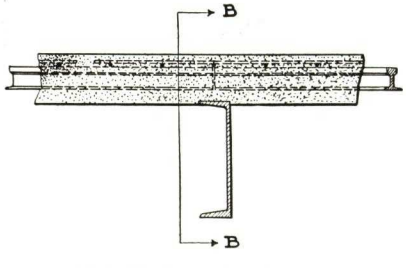
In replacement of old roofs and floors where applications to framing are difficult, or where a uniform paneled undersurface is desired, its use has been found particularly advantageous.

Subpurlin Types of Monolithic Gypsum Floor and Roof Construction

The approval of architects, engineers, and owners throughout the United States and Canada is convincing proof that the Hoge and the Enclosed subpurlin types are well suited to the great majority of conditions, and conform readily to the standards of design and appearance required by architects.

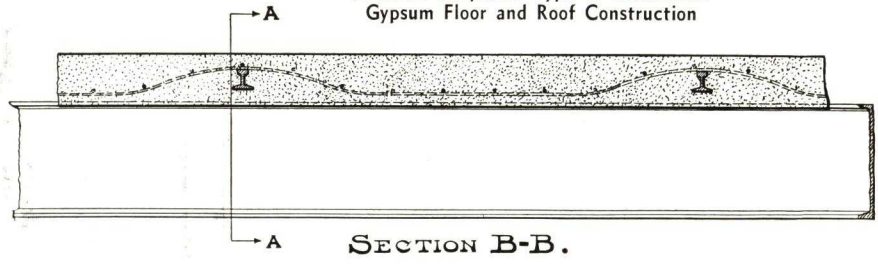
Hoge Subpurlin Type—In the Hoge type small subpurlins are laid about 32 in. apart on the top of walls, beams or purlins spanning the distance between beam or wall supports. On the lower flanges of the subpurlins are supported standard gypsum board, insulation or other composition board, with joints made over purlins, to form a solid undersurface, paneled by the lower flanges of the subpurlins. The subpurlins are designed to carry all loads, which are transferred to them by continuous mesh reinforcement running across and resting over top of the subpurlins. Standard gypsum composition is poured in place over the gypsum board or insulation board and finished smooth to the required slab thickness, ready to receive the roof or floor finish. The undersurface can be left with the attractive composition board finish or may be decorated as desired.

Enclosed Subpurlin Type—Where fireproofing or greater insulation value is desired, the subpurlins are supported on the purlins or blocked above the top of purlins with insulating material. Removable forms are so placed as to permit covering the bottom of the subpurlins with ¾-in. or more of gypsum composition, leaving a solid, plain gypsum undersurface even with the top of the purlins, the full thickness of the slab being above the superstructure, yielding maximum insulation value.



SECTION A-A.

Enclosed Subpurlin Type of Monolithic Gypsum Floor and Roof Construction



SECTION B-B.

LA-HO-CO MONOLITHIC AND PRECAST ROOF DECKS

Although the subpurlin types described above are suitable for the great majority of conditions found in building construction, we also offer a variety of La-Ho-Co designs carried on subpurlins spaced from 15-in. c. to c. to 32-in. c. to c., for those conditions where either extremely light weight, lower prices, or increased insulation value is desired. (Detailed information will be sent on request.)

AMERICAN CYANAMID AND CHEMICAL CORPORATION

STRUCTURAL GYPSUM DIVISION

EXECUTIVE OFFICES

38 Rockefeller Plaza, NEW YORK, N. Y.

TELEPHONE CIrcle 7-0100

SALES OFFICES IN THE PRINCIPAL EASTERN CITIES

PRODUCTS

Gypsteel Plank; Gypsteel Pre-cast Composite Floor Arch; Gypsteel Pre-cast Roofs; Gypsteel Pre-cast Ceilings; Gypsteel Partition Tile, Beam and Column Covering (see File Index); Gypsteel Plasters (see File Index).

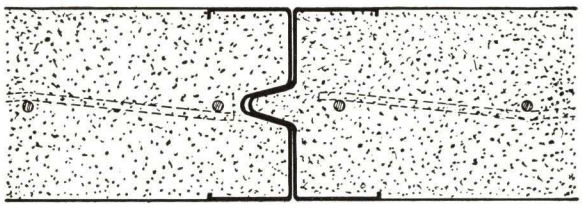
Gypsteel Pre-cast products and Gypsteel Plasters are manufactured from calcined gypsum produced by the exclusive Gypsteel Process. Calcined gypsum is one of the oldest of building materials and, until the development of this process, was manufactured only from rock gypsum, a mineral that is mined or quarried. Under the Gypsteel Process we "manufacture" gypsum, free of the impurities but otherwise identical in composition with nature's product.

GYPSTEEL PLANK*

Gypsteel Plank is a pre-cast building unit manufactured in forms and sizes that are similar to and as easy to handle as lumber. Its principal uses are as lightweight floor slabs and roof decks that afford the permanence and fire-safety of masonry construction. Plank is simply a slab of extra dense, nailable gypsum, reinforced with mesh and bound on sides and ends with a one-piece galvanized steel frame, tongued and grooved like wood.

Gypsteel Plank is manufactured in two sizes, depending upon the spans and loads to be carried.

Cross Section Through Senior and Junior Plank
Weight 12 lbs. per sq. ft.



Half-size Section of Tongue and Groove Joint of Senior and Junior Plank
Showing how they mesh to form a continuous steel I-beam, 2-in. deep.
Note: The ends as well as the sides are tongued and grooved

Senior Plank

2 in. thick, 15 in. wide, 10 ft. long.

For roofs on spans up to 7 ft. and for floors on spans up to 5 ft.

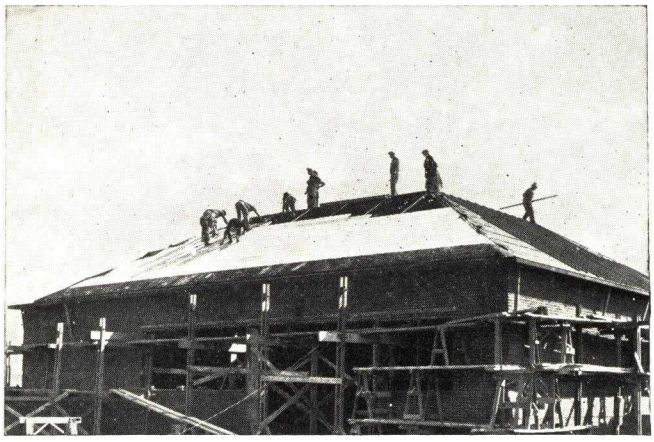
Junior Plank

2 in. thick, 15 in. wide, 6 ft. long.

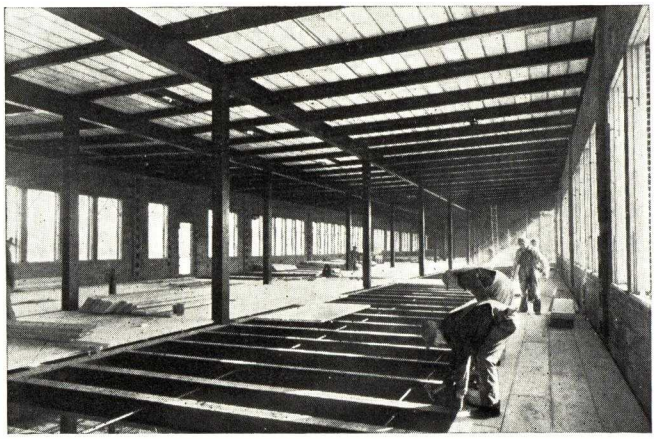
For roofs on spans up to 4 ft. and for floors on spans up to 3 ft.

LOAD TABLE FOR GYPSTEEL PLANK
(Total safe super-imposed load in pounds per square foot)

Senior plank				Junior plank		
4′0″	5′0″	Roofs only		2′0″	3′0″	Roofs only 4′0″
		6′0″	7′0″			
150	150	75	75	150	120	75



Cut-up Roofs, Steep Pitches—Bring Out the Advantages of Gypsteel Plank



Plank Is Laid Just Like Lumber, But with the End Joints at Random Regardless of Location of Supports

*The term Plank, as applied to cementitious building products, is a trade mark of American Cyanamid and Chemical Corporation.

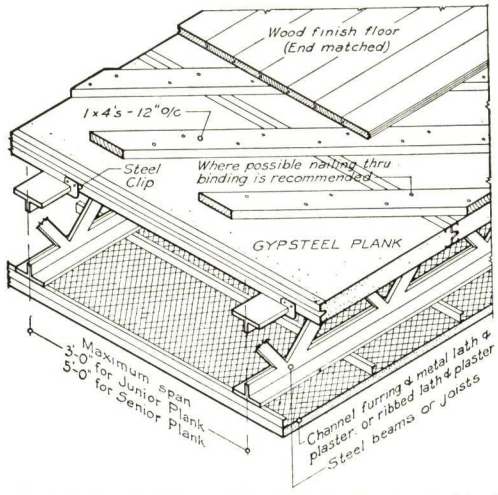
APPLYING GYPSTEEL PLANK

Plank is laid directly over wood or steel members of any type and either uniform or variable spacing up to 7 ft. on roofs, and up to 5 ft. on floors. It may be nailed direct to wood supports, or attached to a steel frame by means of simple clips.

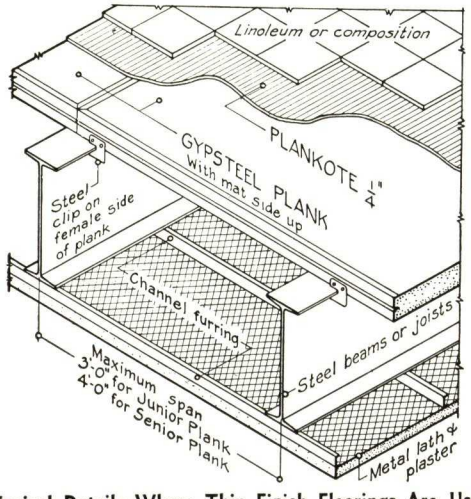
Plank is erected *without regard to joist or purlin spacing* by staggering end joints. *Joints need not come over the supports.* There are no joints to grout, forms to erect, nor delays from freezing weather.

The strength of a Gypsteel Junior or Senior Plank floor or roof is in the meshed steel binding. This binding forms a 2-in. steel I-beam, stiffened by the gypsum core, locking all units together and evenly distributing loads that may be concentrated on one or more units.

For floors or flat roofs, where a metal lath and plaster ceiling is to be installed below, the choice is offered of using either Junior Plank with light steel joists spaced up to 3 ft. on centers or Senior Plank over light steel beams that may be spaced up to 5 ft.** apart. With the Junior Plank-open web joist combination we have the advantage of the cheaper floor slab and a somewhat more economical ceiling. On the other hand, the Senior Plank-beam combination reduces the cost of the steel frame and usually provides a more rigid construction.



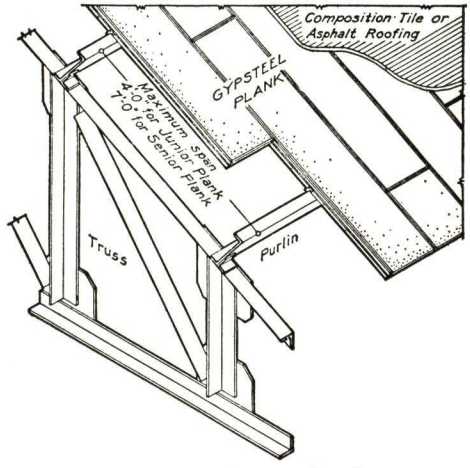
Typical Details Where Wood Finish Flooring Is Used



Typical Details Where Thin Finish Floorings Are Used

Practically any type of standard finish flooring may be applied over Plank. Ordinary double floors are laid by simply nailing the rough flooring direct to the Gypsteel Plank (satisfactory and economical results are obtained using 1x4s, spaced about 12 in. on centers), and then laying the finished flooring in the usual manner. Linoleum, mastic tile and similar flooring may be laid over a ¼-in. minimum coat of Plankote* troweled over the Plank surface by the flooring contractor. Plankote, manufactured by this corporation, bonds perfectly with Gypsteel, sets quickly and firmly, and is easily troweled to a smooth hard finish.

For roofs, where the ceiling side is exposed, economy recommends the use of Senior Plank with the purlins spaced as far apart as is consistent with the load requirements. Any type of standard roofing is easily applied. For built-up roofings, follow the usual specifications for application over wood decks, nailing the first layer of paper or felt, and spot mopping, if desired, but not mopping the entire area. Shingle, slate, and other roofings of this type may be nailed direct to Plank using *square cut nails* penetrating 1½ in.



Typical Roof Framing Details

Plank may be installed on either flat or pitched roofs and may be run either across or with the slope. On steep slopes provide stop angles or bolt plank frequently to steel to take up roof thrust.

ADVANTAGES

1. Plank may be nailed, sawed, cut or bored as readily as wood.
2. No waste because of laps or cutting; the shortest piece may be used.
3. Easy to handle and erect; requires only carpenter's tools.
4. Will not rot, shrink, or warp; vermin and termite proof.
5. Absolutely incombustible.
6. Unusually high insulating properties.
7. Eliminates form work and water in construction; there is no waiting for material to "set."

Send for complete catalog and price list.

*Trade Mark.

**With thin finishes we recommend spans be limited to 4 ft. to assure adequate stiffness.

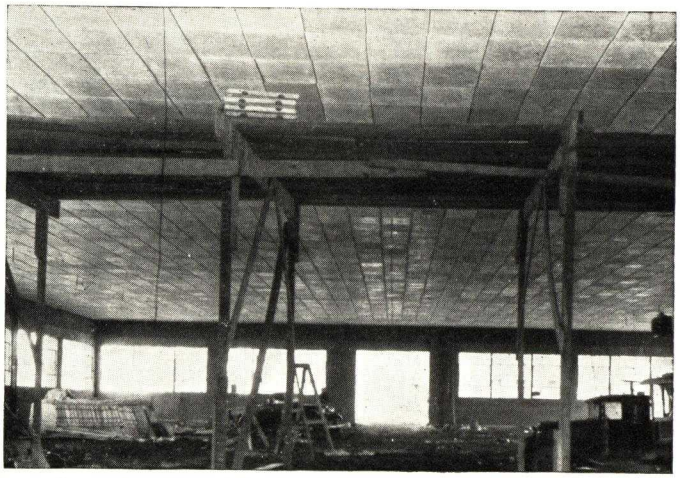
GYPSTEEL PRE-CAST CEILING SLABS

Gypsteel Precast Ceiling Slabs are designed to furnish a flat ceiling of class "A" fireproof construction in steel frame buildings of any type.

Used in combination with Senior or Junior Plank, they are suspended beneath the supporting steel, completely fireproofing these members with 2 in. of solid gypsum, and making possible a light weight, flat ceiling floor system with the highest fireproof rating.

Suspended beneath the bottom chords of roof trusses, Gypsteel Pre-cast Ceilings not only fireproof the steel, but effect substantial savings in fuel through their own high insulating value and by isolating the normally unused space above the bottom chord.

Gypsteel Ceilings are approved for first-class construction by the building of departments of principal cities.



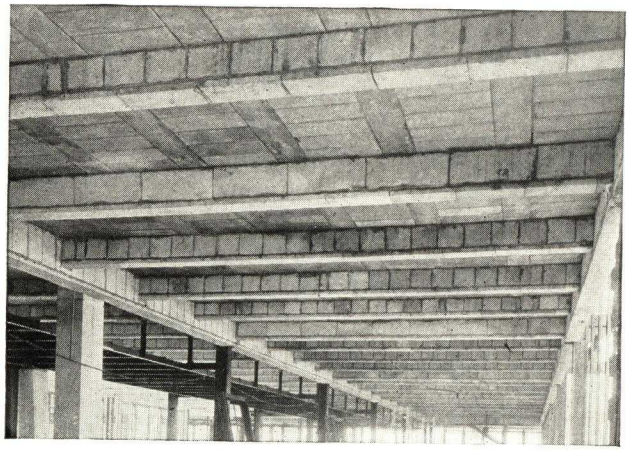
Gypsteel Ceilings Afford Full Protection to Floors and Roof Beams and Provide an Excellent Plaster Base

GYPSTEEL COMPOSITE PRE-CAST FLOOR ARCH

Gypsteel Composite Pre-cast Floor Arch is a thoroughly practical and economical fireproof floor construction, free from form work and water, suitable for general building construction for spans between supporting members up to 8 ft.

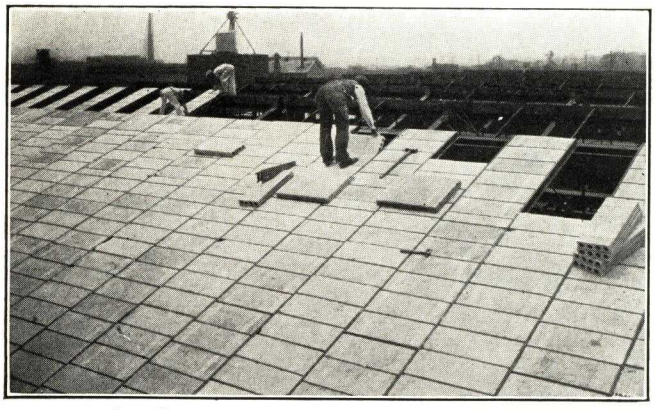
It is adaptable to all classes of fireproof steel frame buildings, being fully approved by the building departments of principal cities for buildings of the first class and for live loads of 150 lbs. per sq. ft.

Because it is light in weight the composite Floor Arch permits substantial savings in the tonnage of steel required for beams, girders, and columns over the typical short span concrete arch construction.



With the Beam and Girder Fireproofing Installed the Gypsteel Composite Floor Is Ready for Plaster

GYPSTEEL SHORT SPAN PRE-CAST ROOF



Installing a Gypsteel Short Span Pre-cast Roof

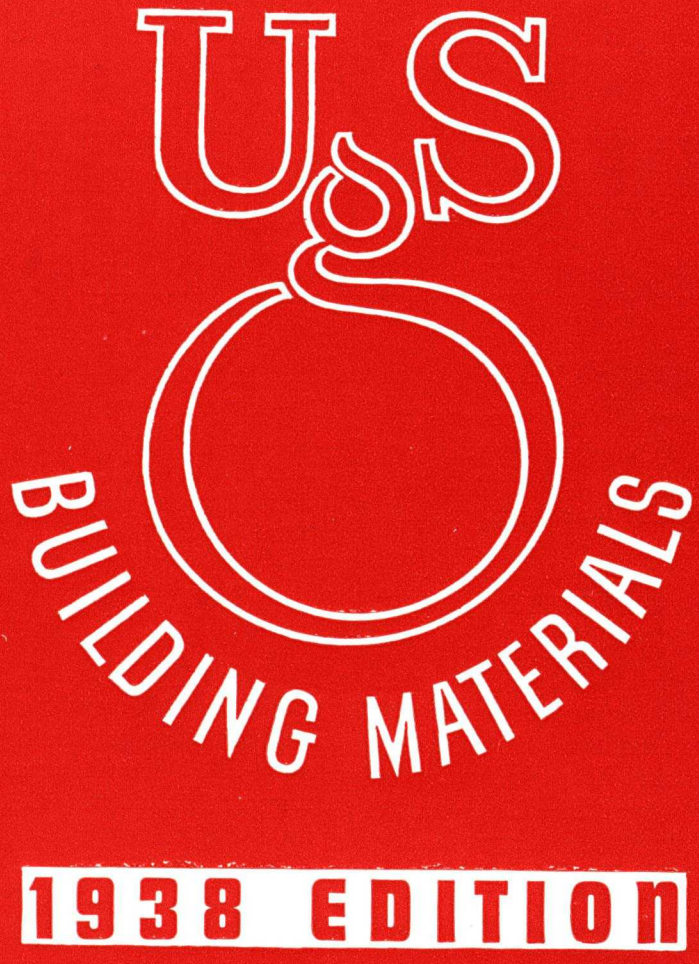
Consists of slabs 30 in. in length supported by sub-purlins spanning the distance between the main purlins. For the greatest economy, they should be installed upon Gypsteel Sub-purlins, especially developed for this purpose. They may also be supported by tees, angles, light rails, junior beams, or metal joists. Slabs are available in various thicknesses from 2½ in. to 4 in., both solid and hollow.

Especially adaptable for curved surfaces, very irregular roofs, or those with numerous hips, valleys, or dormers, and also very steep pitched roofs.

MISCELLANEOUS PRODUCTS

A complete line of pre-cast gypsum units for beam, girder and column fireproofing, as well as all standard sizes of gypsum partition tile, are available under the Gypsteel trademark. The corporation also markets a complete line of gypsum plasters of the highest quality.

THE RED BOOK



1938 EDITION

UNITED STATES GYPSUM COMPANY

UNITED STATES GYPSUM COMPANY

Engineering Sales Division

• • •

GENERAL OFFICES

300 West Adams St., CHICAGO, ILL,

SALES OFFICES IN ALL PRINCIPAL CITIES—FOR LIST SEE BACK COVER

• • •

A NEW USG SERVICE—COMPLETE ROOFS

Insulating Roof Decks, Built-up Roofing and Flashings

UNDIVIDED RESPONSIBILITY

The United States Gypsum Company offers you undivided responsibility for the complete roof which consists of (1) the structural fireproof roof deck, (2) insulation board, if required, (3) waterproof built-up roofing, and (4) flashings.

HOW THIS IS POSSIBLE

In more than twenty years experience in roof deck manufacture and erection, USG has obtained a thorough knowledge of the requirements of the complete roof. Now USG manufactures in its own mills the units of the complete roof. Each unit is manufactured with the relative requirements of the other roof units considered, which results in better performance of the roof assembly.

DIVIDED RESPONSIBILITY

With responsibility for the roof units divided between two or more manufacturers, there is frequently room for an honest difference of opinion. Did some difficulty start in the built-up roofing and in turn affect the roof deck or vice versa? It has been a long standing problem—to which USG now offers you the answer.

WHAT UNDIVIDED RESPONSIBILITY MEANS TO YOU AND YOUR CLIENTS

Visualize the building constructed to the point where exterior walls and structural steel are erected in place but with the structure still open to the sky. Then USG takes complete responsibility for the dependable performance of the units which protect the building and its contents against the weather—the roof deck, insulation board, built-up roofing, and flashings—the complete roof.

MANY TYPES TO COVER PRACTICALLY EVERY NEED

Then consider that USG undivided responsibility is obtainable on a wide range of constructions—USG makes three types of incombustible roof deck—Gypsum, Steel, and Cell Concrete. USG also makes flashings and a full line of built-up roofing adaptable for use over all types of roof decks.

ENGINEERING SERVICE

USG maintains a complete engineering organization experienced in solving roof problems and skilled in economics of structural design.

SOLUTION OF YOUR ROOF PROBLEM

USG complete roof specifications centralize responsibility—a consideration of great value to you and your client.

USG offers the best solution to your roof problem because it offers the complete solution.

Why not call in a USG Engineer on your roof problem? His advice will be unbiased and authentic and there will be no cost or obligation to you.

GYPSUM CONSTRUCTIONS

• • •

ROOFS and FLOORS
FIREPROOFING SPECIALTIES

• • •

WHY GYPSUM • GENERAL TECHNICAL DATA

FIREPROOF—Gypsum Tile have successfully passed the Underwriters' requirements for Fireproof Partitions.

FIRE PROTECTION—Steel loses strength rapidly at temperatures above 1000° F. and, unless properly protected, will fail at the temperatures of 1700° to 2300° F. frequently reached in a building fire.

The ideal fire protection material must:

(1) Be incombustible
(2) Protect the steel against high temperature
(3) Not expand sufficiently to spall off and expose the steel

AND ABOVE ALL MUST:

(4) Maintain these qualities for the duration of the fire.

GYPSUM COMPLIES WITH THE FOREGOING ESSENTIALS OF THE IDEAL FIREPROOFING MATERIAL BETTER THAN ANY OTHER COMMONLY USED MATERIAL.

PROOF—(1) Tests show that Gypsum will not support combustion at any known temperature.

(2) Tests show that it is impossible for gypsum-protected steel to reach higher temperatures than 212° F. until the gypsum has completely calcined; just as impossible as it would be to feel the heat of a blow torch through a piece of ice until after the ice had melted.

(3) Tests show that gypsum, possessing no strength after it has passed 212° in temperature, can only expand through 142° (room temperature to 212°) even when exposed to higher temperatures.

In a 10 ft. length of column fireproofing the total expansion

for gypsum is ..... .156 inches
for clay tile is ..... .59 inches
for concrete is .....1.18 inches

(4) Maintaining these qualities when gypsum is used is simply a matter of thickness of the gypsum protection.

The Bureau of Standards' report (Technological Paper No. 130) says: "This table shows that the length of time required for a temperature of 600° C. (1112° F.) to be attained at a depth of 1½ in. does not vary greatly in the clay and concrete specimens. The gypsums are seen to be distinctly better than clay and concrete in this respect, only one of them (out of 28 total specimens) reaching a temperature of 600° C. at a depth of 1½ in. in the three and one-half hour test. Obviously, the gypsum specimens indicate distinctly superior thermal protection for embedded steel." During a test on 3-in. hollow partition tile at the Underwriters' Laboratories, a two-hour exposure to 1900° F. failed to raise the temperature of the unexposed side of the wall over 90° above room temperature.

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FOR USG PRODUCTS DESCRIBED IN OTHER SECTIONS—SEE MANUFACTURERS' INDEX

LIGHT WEIGHT—The weight of gypsum constructions is very materially less than that of other commonly used materials. For example:

3 in. Hollow Pyrobar* Partition Tile weighs per square foot while	10 lbs.
3 in. Hollow clay partition tile weighs per square foot	15 lbs.
3 in. Solid Pyrobar Roof Tile weighs per square foot while	17 lbs.
3 in. Solid concrete weighs per square foot.	38 lbs.

In a typical structural steel frame building the substitution of gypsum fire protection for clay tile fire protection will show an average of 20 lbs. reduction in the dead load per square foot of floor throughout the structure. If, in addition, gypsum floor construction is substituted for concrete or clay tile arch construction, an additional saving of approximately 30 lbs. per square foot of floor in dead load can be obtained, making a total saving of 50 lbs. per square foot.

ADAPTABLE—The many types of gypsum poured-in place and precast tile constructions for roofs and floors and the many special shapes and sizes of partition tile, shoe tile, angle tile, soffit tile, curb tile, gutter tile provide a type, size, and shape for all conditions.

Where cutting and fitting is necessary, Pyrobar Gypsum Tile may be cut almost as readily as wood.

PLASTER BASE—Gypsum bonds with gypsum. Therefore, gypsum is the ideal base for gypsum plaster which is universally used.

THERMAL INSULATION VALUE—Low heat conductivity is a fundamental characteristic of gypsum. The table below contrasts the B.t.u. loss per hour, per square foot, per degree difference in temperature of several commonly used roof deck materials with the low loss through the equally common types of poured and precast gypsum constructions.

Corrugated sheet iron	1.50
4 in. stone concrete	.72
2½ in. Sheetrock Pyrofill Deck	.38
3 in. Sheetrock Pyrofill Deck	.35
2½ in. Weatherwood Pyrofill Deck (½ in. Weatherwood)	.26
3 in. Weatherwood Pyrofill Deck (1 in. Weatherwood)	.19
3 in. Solid Short Span Pyrobar	.43
4 in. Hollow Short Span Pyrobar	.35
5¼ in. Long Span Hollow Pyrobar	.29

SHEETROCK* • PYROFILL* WEATHERWOOD* • PYROFILL ROOF CONSTRUCTIONS

• • •

DESCRIPTION

SHEETROCK-PYROFILL ROOF CONSTRUCTION—Consists of Sheetrock undersurface in lengths equal to the main purlin spacing supported on the flanges of light rail sub-purlins, spaced 32½ inches on centers and clipped to the main purlins.

Over the Sheetrock is poured a slab of gypsum fiber concrete (Pyrofill) reinforced with an electrically welded galvanized steel fabric.

SHEETROCK UNDERSURFACE—Consists of ⅜ in. Sheetrock, 32 in. wide, and in lengths equal to the main spacing so all joints occur over the main purlins.

WEATHERWOOD-PYROFILL ROOF CONSTRUCTION—Consists of Weatherwood Insulating Board undersurface (either ½ or 1 in. thick) in lengths equal to the main purlin spacing supported on the flange of light rail sub-purlins, spaced 32½ in. on centers and clipped to the main purlins.

Over the Weatherwood Insulating Board is poured a slab of gypsum fiber concrete (Pyrofill) reinforced with an electrically welded galvanized steel fabric.

WEATHERWOOD UNDERSURFACE—Consists of either ½ or 1 in. thick Weatherwood Insulating Board, 32 in. wide, and in lengths equal to the main purlin spacing so all joints occur over the main purlins.

SUB-PURLINS—Light rails (or tees) laid at right angles to the main purlins, spaced approximately 32½ in. on centers and clipped to the main purlins.

REINFORCEMENT—Consists of a continuous electrically welded galvanized steel fabric (specially made to USG specifications) with No. 12 longitudinal wires 4 in. on centers and No. 14 transverse wire 8 in. on centers.

PYROFILL (GYPSUM FIBER CONCRETE)—Consists of gypsum stucco, water, and not to exceed 12½ lbs. of fiber to 87½ lbs. of calcined gypsum. It weighs only 53 lbs. per cubic foot.

CURBS, END WALLS, ETC.—Curbs, end and similar walls may be constructed of Precast Gypsum Tile. Curbs may also be constructed of Sheetrock-Pyrofill or Weatherwood-Pyrofill construction.

*Registered Trade-Mark

See Page 1 for New USG Complete Roof Service

OUTSTANDING ADVANTAGES SHEETROCK • PYROFILL and WEATHERWOOD • PYROFILL ROOF CONSTRUCTIONS

ADAPTABILITY—Whenever steel framing is used (whether the roof be flat, 45° pitched, monitor, sawtooth, Pond, Aiken, etc.), the inherent value of either Sheetrock-Pyrofill or Weatherwood-Pyrofill construction may be advantageously employed.

FIREPROOF—The inherent advantages of gypsum for fireproofing are universally recognized.

LIGHT WEIGHT—The Standard 2½ in. slab weighs only 12 lbs. as against 37 lbs. for 3 in. stone concrete. This saving is reflected throughout the structure, including columns and footings.

APPEARANCE—The flat undersurface with uniform paneled effect is singularly pleasing to the eye. It also has excellent light reflection.

> **NOTE**—*If the underside of the slab is to be painted or otherwise decorated, such work should not be done until the waterproof roof covering has been applied and the slab is thoroughly dry.*

ECONOMICAL—The simplicity of the construction plus the light weight and the speed with which it is installed makes either Sheetrock-Pyrofill or Weatherwood-Pyrofill Roof Construction extremely economical.

NO MAINTENANCE—Calcined gypsum is chemically inert. Examinations of steel rods embedded for fifteen years in gypsum have shown no evidence of progressive corrosion. The maintenance cost is negligible.

HIGH INSULATION—Gypsum has the highest insulating value of any fireproof structural building material. It is effective in protecting the building from extremes of outside temperature, both in summer and in winter.

The following table gives the heat loss through various types of roof construction expressed in B.t.u.'s per hour, per sq. ft., per degree difference in temperature. All values are figured with a 5-ply roof covering:

2½ in. Sheetrock-Pyrofill	.38 B.t.u.'s
3 in. Sheetrock-Pyrofill	.35 B.t.u.'s
2½ in. Weatherwood-Pyrofill (½ in. board)	.26 B.t.u.'s
3 in. Weatherwood-Pyrofill (1 in. board)	.19 B.t.u.'s

SPECIAL ADVANTAGE OF WEATHERWOOD-PYROFILL ROOF CONSTRUCTION—Weatherwood-Pyrofill Roof Construction has the special, additional, and unique advantage of providing a high degree of acoustical absorption. This is particularly important in auditoriums, gymnasiums, and similar buildings but is also of considerable importance in many types of factories and industrial buildings.

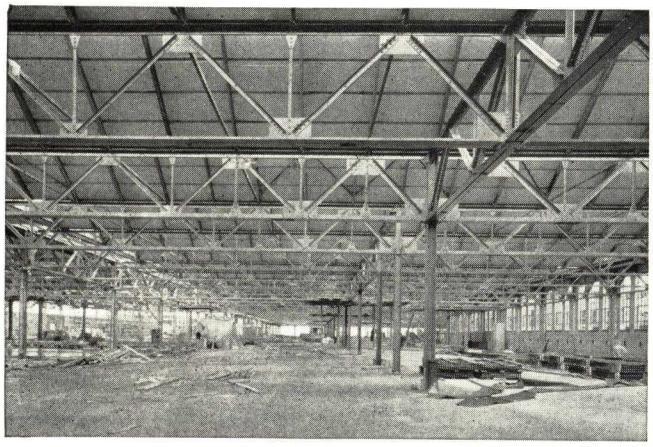
The approximate acoustical absorption provided is given in the following table:

½ in. Weatherwood	30%
1 in. Weatherwood	45%

OTHER POURED • IN • PLACE GYPSUM CONSTRUCTIONS

USG TEE SYSTEM* PYROFILL ROOF CONSTRUCTION—This construction which was formerly called "The Mark's 'T' System" is quite similar to Sheetrock-Pyrofill and Weatherwood-Pyrofill constructions. The principal difference is that standard 32 x 36 in. plaster board or Weatherwood is used with 1 x 1 x ⅛ in. tee irons laid across the main tees to support the ends of the board. The construction details are identical.

USG IMBEDDED RAIL CONSTRUCTION — This construction is also similar to Sheetrock-Pyrofill construction in that the sub-purlins and mat reinforcing are the same. The big difference is that removable wood forms are used, hung three-quarters of an inch below the bottom flange of the sub-purlins. This provides a uniform gypsum undersurface unbroken by exposed sub-purlins. This construction also permits the fireproofing of the main purlins with Pyrofill at low cost.



Sheetrock-Pyrofill Ceiling—Note Good Interior Appearance

PYROFILL MONOLITHIC CONSTRUCTION—This is the oldest type of gypsum roof and floor construction in general use and for some buildings it is still the best. In this construction, twisted wire cables are stretched over the main purlins and then deflected in the center of each span and Pyrofill (gypsum fiber concrete) is poured on removable wood forms to desired thickness. In this construction the cables (figured by suspension formula) take the entire load and the gypsum acts merely as a filler.

On a large, flat roof when no exposed steel is allowed, this construction will be found very economical and satisfactory.

*Trade-Mark

See Page 1 for New USG Complete Roof Service

United States Gypsum Company

Master Specifications

SHEETROCK • PYROFILL and WEATHERWOOD • PYROFILL ROOF CONSTRUCTIONS

NOTE—*Notes are explanatory or advisory only and should not be included in the specifications.*

(1) WORK INCLUDED

NOTE—*Here list the various roof areas to be constructed of Sheetrock-Pyrofill or Weatherwood-Pyrofill and specify the prescribed live load. If live loads vary, designate the live load applying to the various areas.*

(2) SUPPORTING STRUCTURAL STEEL WORK

All steel work for the support of the Sheetrock-Pyrofill Roof Construction has been designed not only to carry the prescribed live and dead loads, but to accommodate the most economical installation in accordance with the standard detail of the United States Gypsum Company.

(3) MATERIALS

(3a) GENERAL—All Gypsum products shall be as manufactured by the United States Gypsum Company, 300 West Adams Street, Chicago, Ill.

(3b) SUB-PURLINS—Sub-purlins shall be steel **[tees] [rails]** of sizes and spacings required or indicated on the structural plans, furnished with a shop coat of paint. Provide all necessary clips **[of types best suited to conditions]** for rigidly securing sub-purlins to main purlins, etc.

(3c) SHEETROCK FORMS—Sheetrock (⅜ in. thick x 32 in. wide) shall be mill-made to exact lengths (maximum 10 ft.) to match the main purlin centering.

(3d) WEATHERWOOD FORMS—Weatherwood **[½ in.] [1 in.]** thick x 32 in. wide shall be mill-made to exact lengths (maximum 10 ft.) to match the main purlin centering.

(3e) REINFORCEMENT—Steel reinforcement shall be galvanized electrically-welded steel fabric made to USG specifications consisting of No. 12 main longitudinal wires 4 in. on centers and No. 14 transverse wires 8 in. on centers having an effective sectional area of .026 sq. in. per foot width of slab.

(3f) PYROFILL—Pyrofill shall consist of calcined gypsum and not to exceed 12½ lb. of clean soft wood fiber to every 87½ lb. of gypsum. The gypsum and wood fiber shall be mill mixed. Water for proper consistency shall be added at the job.

(3g) PRECAST CURB TILE—Where so indicated on plans and details furnish 3-in. thick precast gypsum curb tile (reinforced when carrying a roof load or retaining drainage fill). For end wall construction where so indicated furnish Pyrobar Curb Tile (3-in. x 15-in. x 30-in. non-reinforced).

(3h) GYPSUM MORTAR—Gypsum mortar shall consist of one part of unfibered gypsum cement plaster and not to exceed two parts of clean sharp sand.

(4) ERECTION

(4a) GENERAL — All **[Sheetrock-Pyrofill] [Weatherwood-Pyrofill]** Roof Construction including all sub-purlins **[curbs] [end walls] [saddles] [drainage fill]** etc., shall be completely erected by the Engineering Sales Division of the United States Gypsum Company.

Roof construction shall be of thickness required on plans and details.

All joints in sub-purlins shall be staggered or rigidly tied together. Reinforcement shall be continuous. All roof surfaces shall be screeded smooth and true ready to receive the finished waterproof roof covering.

(4b) POURED CURBS—All curbs so indicated on plans and details shall be constructed of Sheetrock-Pyrofill.

(4c) TILE CURBS—All curbs so indicated on plans and details shall be constructed of precast gypsum curb tile (reinforced when carrying roof load or retaining drainage fill) set in gypsum mortar.

(4d) END WALLS, ETC.—Construct all **[end walls]** of **[monitors] [sawtooth skylights] ["A" frames] [specify]** of Pyrobar Curb Tile set in gypsum mortar.

(4e) DRAINAGE FILL—Provide Pyrofill saddles and drainage pitches to direct roof drainage to **[gutters] [drainage outlets].**

(5) WATERPROOF ROOF COVERING

NOTE—*Provide in the Roofing and Sheet Metal division of the specifications that the waterproof roof covering shall be applied as soon as possible after the Sheetrock-Pyrofill slab is erected (preferably within twenty days). See USG Built-up Roofing Section.*

RAIL SIZES AND WEIGHTS OF SLABS

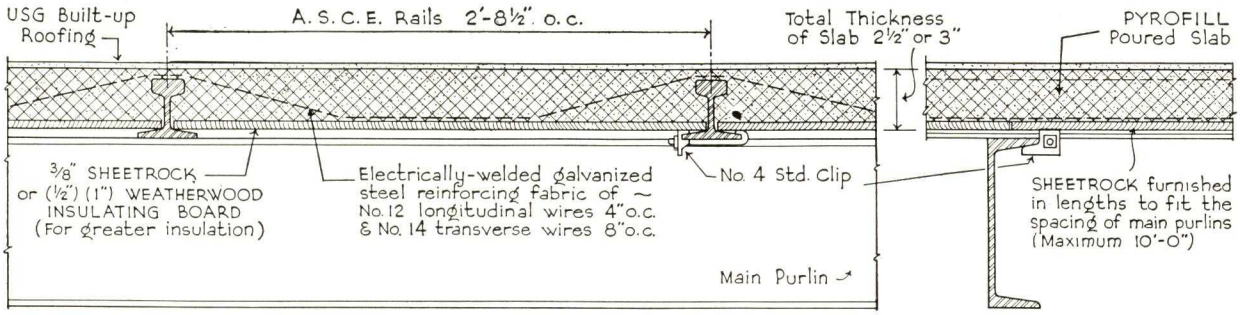
Rails Spaced 32½ In.—45 Lb. per Sq. Ft. Total Load B.M.=1/10 WL; Fiber Stress, 18,000 Lb. Per Sq. In.

Span of main purlins	Size of rail, lb.	Weight of rail per sq. ft. of roof, lb.	*Minimum thickness of slab, in.	Weight of Slab including rail, lb.
Up to 6'4"	8	1.00	2½	11.50
6'-4" to 8'-11"	12	1.50	2½	12.00
8'-11" to 11'-3"	16	2.00	2½	12.50
11'-3" to 13'-2"	20	2.50	3	15.00

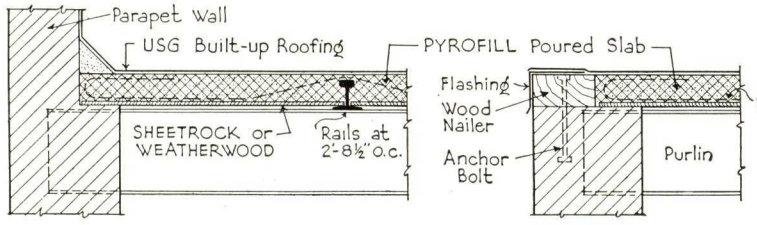
*Includes thickness of Sheetrock or Weatherwood. For other spacing of sub-purlins, or other loads, allowable span will vary inversely as the square root of the spacing or the load. Spans can be increased over those shown by considering the effect of the rail imbedment in the slab. Tests have shown that an 8-lb. rail may be used for spans up to 7 ft.

See Page 1 for New USG Complete Roof Service

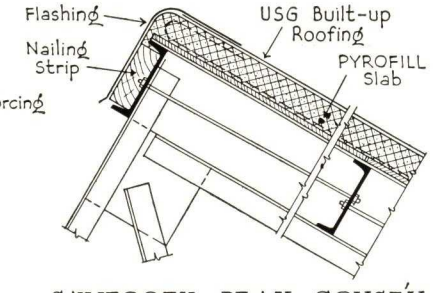
DETAILS OF SHEETROCK-PYROFILL SYSTEM



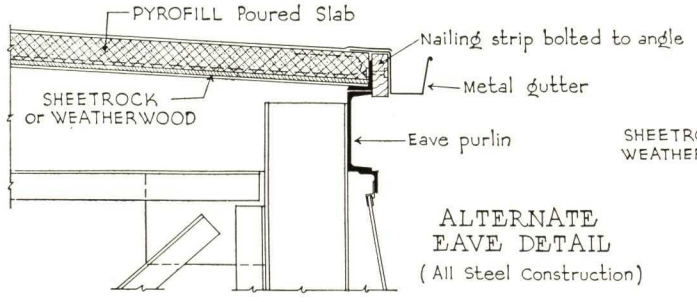
TYPICAL SHEETROCK ~ PYROFILL ROOF CONSTRUCTION



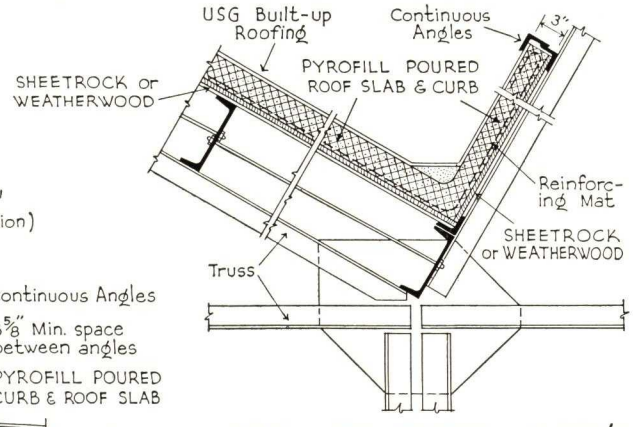
ALTERNATE DETAILS FOR ENDS OF BUILDING



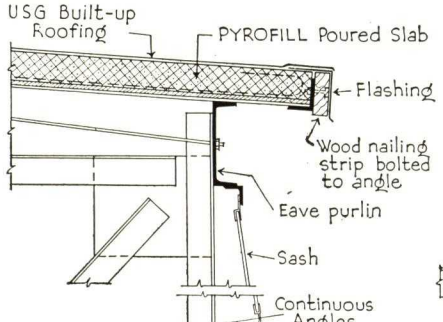
SAWTOOTH PEAK CONST'N.

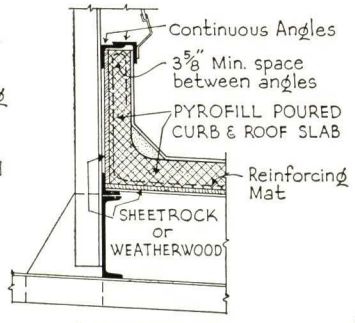


ALTERNATE EAVE DETAIL
(All Steel Construction)

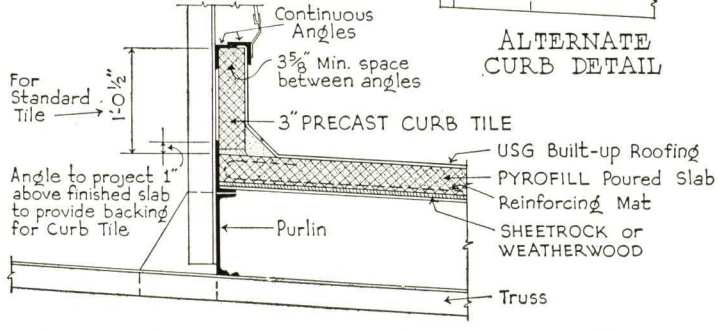


SAWTOOTH GUTTER CONST'N.

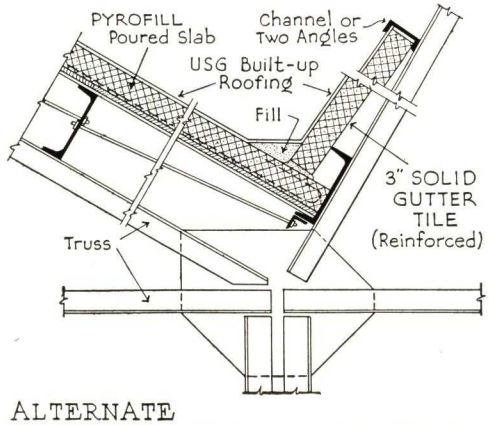




ALTERNATE CURB DETAIL



CURB & EAVE CONSTRUCTION FOR MONITOR



ALTERNATE SAWTOOTH GUTTER CONSTRUCTION

See Page 1 for New USG Complete Roof Service

United States USG Gypsum Company

PYROBAR SHORT SPAN ROOF TILE

• • •

DESCRIPTION

PYROBAR SHORT SPAN ROOF TILE—Pyrobar Short Span Roof Tile are cast in steel moulds using a dense mix of specially processed gypsum and are reinforced with electrically welded galvanized steel fabric. They are furnished in three sizes: 3 x 12 x 30 in. solid, 3 x 18 x 36 in. solid, and 4 x 12 x 30 in. hollow, all weighing 17 lbs. per square foot.

The tile are laid directly on steel supports without mortar and with sides tight together with full bearing on the sub-purlins. The grouting grooves are then filled with gypsum mortar and the roof is immediately ready for the application of the roof covering.

SPECIAL UNITED STATES GYPSUM BULB TEE SUB-PURLINS—This section has been developed primarily for use with Short Span Pyrobar Roof Tile as a more economical sub-purlin than standard tees. The wide flange provides ample bearing for the tile, and, being designed particularly for this purpose, it has considerably greater load carrying capacity than a standard tee of equal sectional area. The United States Gypsum Company is prepared to furnish the bulb tees, erected in place in connection with its installation of Short Span Pyrobar Roof Tile, or in connection with the installation of Pyrobar by others, bulb tees can be furnished fabricated ready for erection.

GUTTER AND CURB TILE • DRAINAGE FILL—

Gutter Tile—Curbs under sawtooth sash, etc. restraining drainage fill or subjected to roof loads, are constructed of 3-in. solid reinforced Pyrobar Gutter Tile, 12 in. wide and made in lengths to fit the structural steel work.

Curb Tile—Curbs, above and below monitor and sawtooth sash, end walls, etc., which do not sustain a roof load or restrain drainage fill are constructed of 3-in. solid non-reinforced Pyrobar Curb Tile, 15 x 30 in.

Drainage Fill—The use of Pyrofill for drainage fill is ideal due to its light weight and quick settling qualities. Where deep fill is required, a Pyrobar tile or cinder fill with a Pyrofill topping is used. The Pyrofill provides a smooth surface for the roof covering and is an excellent material for constructing fillets and leveling off uneven and broken surfaces in connection with difficult roof framing.

OUTSTANDING ADVANTAGES

ADAPTABILITY—Pyrobar Short Span Roof Tile supported on tee sub-purlins is by far the most flexible precast roof construction. It is easily cut and fitted at hips, valleys, dormers, and openings which is very important for many roofs. It can be used with economy on any type of factory or industrial building, power plant, school, etc. The solid tile is a nailing base.

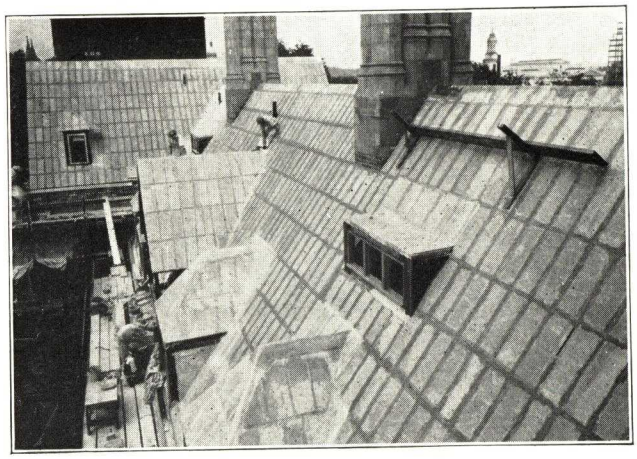
FIREPROOF—Gypsum is absolutely incombustible and the inherent advantages of gypsum for fireproofing are universally recognized. For proof of the fireproof qualities of gypsum, see page 2.

LIGHT WEIGHT—The weight of the tile plus the USG Bulb Tee is only about 18 lbs. per square foot (less than half the weight of 3 inches of stone concrete).

APPEARANCE—The interior appearance of the tile is neat and the undersurface is an excellent light reflector.

ECONOMICAL—Pyrobar Roof Tile are low in cost and permanent. The large light weight units are easily and speedily erected in any weather in which it is possible to work.

The Pyrobar tile are laid directly on the supporting steel work and require only the grouting of joints to make the roof ready for the waterproof covering. Waterproofing follows immediately, protecting the interior, and thus making possible early occupancy.



Bingham Hall, Yale University, New Haven, Conn.
W. B. Chambers, Architect
11,755 sq. ft. Short Span Pyrobar

NO MAINTENANCE—Gypsum Tile is chemically inert. Examinations of steel rods embedded for fifteen years in gypsum have shown no evidence of progressive corrosion. The maintenance cost is practically nothing.

HIGH HEAT INSULATION—Gypsum has the highest insulating value of any fireproof structural building material. It is effective in protecting the building from extremes of outside temperature, both in summer and winter.

See Page 1 for New USG Complete Roof Service

HEAT TRANSMISSION VALUES—In the following the transmission is expressed in B.t.u.'s per hour, per square foot, per degree difference in temperature. All roof decks are figured with 5-ply roof covering.

3 in. Solid Pyrobar Roof Tile..... .43 B.t.u.'s
4 in. Hollow Pyrobar Roof Tile.... .35 B.t.u.'s

NAILING BASE—The 3 in. solid is recommended particularly for nailing purposes. Their greater density and thickness provide great nail holding power.

Application of ordinary slate or ornamental tile to roofs up to 60° slope should be made with cut nails having not less than 2 in. penetration. When the slope of the roof is greater than 60° or extra heavy slate or tile is to be used, refer the problem to the Company's Engineers for special study and recommendations.

The roof deck should be reasonably dry. Square cut cement coated Naval bronze nails have proven their superiority after a large number of tests.

Application of sheet metal (tin or copper) requires thoroughly rigid fastening, due to the strain put upon the cleat nails by the expansion and contraction of the sheets. There should be sufficient cleats to securely anchor the sheets to the roof construction. Standard practice indicates that the spacing of cleats should be approximately 8 in. on centers, each secured with two nails having not less than 2 in. penetration.

It is standard practice to use a sheet of roofing felt between the gypsum roof deck and the ornamental covering, whether of slate, tile, or metal.

Master Specifications

PYROBAR SHORT SPAN ROOF TILE

(1) WORK INCLUDED

NOTE—*Here list the various roof areas to be constructed of Pyrobar Precast Roof Tile and specify the prescribed live load. If more than one type of tile is used, list separately the areas constructed of each.*

(2) MATERIALS

(2a) SHORT SPAN TILE—Where so designated, the roof slab shall be constructed of Pyrobar Short Span Roof Tile **[3 x 12 x 30 in. Solid] [3 x 18 x 36 in. Solid] [4 x 12 x 30 in. Hollow]** accurately laid, without mortar, upon the supporting steel with full bearing and with tile units laid tight. All joints on top surface shall be filled with gypsum mortar and the roof left smooth and true, ready for the application of the waterproof roof covering.

(2b) SPECIAL UNITED STATES GYPSUM BULB TEE SUB-PURLINS—All sub-purlins shall be special United States Gypsum Bulb Tees.

(2c) CURB TILE, END WALLS, ETC.—Where so indicated on the plans, curbs and end walls shall be constructed with 3 in. Solid Pyrobar Curb Tile set in gypsum mortar.

(2d) GYPSUM MORTAR—Gypsum mortar shall consist of one part of unfibered gypsum cement plaster and not to exceed two parts of clean, sharp sand. Mix to the proper consistency in a clean mortar box with clean water.

(2e) SADDLES AND DRAINAGE FILL—Saddles and Drainage Fill shall be constructed of Pyrofill (Gypsum Fiber Concrete) consisting of calcined gypsum and not to exceed 12½ lbs. of clean soft wood fiber to 87½ lbs. of gypsum and sufficient clean water for proper consistency.

(3) ERECTION

(3a) BY UNITED STATES GYPSUM COMPANY—All Pyrobar Precast Roof Tile Construction shall be completely erected by the Engineering Sales Division of the United States Gypsum Company or one of its authorized erectors.

(4) WATERPROOF ROOF COVERING

NOTE—*Provide in the Roofing and Sheet Metal division of the specifications that the waterproof roof covering shall be applied as soon as possible after the gypsum roof slab is erected (preferably within twenty days).*

NOTE—*For application of ornamental roofing, such as slate, tile, and metal, see recommendations given above under "Nailing Base".*

SUB-PURLIN SIZES FOR PURLIN SPANS UP TO 8 FT. 5 IN.

Used with Short Span Tile, Solid and Hollow—18,000-lb. Stress

Spaced 30¾ In. on Centers—50 Lb. per Sq. Ft. Total Load—BM=1/10 WL

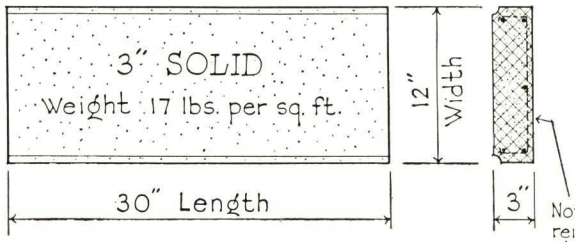
Span	6' 1"	6' 11"	7' 9"	8' 5"
Size of tee	2¼ x 2¼—4.1 lb.	2¼ x 2¼—4.9 lb.	2½ x 2½—5.5 lb.	2½ x 2½—6.4 lb.

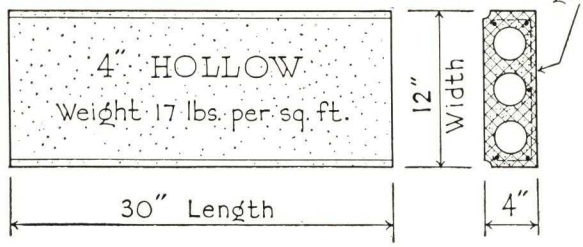
USG Bulb Tee—2.7 lb.—1.05 lb. Steel per sq. ft. of roof—Span to 7'-2" (6'-7" for 36¾" O.C.)

For other spacing of sub-purlins, or other loads, allowable span will vary inversely as the square root of the spacing or the load.

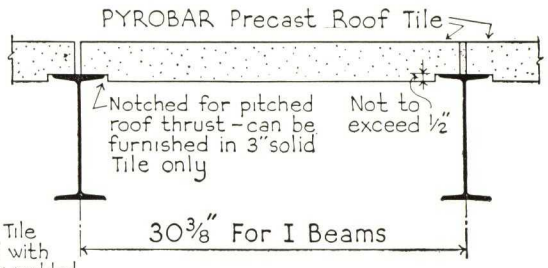
See Page 1 for New USG Complete Roof Service

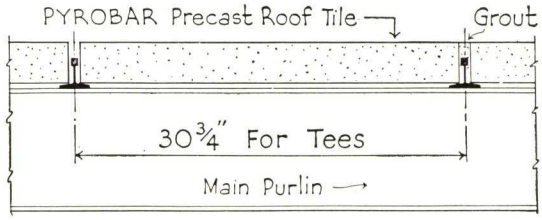
DETAILS OF PYROBAR SHORT SPAN ROOF TILE





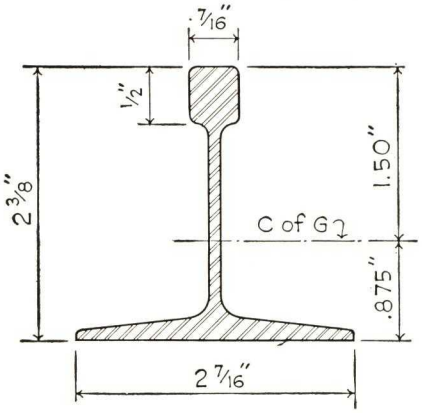
Note All Tile reinforced with electrically-welded galvanized steel mat





U. S. G. BULB TEE SUB-PURLIN

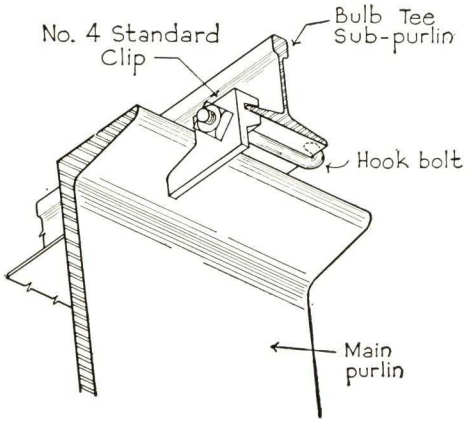
For Short Span Roof Tile



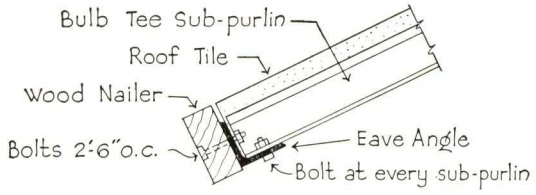
Weight Per Yard	8.10 lbs.
Section Modulus	.440 in.³
Moment of Inertia	.660

Based on 2'-6¾" spacing of Tees
Total Roof Load of 50 lbs. per sq. ft.

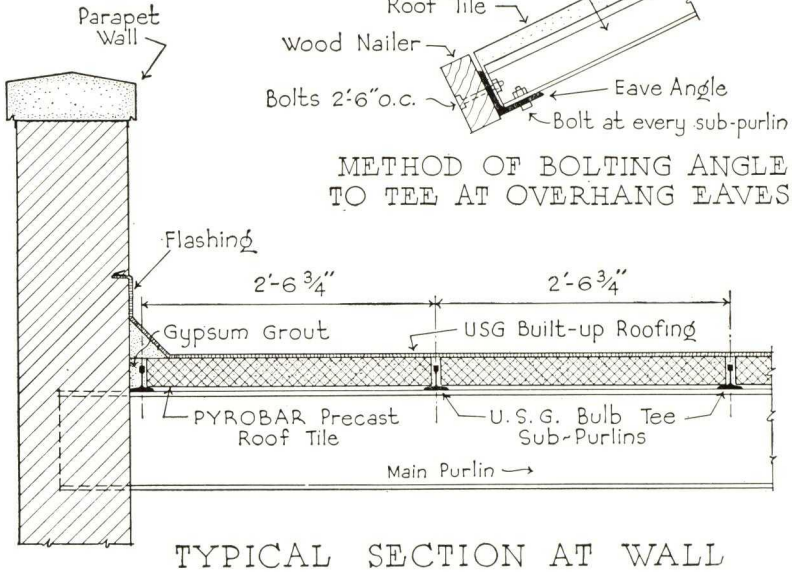
Maximum Span (fs = 16000, $M = \frac{WL}{10}$)	6'-9"
Deflection	.25
Maximum Span (fs = 18000, $M = \frac{WL}{10}$)	7'-2"
Deflection	.31



METHOD OF CLIPPING SUB-PURLINS TO MAIN PURLINS ~ SLOPED ROOF



METHOD OF BOLTING ANGLE TO TEE AT OVERHANG EAVES



TYPICAL SECTION AT WALL

See Page 1 for New USG **Complete** Roof Service

PYROBAR LONG SPAN HOLLOW ROOF TILE

• • •

DESCRIPTION

GENERAL—Pyrobar Long Span Hollow Precast Roof Tile are cast in steel moulds using specially processed gypsum and are reinforced with electrically welded galvanized steel fabric. They are made 5¼ in. thick, 18 in. wide, and any length from 4 to 6½ feet to fit the purlin spacing on the job. They are made in either butt end or lap joint end for I-beam or channel purlins respectively, and can be furnished notched if required for roof thrust. The weight of this tile is 23 pounds per square foot.

Curb and Gutter Tile and Drainage Fill are the same as described on page 7.

OUTSTANDING ADVANTAGES—

(1) Fireproof—See page 2.

(2) Light Weight—See page 3.

(3) Appearance—The flat, even surface is extremely pleasing in appearance and provides a high light reflection coefficient.

ECONOMICAL—Pyrobar Roof Tile are low in cost and permanent. The large light-weight units are easily and speedily erected in any weather in which it is possible to work. The tile are laid directly on the supporting steel work and require only the grouting of joints to make the roof ready for the waterproof covering. This can follow immediately, materially shortening the construction period and making possible earlier occupancy. Maintenance cost is practically nothing.

HEAT INSULATION—Gypsum has the highest insulating value of any fireproof structural material. It is equally effective in protecting the building from extremes of outside temperature, both in summer and in winter. Pyrobar Long Span Hollow Roof Tile has the very low transmission of .29 B.t.u.'s. For complete list, see page 3.

ADAPTABILITY—Long Span Hollow Pyrobar Roof Tile are primarily designed to provide a flat uniform ceiling with maximum light reflection and insulation. They are manufactured in lengths 4 ft. to 6 ft. 6 in. to suit the steel framing, and 5¼ in. deep. The tile can be notched to fit over the purlin flanges if desired and can be furnished either with or without lap joint, depending on the bearing afforded. Lap joint tile should be used whenever channel purlins are provided. Long Span Tile are not recommended for roofs with difficult framing requiring considerable cutting nor where a nailing deck is required.

PURLIN REQUIREMENTS—The tile are made to span from purlin to purlin (either steel or wood). No tees or other type of sub-purlins are required. The most economical purlin spacing is approximately 6 feet.

INSTALLATION—The tile are laid directly on the steel purlins or wood framing with sides tight together. The grouting joints on the top surface are then filled with gypsum mortar and the roof is immediately ready for the application of the roof covering.

SPECIFICATIONS—The specifications for Pyrobar Short Span Roof Tile given on page 8 may be used by substituting "Long Span Hollow" for "Short Span."

METAL BOUND GYPSUM FLOOR and ROOF TILE

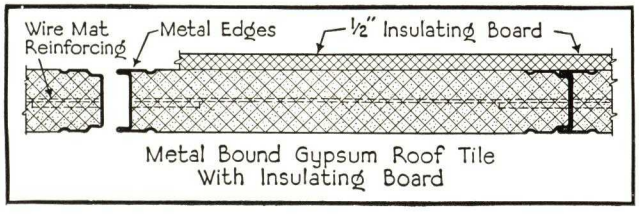
• • •

DESCRIPTION

GENERAL—This is a 2-inch thick reinforced and metal bound gypsum tile. Tongue and groove metal edging enables the tile to cantilever so that ends of tile need not come directly over supports. The metal edging is anchored to the body of the tile by means of metal ties. The USG metal edge, as shown in the illustration, is designed to provide maximum efficiency by reason of the distribution of metal with relation to the neutral axis. Units are 2 in. by 15 in. by 10 ft.

PERMISSIBLE SPANS—This tile is adapted to floor spans up to 4 ft. between beams and to roof purlin spacings up to 7 ft.

ADVANTAGES—The construction is light weight (12 lbs. per square foot). No special sizes are required since the end joints need not fall over supports.



Metal Bound Gypsum Roof Tile With Insulating Board

INSULATION—Since the metal edge extends through the tile tending to conduct heat, we recommend that ½ in. insulation board be used over the tile for roof construction.

See Page 1 for New USG **Complete** Roof Service

PYROBAR PRECAST 2½ INCH THICK TONGUE and GROOVE FLOOR and ROOF TILE

• • •

DESCRIPTION

PURPOSE—To provide a precast, light weight, incombustible construction for floors or roofs in connection with Junior Beams, Bar Joists, and other Metal Joists.

GENERAL—2½-in. Tongue and Groove Tile are factory made in units 2½ in. x 10 in. x 6 ft. 0 in. with tongue and groove joints. They are made without any metal edge or any other exposed steel, being reinforced by an electrically welded mat embedded in the gypsum mass where it is protected from corrosion and other damage. This tile weighs 14 lbs. per square foot.

LOADING—For floor construction with supports spaced not over 30 in. O.C., 2½ Inch Tongue and Groove Tile will safely support a load of 150 lbs. per square foot. For roof construction with supports spaced not over 4 ft. 0 in. OC., 2½ Inch Tongue and Groove Tile will safely support a load of 50 lbs. per square foot.

ADVANTAGES—Light weight (14 lbs. per square foot), easy and speedy erection, embedded reinforcing, low heat conductivity without additional insulation, standard size (no special sizes), and all the advantages of precast units over poured in place construction from the standpoint of cleanliness and independence from freezing weather conditions.

This is our recommended type of Tongue and Groove Tile construction.

PYROBAR PRECAST CEILING TILE

• • •

DESCRIPTION

PURPOSE—To provide fire protection and a plaster base under any type of steel floor or roof construction.

GENERAL—Precast reinforced gypsum tile, 2 x 18 x 36 in. with fractional sizes as required for starting tile, closures, etc. All four edges have lapped joints. A 3/16-in. galvanized rod is embedded in each tile so that they may readily be attached to a supporting system of hot rolled plasterer's channels. The tile may be attached directly to the steel or suspended from it. Girders may be fireproofed with Pyrobar beam and girder fireproofing.

ADVANTAGES—Especially indicated for the protection of light steel floor systems, they provide full fire protection and an economical plaster base in one material. Space for pipes and conduits is provided without resorting to heavy floor fills.

HYDROCAL* MASTIC FLOOR FINISH

• • •

DESCRIPTION

GENERAL—Hydrocal (Patented), a new specially processed gypsum cement of great strength, is utilized in place of Portland cement in this many purpose mastic floor mixture. Hydrocal is mixed with sand and emulsified asphalt in various proportions, depending upon the nature of the work to be done. For heavy traffic, crushed stone or gravel is added to the aggregate.

The mastic composition is poured like concrete and leveled off and finished in thicknesses from ½ in. to ¾ in. over the base. It may be used over gypsum, concrete, wood, or metal floor constructions.

ADVANTAGES — Hydrocal requires less emulsified asphalt than does Portland cement in mixtures of this character, resulting in a lower cost.

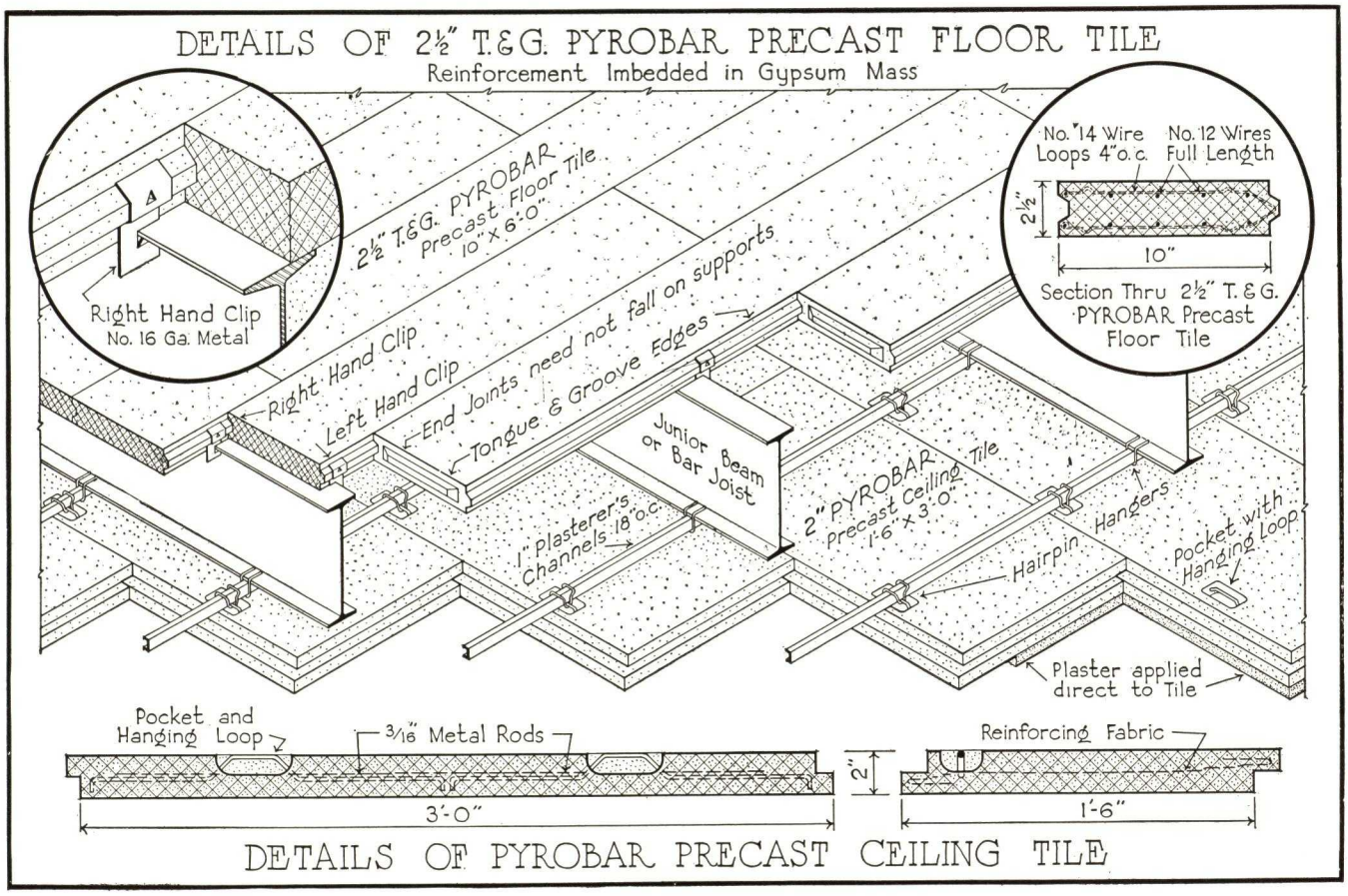
It is quick setting and durable, providing a surface resistant to dusting, cracking, and wear, even under factory trucking. It may be used as a low cost leveling mixture for underlayment, under composition, carpets, etc. It is not recommended under extreme acid, oil, or moisture conditions.

The materials may be purchased or the floor finish will be installed complete by the company.

*Registered Trade-Mark

See Page 1 for New USG Complete Roof Service

DETAILS of PYROBAR PRECAST 2½ INCH T and G FLOOR and ROOF TILE and PYROBAR PRECAST CEILING TILE



See Page 1 for New USG **Complete** Roof Service

United States Gypsum Company

RED TOP* RIB FLOORS

• • •

DESCRIPTION

GENERAL—Electrically welded bar trusses (see below), prefireproofed with gypsum at the producing mills are laid directly on the top flanges of the supporting steel, to which they are field welded.

Sheetrock is then laid on the shoulders of the Red Top Ribs and a Sheetrock Pyrofill slab poured in place. The ribs are generally placed 25 in. on center for floors and 33 in. on center for roofs. For floor loads exceeding 150 lbs., the spacing is proportionately reduced.

ADVANTAGES—It will be noted that each rib forms the stem of a Tee Beam in which the Sheetrock Pyrofill slab is the cross member. The loads are based on the strength of the steel truss members alone so that the Tee construction represents additional strength and stiffness, not considered in the calculations.

It also serves to prevent any lateral sway or tendency of the rib to rotate. The enclosing gypsum makes the slab a rigid whole, effectively tying the entire structure together.

FIREPROOF—This construction is generally acceptable any place where concrete is accepted in building codes and insurance classifications.

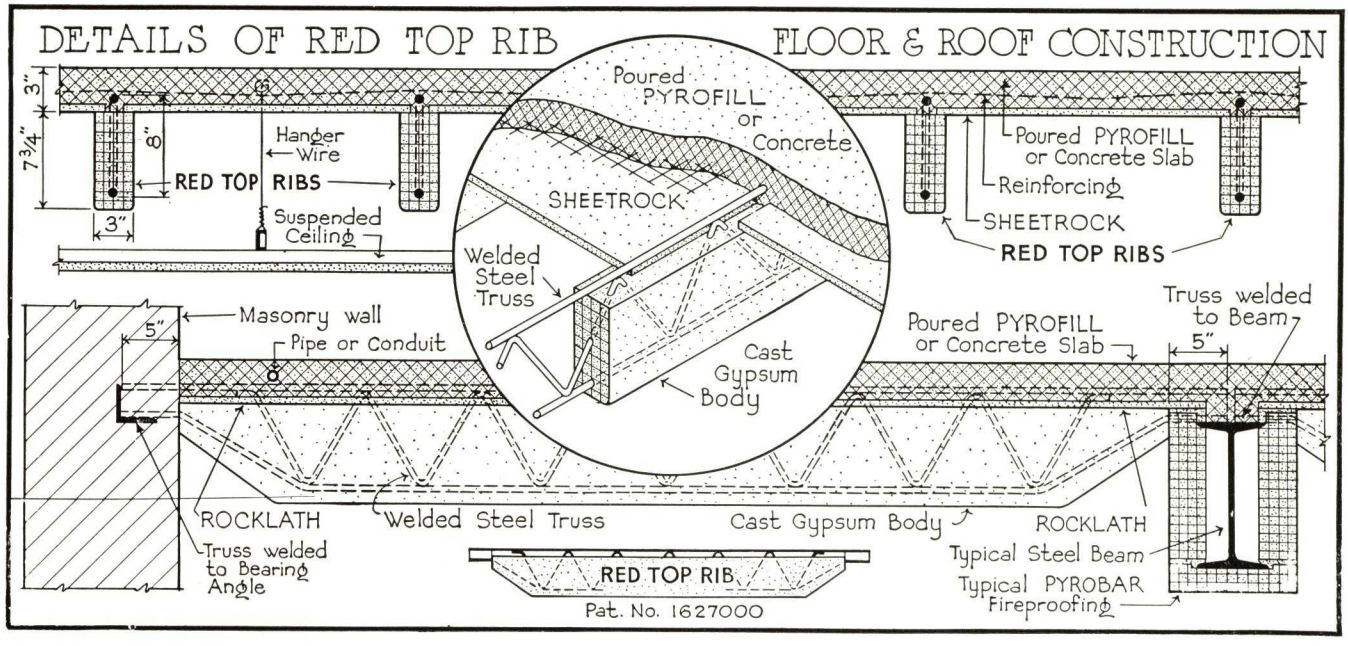
It is unnecessary to use concrete for fireproofing as both the supporting steel beams and girders may be fireproofed with Pyrobar beam fireproofing after the slab is poured, as may the columns, saving additional weight and steel costs.

ECONOMIES—The elimination of all temporary centering, the fireproofing of the ribs, and the construction largely factory built, makes for speedy erection and immediate use of the slabs.

The light weight (less than 20 lbs. per square foot) provides economies in supporting steel from roof to foundation that will generally make this floor construction more economical for any type of fireproof steel building. In tall buildings, useful reductions in footing sizes and costs are possible.

CEILINGS—Where a beam ceiling is desirable, the cast rib and Sheetrock panels are attractive in appearance. Metal lath and plaster ceilings may be attached or suspended in the usual way, in which event the space between the ceiling and the Sheetrock Pyrofill slab may be used for conduits. It is also perfectly possible to embed conduits in the slab itself as they may be readily laid over the ribs and Sheetrock before the Pyrofill is poured, making cinder-fill unnecessary, reducing the total height of the building and making substantial savings in the dead load carried by the supporting steel.

Where this construction has been used, surprising savings in supporting steel and actual slab costs were secured over other structural designs of equal merit in fire protection and strength.



*Trade-Mark

See Page 1 for New USG **Complete** Roof Service

USG STEEL ROOF DECK

• • •

DESCRIPTION

GENERAL—

Deck Plates—USG deck plates are rolled from copper-bearing steel. Mill painted in gray. Other materials on special order. USG Deck Plates are 18 in. wide with 1½ in. deep reinforcing ribs, 6 in. on centers. Stiffening beads are formed midway between the ribs. Deck plates are interlocking and end-lapping type, clipped together when erected, forming an integral surface for the application of insulation and roofing materials.

Clips—Two standard types. One for fastening the deck plates to the purlins and the other for locking the plates together between the purlins.

ADAPTABILITY—USG Steel Roof Decks are adaptable for all steel frame structures, fitting any purlin spacing.

ADVANTAGES—

Long Life—The use of copper-bearing steel and insulation assures long life and low maintenance.

Economy—Cost is low for an incombustible roof deck.

(1) Structural Steel Savings result from light weight of roof unit.

(2) Fuel Costs are reduced through the use of insulation.

(3) Erection is rapid, due to simplicity of design and method of clipping. Saddles are made from deck plates and are easily placed. These features speed completion of the building and effect economies in construction.

Results — Clean, sanitary and pleasing interior. Heat insulation value depends on the thickness and efficiency of the roof insulation board used.

ENGINEERING DATA—The allowable safe loads given in the table below are based on actual tests on bare plates. Application of insulation gives additional rigidity to the deck.

ALLOWABLE SAFE LIVE LOADS—POUNDS PER SQ. FT.

U.S.S. Ga.	Clear Span									
	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
22	83	66	53	44	37					
20			81	67	56	48	41			
18					71	60	52	45	39	35

Factor of safety for 22 and 20 Gauge—4.
Factor of safety for 18 Gauge—3.5.

Weight of 20 gauge deck is 2.4 lbs. per sq. ft.; 18 gauge weighs 3.2 lbs. Total dead load, including insulation and roofing material, is approximately 5 lbs. per sq. ft.

INSULATION—The accompanying table gives the heat transmission expressed in B.t.u. per hour per sq. ft. per degree difference in temperature. Five-ply roofing is included.

Deck without insulation ..... .95 B.t.u.'s
Deck with ½-in. insulation..... .39 B.t.u.'s
Deck with 1 -in. insulation..... .25 B.t.u.'s
Deck with 1½-in. insulation..... .18 B.t.u.'s

Master Specifications

USG STEEL ROOF DECK

(1) WORK INCLUDED

NOTE—*Here list the various roof areas to be constructed of USG Steel Roof Deck.*

(2) MATERIALS

The steel deck shall be manufactured by the United States Gypsum Company from copper-bearing steel and painted light gray after fabrication.

Deck plates shall have reinforcing ribs not more than 6 in. O.C., 1½ in. deep, ½ in. wide at base. Plates shall have stiffening beads formed into the plates midway between the reinforcing ribs. Deck plates shall be U.S.S. No. **[specify]** gauge.

Clips shall be furnished for securely fastening the deck plates to the purlins, and for interlocking adjoining deck plates together at the ends and midway between the purlins.

(3) ERECTION

Erection shall be done by an experienced erector, subject to the architect's approval.

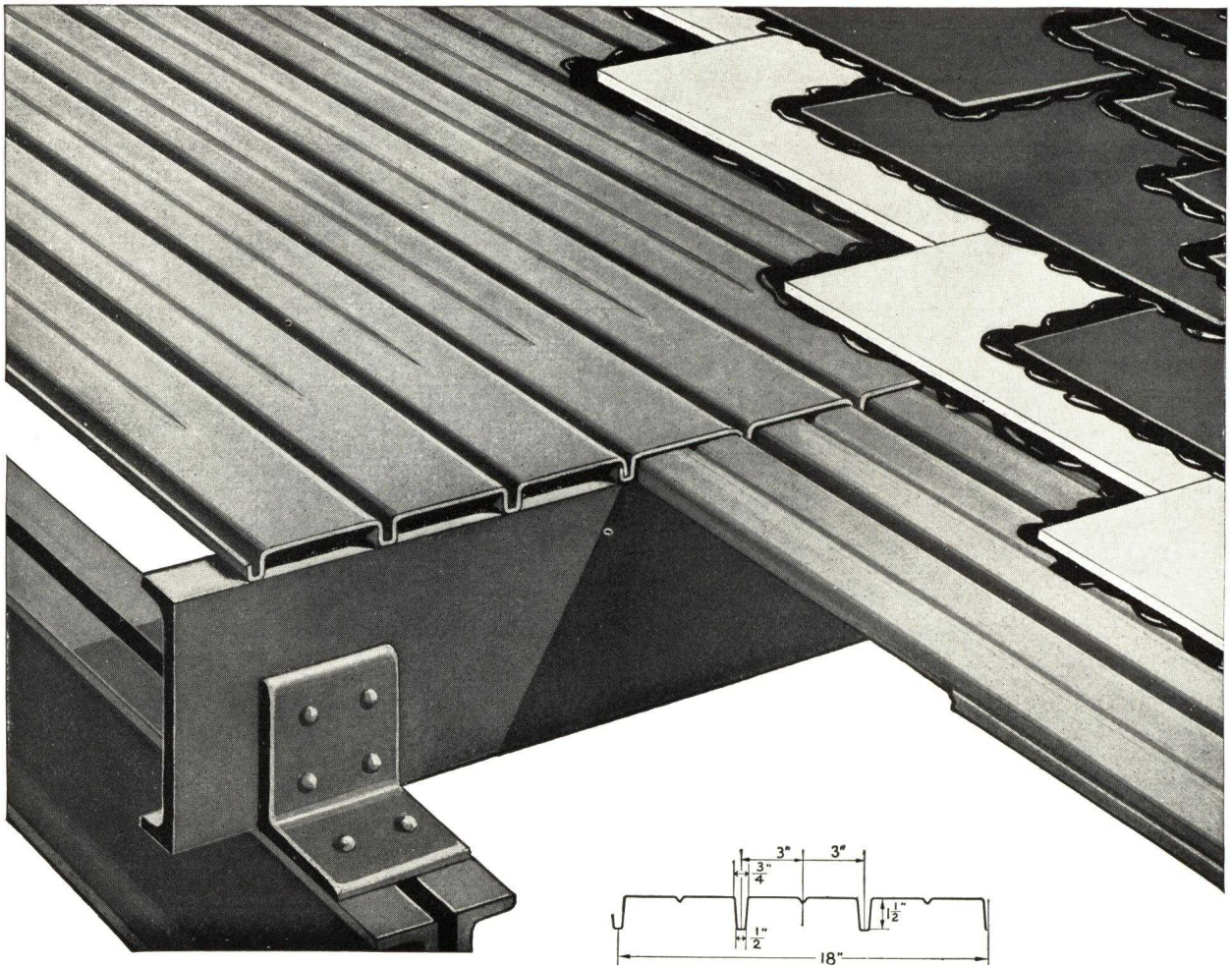
All end laps shall be not less than 2 in. in length and shall be made directly over the purlins.

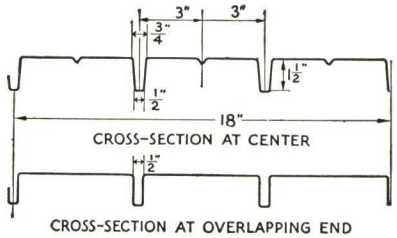
Each plate shall be securely fastened to the purlin by **[steel clips engaging the deck rib] [welding].**

Each plate shall be securely fastened to the adjoining plate by at least three intermediate clips.

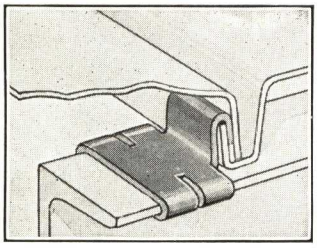
See Page 1 for New USG Complete Roof Service

DETAILS of USG STEEL ROOF DECK

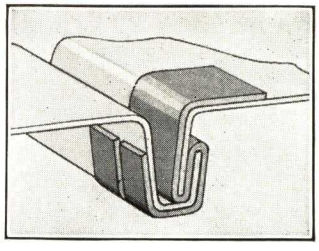




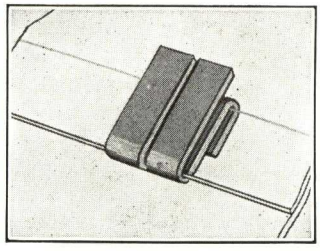
CROSS-SECTION AT OVERLAPPING END



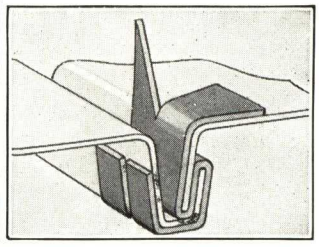
RD-1 PURLIN CLIP for securing deck plates to purlins. Made in two types. On I-Beam purlins, use type "B" clips. On channel purlins and bar joists, use type "C" clips. Made from No. 16 ga. electro galvanized steel.



RD-2 INTERMEDIATE CLIP for interlocking deck plates on flat roofs. Clips are installed at each purlin support and between them on wide spans, and bent to fit as shown above. Made from No. 20 ga. electro galvanized steel.



RD-3 END CLIP. Used on USG Steel Roof Deck plate ends to prevent any possible slippage when installed on pitched roofs. Sufficiently long to permit full two-inch end lap. Made from No. 20 ga. electro galvanized steel.



RD-4 INTERMEDIATE CLIP for use on steep, pitched steel deck roofs. The prong provides a method for securely attaching the insulation. Except for this feature, the clip is identical with RD-2, and is similarly used.

See Page 1 for New USG **Complete** Roof Service

PYROBAR PARTITION and FURRING TILE, COLUMN, BEAM and GIRDER FIREPROOFING

• • •

DESCRIPTION

GENERAL—Pyrobar Gypsum Tile consist of 97% gypsum and 3% special wood fiber. They are moulded in steel moulds by continuous automatic machine process, which insures accurate proportions and an even distribution of gypsum, fiber and water, resulting in tile of uniform size, weight, strength and density.

PARTITION AND FURRING TILE—A Pyrobar tile is 30 in. long, 12 in. high and of various thicknesses from 1½ to 6 in. For complete sizes and weights, see table on page 17.

Smooth face tile are made for warehouse and similar use where the furring and partitions are to remain unplastered.

Pyrobar tile meets fully the standard specifications for Gypsum Partition tile or block of the American Society for Testing Materials.

All Pyrobar Gypsum Tile are trade-marked for the protection of owners, architects, engineers and contractors.

COLUMN COVERING—Column fireproofing is accomplished either with 2 in. solid or 3 in. hollow Pyrobar Partition Tile. When desired, or required by a building code, the space between the covering and the steel may be solidly backfilled with clean masonry rubbish and gypsum mortar.

BEAM AND GIRDER FIREPROOFING—Beam and Girder Fireproofing employs shoe tile, angle tile, soffit tile, and standard Pyrobar partition tile. (See page 18.)

Pyrobar Shoe Tile, which fit over the lower flanges of the steel, in combination with Pyrobar Partition Tile for side protection are used as beam fireproofing for sections with a flange width not over 9 in. They are moulded in a double unit, 18 in. long, sufficient for 18 in. of beam. They are light in weight, easily split, and placed with a minimum quantity of mortar and labor. The double unit reduces breakage during shipment and handling.

For rolled sections and built-up members with flange widths of 3 in. to 17 in. Pyrobar soffit tile may be used in combination with Pyrobar partition tile for a side covering. The soffit tile are channel shaped to protect the bottom and also the edges of the lower flange. They are specially moulded at the mill in 13 standard widths and in standard 36 in. lengths. For jobs of appreciable size, special soffit tile of the same type will be manufactured to fit any built-up member.

These constructions provide a full two inches of protection to all parts of the steel, and fulfill the requirements of the National Board of Fire Underwriters.

SET FAST* CEMENT—This is a specially prepared gypsum cement used with water and sand as a mortar for setting gypsum partition tile, and gypsum fireproofing and column covering. It is also extensively used as a mortar for interior clay tile partitions and fireproofing. Its easy working qualities together with the early strength of the gypsum makes Set Fast Cement Mortar ideal for economical rigid mortar joints in all interior tile work.

APPROVED USES—In the following classes of fireproof construction, Pyrobar Precast Gypsum Tile are approved by the Underwriters' Laboratories, Inc., and most city building codes.

Non-bearing corridor walls, partitions, wall furring and false columns and pilasters. Partitions and corridors in merchandise storage warehouses.

Fire division walls.

Elevator, stairway, dumbwaiter and corridor enclosures.

Light wells, pipe chases, heat and vent ducts.

As covering for columns, beams, girders, trusses and other steel members requiring fireproofing.

Floor fill, instead of cinder concrete fill.

Fireproof insulation on concrete roofs.

RECOMMENDED THICKNESS—PARTITION AND FURRING TILE—Pyrobar Gypsum Tile for furring and partitions are made in standard face dimensions (12 x 30 in.) in both solid and hollow types, and various thicknesses to meet Underwriters' standards and the building codes of the various cities. For table of sizes and weights, see page 17.

The thickness of the partition should be determined primarily by the location and the ceiling height. As a rule 3 or 4-in. tile is the thickness used for the average building where partitions do not exceed 15 ft. in height. Corridor partitions are generally thicker than transverse partitions.

Two-inch solid Pyrobar Tile may be used for partitions not exceeding 10 ft. in height and for covering columns, constructing pipe chases, vent ducts, dumbwaiter shafts, etc.

Split and hollow Pyrobar Furring are laid up against exterior walls and securely spiked every square yard. Joints should be broken the same as for

*Trade-Mark

See Page 1 for New USG Complete Roof Service

partition work. Furring may also be fastened to the building wall by means of wall ties built into the masonry. The hollow portion of the tile should be placed against the walls, thus minimizing the contact area with the outside walls.

Where furring stands free from the wall, allowing space for pipes, vents, etc., it is customary to use 2-in. solid or 3 or 4-in. hollow Pyrobar Tile to assure necessary rigidity.

Free standing furring should be anchored to the exterior wall either by dwarf walls between the furring and exterior wall, or by building into the exterior wall corrugated metal wall ties of sufficient length to span the space and be embedded in the furring tile joints.

ADVANTAGES

NOTE—*See also "Why Gypsum - General Technical Data," pages 2 and 3 for comprehensive information on gypsum and its advantages.*

FIREPROOF—Gypsum Tile have successfully passed the Underwriters' requirements for fireproof partitions.

LIGHT WEIGHT—See page 3.

IDEAL PLASTER BASE—See page 3.

EASILY AND CHEAPLY ERECTED—The large, uniform units are much easier and therefore cheaper to erect than other masonry partition units.

PLASTER SAVINGS—Pyrobar Tile are cast in steel moulds assuring a product with straight edges and true faces. This insures a perfectly even, true wall which takes a minimum amount of plaster.

Experience shows that plastering over Pyrobar Tile requires only 80% as much plaster as over clay tile.

ECONOMICAL—Breakage is almost negligible. Cutting around openings and pipes does not cause waste as all the pieces can be used, whereas with clay tile a full tile is usually wasted in cutting even a small piece.

Ordinarily from 5 to 7% less Pyrobar Tile is required for a job than clay tile.

ALTERATIONS—Alterations in the partitions after completion of the building are easily made. Additional openings in Pyrobar walls may be cut with a saw, thus saving replastering, patching debris, and time.

GROUNDS—Grounds for plastering are nailed directly to the tile. Nailing blocks may be spiked to the tile ends for the support of wood trim, blackboards, etc. Heavy fixtures may be supported by bolting through the walls using large metal washers on the bolts.

SPECIAL SHAPES—Pyrobar Tile are made in special shapes and sizes to fit all conditions.

WEIGHT OF FIREPROOFING PER LIN. FT. OF BEAM IN LB.

Size member	Precast Gypsum	Clay Tile	Concrete
6 in. I	19	33	60
7 in. I	21	36	71
8 in. I	23	39	93
9 in. I	25	43	95
10 in. I	27	47	118
12 in. I	30	51	131
15 in. I	35	60	168
18 in. I	42	68	208
20 in. I	44	73	234
21 in. I	48	79	293
24 in. I	52	85	297

SIZES AND WEIGHTS OF PYROBAR PARTITION AND FURRING TILE

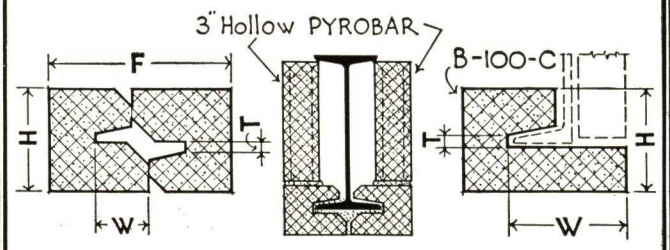
Size of Pyrobar, Gypsum Tile, In.	Recommended heights for each size	Weight tile per sq. ft., lb.	Weight mortar per sq. ft., lb.	Weight plaster, one side, per sq. ft., lb. ½ in. grounds	Total weight plastered, one side, per sq. ft., lb.	Weight plaster two sides per sq. ft., lb.	Total weight plastered, two sides, per sq. ft., lb.	Approx. mortar requirements per 1000 sq. ft.	
								Pounds Set Fast Cement	Cubic yards sand
1½-in. Split...1½ x 12 x 30	Furring†	4.9	1.4	3	7.9			500	0.625
2-in. Split.....2 x 12 x 30	Furring†	6.4	1.4	3	9.4			600	0.75
2-in. Solid.....2 x 12 x 30	10 feet*	9.4	1.5	3	12.4	6	15.4	600	0.75
3-in. Hollow.....3 x 12 x 30	13 feet*	9.9	2.0	3	12.9	6	15.9	800	1.00
3-in. Solid.....3 x 12 x 30	15 feet†	13.0	2.0	3	16.0	6	19.0	800	1.00
4-in. Hollow.....4 x 12 x 30	17 feet*	13.0	2.5	3	16.0	6	19.0	900	1.125
5-in. Hollow.....5 x 12 x 30	20 feet*	15.6	2.75	3	18.6	6	21.6	1000	1.25
6-in. Hollow.....6 x 12 x 30	30 feet*	16.6	3.0	3	19.6	6	22.6	1100	1.40

*Underwriters' Laboratories recommendations. †No Underwriters' recommendation.

See Page 1 for New USG Complete Roof Service

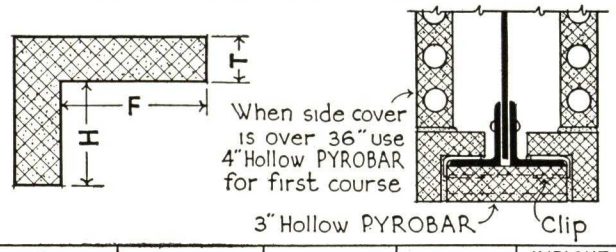
PYROBAR BEAM and GIRDER FIREPROOFING WEIGHTS of SHOE TILE, ANGLE TILE and SOFFIT TILE PER LINEAL FOOT OF BEAM

PYROBAR SHOE TILE



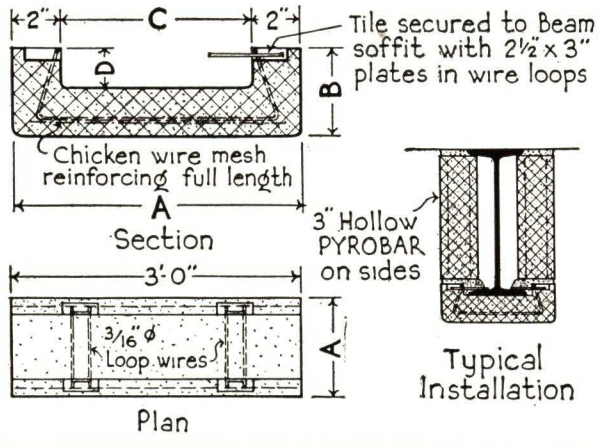
TYPE	MAX. WIDTH OF FLANGE	F	H	T	W	WEIGHT PER LIN. FT.
B-40	5"	7 5/8"	4 1/4"	1/2"	2"	12.5 lbs.
B-50	6"	8 1/4"	4 1/4"	5/8"	2 1/2"	13
B-65	7 1/2"	9 3/4"	4 1/4"	13/16"	3 1/4"	15
B-80	9"	10 1/2"	4 1/4"	15/16"	4"	16
B-100-C	Channels		4 1/2"	1/2"	4 7/8"	10

PYROBAR ANGLE TILE

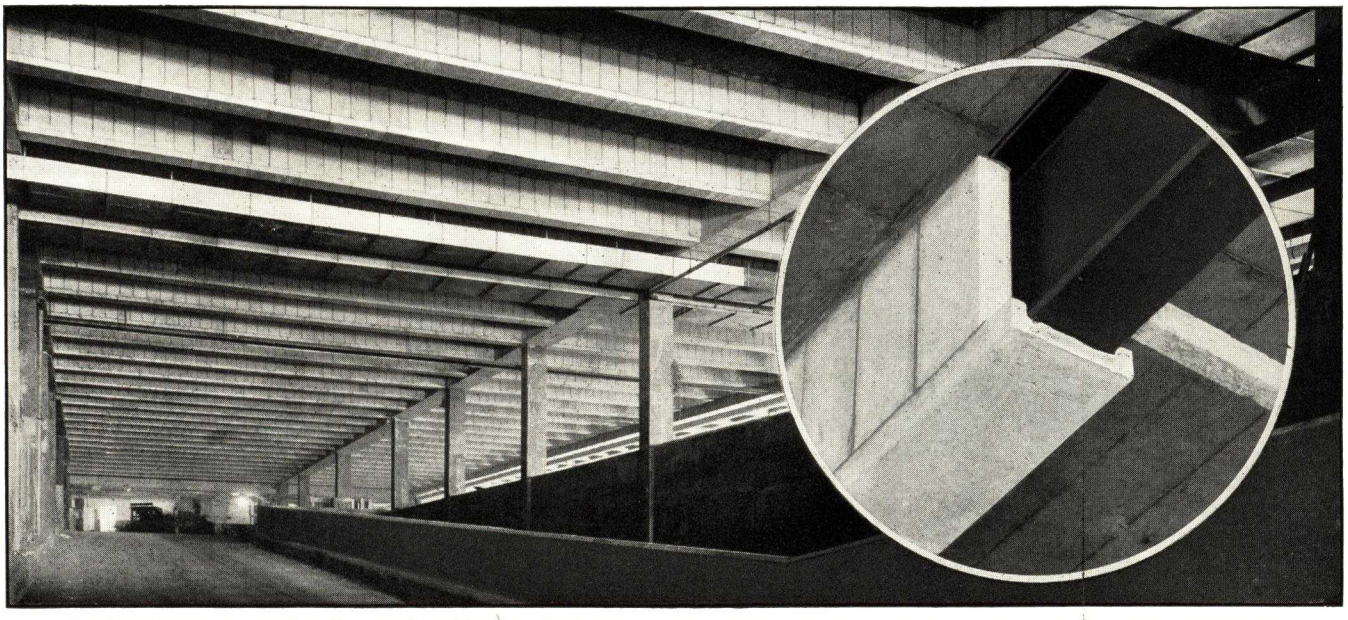


TYPE	F	H	T	WEIGHT PER LIN. FT.
L-34	3"	4"	2"	15 lbs.
L-45	4"	5"	2"	18.5
L-46	4"	6"	2"	20

PYROBAR SOFFIT TILE



TYPE	A	B	C	D	WEIGHT PER LIN. FT.	MAX. WIDTH OF FLANGE
B-30-S	7 1/4"	3"	3 1/4"	1"	8 lbs.	3"
B-40-S	8 1/4"	3 1/4"	4 1/4"	1 1/4"	9	4"
B-50-S	9 1/4"	3 1/4"	5 1/4"	1 1/4"	10	5"
B-60-S	10 1/4"	3 1/4"	6 1/4"	1 1/4"	11	6"
B-70-S	11 1/4"	3 1/2"	7 1/4"	1 1/2"	12	7"
B-80-S	12 1/4"	3 1/2"	8 1/4"	1 1/2"	13	8"
B-90-S	13 1/4"	3 1/2"	9 1/4"	1 1/2"	14	9"
B-100-S	14 1/4"	3 3/4"	10 1/4"	1 3/4"	15	10"
B-115-S	15 3/4"	3 3/4"	11 3/4"	1 3/4"	16	11 1/2"
B-130-S	17 1/4"	3 3/4"	13 1/4"	1 3/4"	17 1/2	13"
B-145-S	18 3/4"	4"	14 3/4"	2"	19	14 1/2"
B-160-S	20 1/4"	4"	16 1/4"	2"	20 1/2	16"
B-175-S	21 3/4"	4"	17 3/4"	2"	22	17 1/2"



Pyrobar Beam and Girder Fireproofing Used in New Chicago Post Office—Graham, Anderson, Probst and White, Architects

See Page 1 for New USG **Complete** Roof Service

SALES OFFICES

Atlanta, Ga. . . . . 1440 Citizens and Southern Bank Bldg.
Baltimore, Md. . . . . Standard Oil Bldg.
Birmingham, Ala. . . . . 1203 Comer Bldg.
Boston, Mass. . . . 731 Statler Office Bldg., 20 Providence St.
Buffalo, N. Y. . . . . 514 Brisbane Bldg.
Cincinnati, Ohio . . . . . 3012 Carew Tower
Cleveland, Ohio . . . . . 627-629 Hanna Bldg.
Dallas, Tex. . . . . 1301 Santa Fe Bldg.
Denver, Colo. . . . . Continental Oil Bldg.
Detroit, Mich. . . . . (At Mill) River Rouge, Mich.
Houston, Tex. . . . . 4616 Main St.
Indianapolis, Ind. . . . . 815 Architects' and Builders' Bldg.
Kansas City, Mo. . . . . 438 Ward Parkway
Los Angeles, Calif. . 507 Architects Bldg., 5th St. at Figueroa
Milwaukee, Wis. . . . . (At Mill) 439 W. Oregon St.
Minneapolis, Minn. . . . . 1308 Foshay Tower
New York, N. Y. . . . . 30 Rockefeller Plaza
Omaha, Neb. . . . . 312 Woodmen of the World Bldg.
Philadelphia, Pa. . . . . 1616 Walnut St.
Pittsburgh, Pa. . . . . 712 Grant Bldg.
Portland, Ore. . . . . 706 Spalding Bldg.
St. Louis, Mo. . . . . 806 Louderman Bldg.
San Francisco, Calif. . . . . 2501 Harrison St.
Washington, D. C. . Investment Bldg., 15th and K Sts., N. W.

Samson Plaster Board Company
Sales Agents for United States Gypsum Company
Crosby Building, Buffalo, N. Y.

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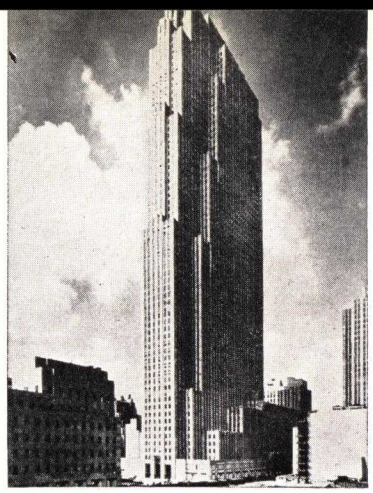
Phipps Houses, Inc., Woodside, Long Island, N. Y.

AEROCRETE

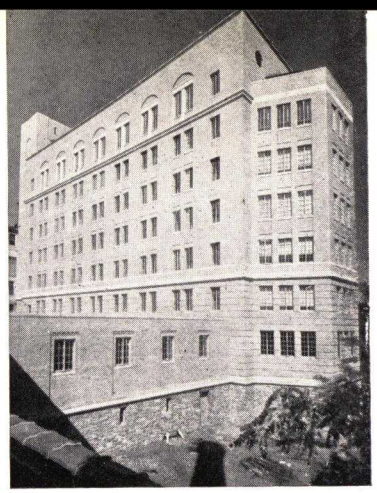
LIGHTWEIGHT CONCRETE

1929

1931



1933



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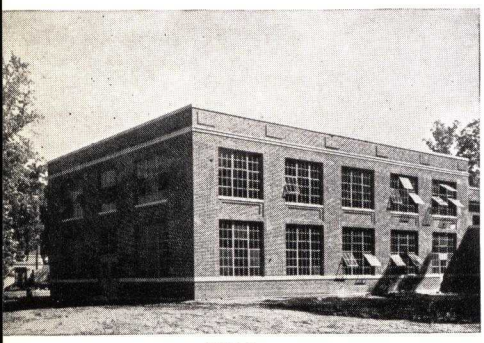

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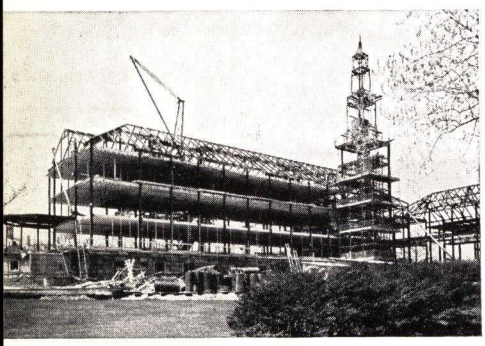

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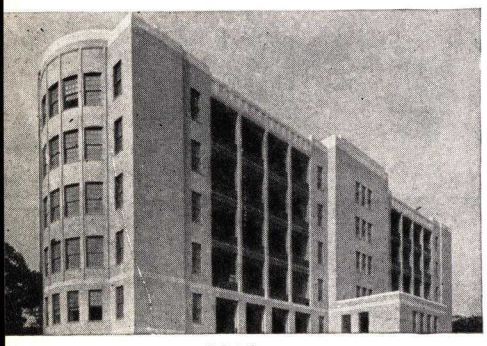
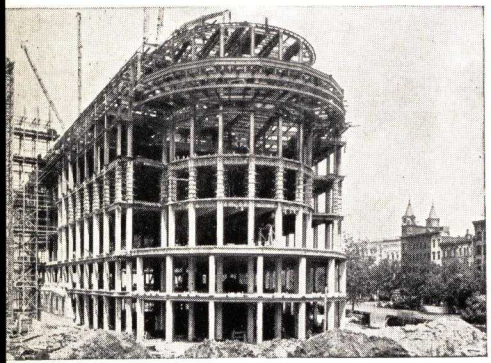


1936



1937

A FEW BUILDINGS IN ★ WHICH AEROCRETE REG. TRADE MARK WAS USED 1929-1937

	JOB	ARCHITECT	TYPE OF CONSTRUCTION
1929	Top Addition, Office Bldg. Bethlehem Steel Company, Bethlehem, Pa.	Graham, Anderson, Probst & White, Chicago, Ill.	Structural Arches and Fireproofing, Floor Fill, in six top stories
1931	Majestic Apartments, Central Park West, New York City	Irwin Channing, New York City	Sound Insulating Partitions
1932	Dynamometer Building, U. S. Bureau of Standards, Washington, D. C.	U. S. Bureau of Standards	Reinforced Aerocrete Structural Roof, Partition Slabs
1933	Rockefeller Center, New York City	Reinhart & Hofmeister. Corbett, Harrison & McMurray. Hood & Fouilhoux. New York City	*N.B.C. Studios*: Partitions *Sunken Plaza*: Structural Arches and Fill
1934	Washington County Hospital, New Wing, Hagerstown, Maryland	Buckler & Fenhagen, Baltimore, Md.	Structural Arches and Fireproofing
1935	Miriam Osborne Home, New Wing, Rye, N. Y.	James Gamble Rogers, New York City	Long Span Floors, Floor Fill
1936	Children's Pavilion, Seaview Hospital, Staten Island, N. Y.	Adolph Martin, New York City	Long Span Floors, Floor Fill
1937	Federal Trade Commission Building, Washington, D. C.	Bennett, Parsons & Frost, Chicago, Ill.	Structural Arches, Floor Fill

AEROCRETE CORPORATION OF AMERICA
R.C.A. Building, Rockefeller Center
49 West 49th Street
NEW YORK, N. Y.

AEROCRETE

Lightweight Concrete

Aerocrete Block
Showing Air Cells Actual Size

WHY AEROCRETE FOR THE MODERN BUILDING

In the search for improved serviceability and economy, progressive engineers are paying an increasing amount of attention to the elimination of unnecessary weight or dead load. To this trend in the building industry, light weight concrete in general, and Aerocrete in particular, have been making an important contribution.

Aerocrete is a light weight concrete. Together with its companion material, "Gritcrete", it can be produced on the job to weigh from 50 to 108 lbs. per cu. ft. These weights compare with 144 lbs. per cubic foot for stone concrete. In buildings designed for men and women to live and work in, as distinct from those used for heavy loadings such as warehouses or industrial plants, the use of Aerocrete will afford economy of space or money, or both.

Foremost in the properties of Aerocrete is its high degree of resistance to the passage of sound. The even, cellular structure of Aerocrete not only accounts for its high resistance to sound, but makes it likewise an excellent insulator to heat and cold. Since Aerocrete is as indestructible as concrete, its thermal insulation will last as long as the building in which it is used. Aerocrete is likewise a superior fireproofing medium.

WHAT IS AEROCRETE

Aerocrete is simply a mixture of Portland Cement, properly graded sand and water. These ingredients are first proportioned to give the desired weight, and are then mixed at the job site in the standard type concrete mixer, no special equipment of any sort being necessary. At the time of mixing there is added our Aerocrete Admixture, which has the property of reacting with the alkaline constituents of the Portland Cement. In this reaction, a small percentage of the mixing water is broken down into its component gases, and these, as they are formed, cause the wet concrete to expand after placing by a controlled, predetermined amount.

The start of the expansion does not occur until fifteen or twenty minutes after the Aerocrete has been mixed, giving plenty of time in which to get the material in place. The rise then continues slowly for a period of from forty-five to sixty minutes. The timing and the amount of expansion is exact within close practical limits.

WHY IS AEROCRETE ECONOMICAL

The resulting economy is important. Depending on the desired weight, the expansion varies from 75 to 30 per cent of the original pouring height; the lighter the weight the greater the expansion. Therefore, due to the bulking action of the mass after placing, and to the natural workability of the wet Aerocrete, the cost of placing Aerocrete is consistently less on any production operation than that for ordinary concrete.

Aerocrete does not involve the use of special equipment. The usual type of concrete mixer, together with a bucket or platform hoist, and standard concrete buggies for placing, represent the usual construction outfit. If desired, the material can be delivered in ready-mixed concrete trucks, and the Compound added at the job site.

WHY DOES AEROCRETE HELP IN SOUNDPROOFING A BUILDING

Mention has been made that Aerocrete acts to retard the passage of sound. It has been widely used in many buildings for this reason and the excellent results obtained have been recorded in a number of tests as well as by the experience of the owners, architects and builders concerned. It

An Early Load Test on a Seven-foot Span of 4" Aerocrete Weighing 60 lbs. Per Cu. Ft., Showing Arch Supporting a Load of 900 lbs. Per. Sq. Ft.

An Early Load Test of Long Span Aerocrete Floor System. The Span is 29 Ft. and the Load Producing Failure was 330 lbs. Per Sq. Ft.

was selected for use by the National Broadcasting Company for the partitions of the Studios of Radio City in Rockefeller Center. As precast blocks for partitions and poured in place for structural floors and floor fill, Aerocrete is a preferred material to be used to obtain a more sound proof building. In addition to the above, and this is particularly true of office buildings and the like, Aerocrete is considerably easier to cut into if changes in the location of pipes or conduits are required. The resulting noise and inconvenience to adjoining tenants is thereby greatly lessened.

IS AEROCRETE FIREPROOF

Aerocrete has the same rating as stone concrete from the Rating Board of the Fire Underwriters; it is a fully fireproof material, as proven by a series of rigorous tests carried out under conditions designed to duplicate a severe fire in a restricted space. In such a test, for example, conducted for the Building Department of New York City by Columbia University, a thermo-couple or high temperature thermometer was placed only two inches away from the surface of the Aerocrete encasing a steel beam. The beam was exposed on three sides to the action of the fire, which was maintained at a temperature of over 1700° Fahrenheit for four hours. The temperature at the point described rose only from 47° to a maximum of 221°, while two inches away a roaring inferno of 1700° continued during the four hours mentioned.

DOES AEROCRETE RESIST THE PASSAGE OF HEAT AND COLD

Look at the photograph on the previous page showing the actual size and nature of the cells making up a block of Aerocrete. The reader will note that these cells consist of evenly distributed, closed voids. These air cells resist the passage of heat or cold. This is highly important in roof construction. Part or all of the expensive, impermanent, vegetable, insulating material may be eliminated with a consequent saving in cost. Such a saving may be a highly important factor in a factory, auditorium, or gymnasium where the roof covers a large area and represents a sizable proportion of the cost of the Building. There are numerous installations, both in the north where the severity of the winters have tested Aerocrete, and in the south where the summer sun is at a maximum, the owners or occupants of which will be pleased to attest to the excellence of Aerocrete as an insulator to heat and cold.

COEFFICIENTS OF HEAT TRANSMISSION

Material	Wgt. per cu. ft., lbs.	C*	Equivalent thickness, in.
Corkboard	10	0.30	1.00**
Aerocrete	50	1.44	4.80 †
Aerocrete	60	1.80	6.00 †
Aerocrete	70	2.18	7.27 †
Aerocrete	80	2.56	8.53 †
Brickwork (dry)	132	4.00	13.33 ††
Concrete	140	8.30	27.70 ††
Cinder concrete	110	5.20	17.35†
Gypsum	...	2.98	9.93‡

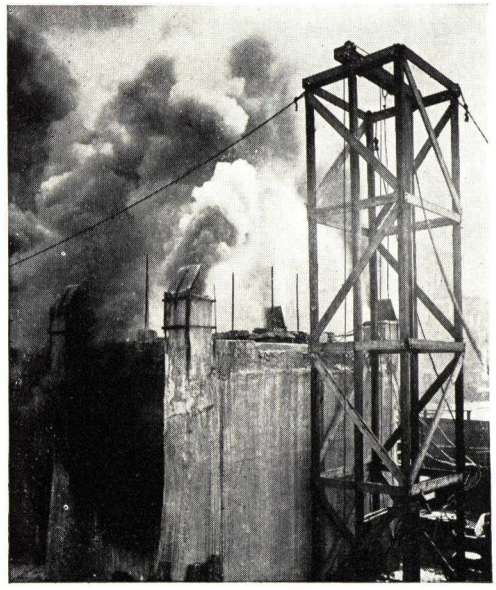
*C—Coefficient of heat transmission in B.t.u. per hour, per square foot, per inch thickness, per degree difference Fahrenheit.

**Bureau of Standards.

†Peebles, Armour Institute.

††Willard, Light & Harding.

‡A. S. R. E., Committee Report.



Four Hour Fire Test on Aerocrete in 1927, For New York Building Department.

AEROCRETE STRUCTURAL FLOORS FOR MODERN FIREPROOF CONSTRUCTION

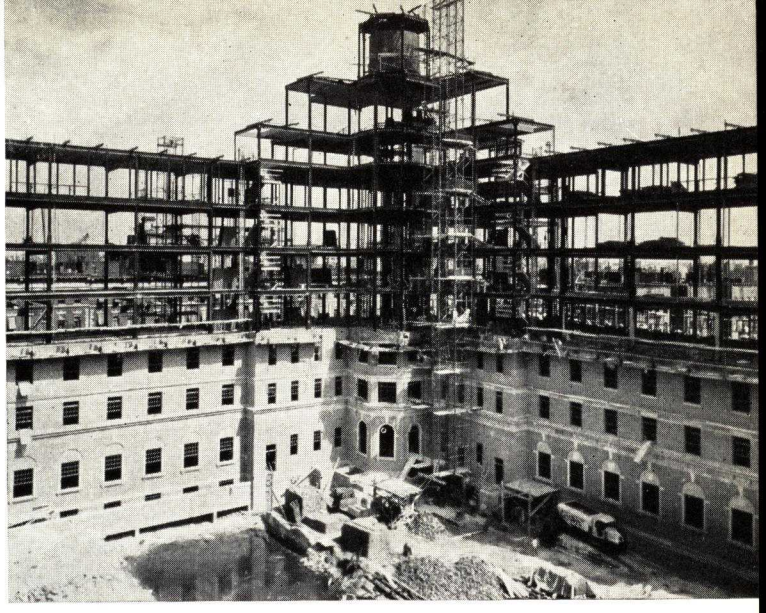
In considering the merits of different structural systems for his new project, the designing architect or engineer will pay particular attention to certain basic qualifications. The type of floor selected should certainly be one which has proven its usefulness over a period of years, with a full record of successful installations. It should enable the builder to proceed with the work with due speed and proper economy. It should be one which uses readily obtainable materials and equipment, under conditions that will not produce delays or labor difficulties as the job progresses. The system and the material should be properly adjustable to take care of the various conditions of span, loading, and use, that normally occur even in the simplest type of structure. It should not occupy an undue percentage of the cubical contents of the building. It should be highly soundproof, free from any tendency to vibrate, able to take occasional concentrated overloadings, and it should be of such a nature that minor alterations, often required in later occupancy, can be made without a complete reconstruction of the floor slab or structural panel.

AEROCRETE FLOORS GIVE THESE ADVANTAGES

Aerocrete floor systems have been installed in this country since 1928. The first major structural installation was that made in the top addition to the office building of the Bethlehem Steel Company. The use of Aerocrete in this

project enabled the architects to increase the height of the building by a much needed six stories instead of the four which was all that could have been obtained otherwise. Since that time, and in spite of the severe depression in the building industry, the use of Aerocrete floor systems has steadily increased in number so that today we can point to buildings of widely varying size and purpose such as the largest new government office building, the structural roof of a new southern pulp and paper mill, a building for the Bureau of Standards or the New Chronic Hospital for the City of New York, to demonstrate the range of structural applications for which Aerocrete is being used.

The following paragraphs, cuts and tables, cover several types of Aerocrete Floor Systems. It should be noted, however that in many buildings, two or even more of the systems may be combined, each used in those areas where its usefulness is most suited. It is this property of extreme flexibility to take care of the many conditions that arise in the practical design of structures that accounts for much of the popularity that Aerocrete is currently enjoying.



Progress Photograph of Long Span Floor System Installed in Harlem Hospital, New York City. Sloan & Robertson, Architects

AEROCRETE "L. S." FLOOR CONSTRUCTION

The design of the Aerocrete "L. S." Floor utilizes the outstanding properties of Aerocrete to excellent advantage to give a floor of exceptional rigidity, yet of shallow depth, combined with speed and economy of erection.

The construction consists of structural I-beams spaced 3 to 5 ft. apart which are erected as part of the structural steel work. The depth of these beams will vary from 4 to 8″, depending upon the span and load. Flat form-work is hung directly from the I-beams, and on these forms the Aerocrete is poured so as to fireproof and encase the beams thoroughly in a light, fireproof, soundproof slab of Aerocrete.

LIGHT, RIGID, SOUNDPROOF

Owing to the lightness of Aerocrete, it is possible to install a slab of sufficient thickness to encase the beams without increasing the dead load as compared to competing types of construction. Owing to the plastic consistency of Aerocrete, the material flows entirely around the haunches and web of each beam so as greatly to stiffen these members. As measured by the permissible deflection of 1/360 of the span, the beams surrounded by Aerocrete show an additional stiffness of better than 100%. Due to the cellular nature of the material, the floor system is highly insulating to sound.

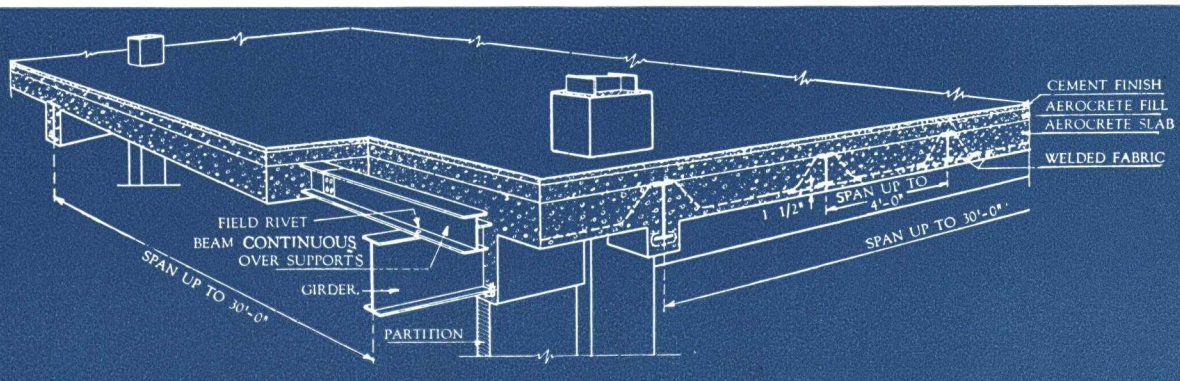
SIMPLE IN DESIGN AND INSTALLATION

One of the main advantages of the system is its simplicity. Since the stresses are taken in the steel, the Aerocrete only carries over the short spans between the beams. It is therefore possible to strip the forms safely in from two to three days of normal curing weather. Posting and shoring is of course not needed as the forms are hung from the steel. In the erection of multi-storied buildings it should be noted that the beams for the floor give a working deck for the erection of the steel skeleton, the result being a lowered unit price on the cost of steel erection.

In spite of the superior features of the floor, its cost compares favorably to that of other systems giving a shallow depth floor with flat ceiling. In most localities, the weight of the Aerocrete, using sand as an aggregate, will be 70 lbs. per cu. ft. but where good steam hard coal cinders are available, an Aerocrete weighing 60 lbs. per cu. ft. may be specified.

TO SUM UP

Simplicity and flexibility of design are properties of the "L. S" system. A floor can be designed for such loads and spans as may occur in buildings intended for human occupancy, within the widest practical limits. In addition, the designing engineer can lay out and detail an "L. S." floor easily and rapidly without unnecessary study and costly detailing. Openings of one sort or another are easily provided for, and job or tenant changes can be effected with little trouble, as the Aerocrete slab can be cut into without disturbing the structural strength of the floor.



TYPICAL FLOOR SECTION

LONG SPAN STEEL-AEROCRETE FLOOR CONSTRUCTION

AEROCRETE "R. S." FLOOR CONSTRUCTION

The Aerocrete "R. S." Floor Construction consists of a combination of Aerocrete with stone concrete and steel, to form a composite reinforced concrete floor with properties of great stiffness and rigidity, minimum thickness, absolute fireproofness, and high sound insulation. The underside of the slab is flat, ready to receive the plaster direct.

HOW THE "R. S." FLOOR IS MADE UP

For simplicity, the construction may be considered to consist of three parts. First, there is a flat slab of Aerocrete of a density of 70 lbs. per cu. ft. Secondly, embedded in the Aerocrete is a steel member, the bottom flange of which is 1″ up in the Aerocrete. This steel member consists of a heavy tension member connected by an open web system to a lighter top member, this last extending up above the Aerocrete. Thirdly, this top member is encased in a slab of stone concrete 2 to 2½″ thick, the steel and the concrete together taking the compressive stresses, as will be described in what follows.

FORMS ARE HUNG FROM JOISTS

As a practical construction expedient, the steel reinforcement is prefabricated in the form of sturdy reinforced trusses, ranging in weight from 5¾ to 29½ lbs. per lin. ft., depending upon span and load. From these trusses are hung the forms for receiving the Aerocrete. As a result, these forms are of the most economical type, consisting of flat sheathing lumber laid on stringers, and the need for posting, shoring or centering is eliminated. As the top member of the truss is designed to take the stresses resulting from the combined weight of the Aerocrete and the concrete, the forms can be stripped in from three to four days.

FURTHER DETAILS OF "R. S." FLOOR

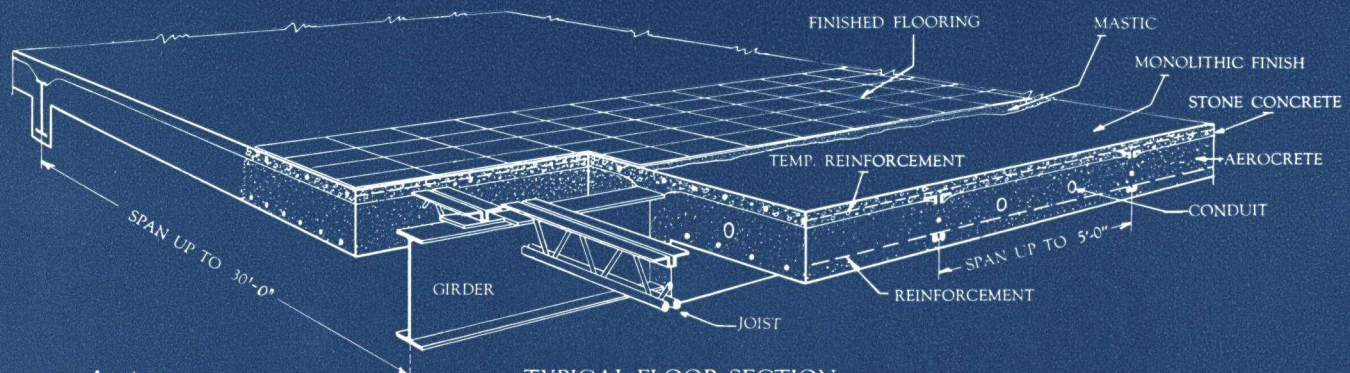
The trusses are spaced from 3 to 5 ft. apart, the wider spacing being the more economical where conditions permit. After the forms have been placed and the Aerocrete is poured, the stone concrete is placed within 24 to 48 hours. The concrete may be finished monolithically to receive, or to act as, the finished flooring.

The finished construction provides a smooth underside ready for plastering. This underside consists of a continuous flat surface of Aerocrete to which an excellent bond with plaster is obtained.

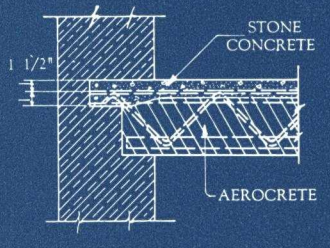
Using an open truss in the construction enables conduits, and in the larger sizes, pipes as well, to be run in any direction through the open webs. In this way the necessity for a floor fill is obviated, with a consequent saving in cost, in dead load, and in floor thickness.

SUMMARY

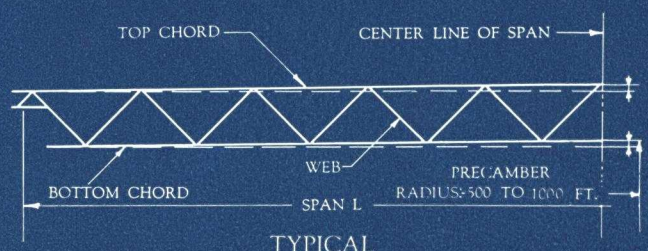
To sum up, this floor system consists of a stone concrete slab reinforced by a steel member, prefabricated to carry the forms and the dead load, and an Aerocrete filler. Compressive and tensile stresses are taken in the concrete and steel. Shear stresses are taken by the steel and the Aerocrete. Flat forms are hung from the steel so that the erection is speedy, easy and economical. Conduits can be run through the trusses in any direction. A permanent economical plaster finish is insured, due to the flat continuous underside of Aerocrete. The stone concrete may be finished monolithically. The resulting floor is absolutely fireproof and highly soundproof. The nature of the design permits of extreme flexibility in laying out the system in practice. Owing to the special reinforcing of the trusses, an exceptionally stiff and rigid floor results.



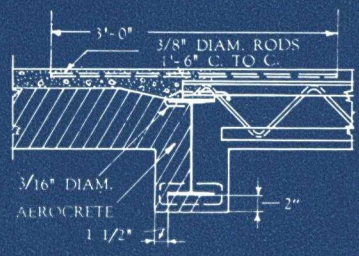
TYPICAL FLOOR SECTION



TYPICAL SUPPORT ON WALL



TYPICAL JOIST



TYPICAL SUPPORT ON GIRDER

AEROCRETE "RS" FLOOR CONSTRUCTION

AEROCRETE "RS" FLOOR CONSTRUCTION

SAFE APPLIED LOADS PER SQ. FT. D = 6½" THICK SLAB H = 4¼" WEIGHT = 49 LB. PER SQ. FT.

SPAN IN FT.	10′-0″					10′-6″					11′-0″					11′-6″					12′-0″				
SPACING IN IN.	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48
JOISTS 4-1	104-A	91-A	79-A	70-A	61-A	88-A	76-A	66-A	57-A	49-A	76-A	64-A	54-A	46-A	39-A	62-A	52-A	44-A	36-A		51-A	43-A	34-A		
" 4-2	131-A	118-A	103-A	89-A	79-A	112-A	99-A	87-A	76-A	65-A	94-A	85-A	73-A	64-A	56-A	83-A	72-A	62-A	53-A	45-B	70-A	61-A	51-A	43-B	36-B
" 4-3	157-A	139-A	125-A	113-A	103-A	136-A	120-A	107-A	96-A	87-A	118-A	105-A	92-A	82-A	73-A	103-A	90-A	78-A	70-A	62-B	89-A	78-A	67-A	59-B	51-B
" 4-4		170-A	153-A	139-A	128-A	166-A	148-A	133-A	120-A	108-A	146-A	129-A	116-A	104-A	93-A	128-A	114-A	101-A	90-B	79-B	112-A	99-A	87-B	77-B	68-B
" 4-5			180-B	163-B	148-B		174-B	156-B	141-B	128-B		153-B	137-B	124-B	112-B	151-B	135-B	120-B	108-B	97-B	134-B	119-B	105-B	94-B	84-B
" 4-6										151-B			161-B	146-B	133-B		157-B	141-B	128-B	116-B	156-B	139-B	124-B	112-B	101-B
" 4-7															153-C				148-C	135-C		162-C	146-C	131-C	119-C
" 4-8																			158-C	147-C			158-C	148-C	137-C

SEE MARKING NOTES

SPAN IN FT.	12′-6″					13′-0″					13′-6″					14′-0″					14′-6″					15′-0″				
SPACING IN IN.	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48	36	39	42	45	48
JOISTS 4-2	60-A	50-A	42-B	35-B		50-A	42-B	34-B			42-B	34-B				34-B														
" 4-3	78-A	66-A	56-B	50-B	43-C	66-A	57-B	49-B	41-C	34-C	56-B	49-B	40-C	33-C		49-B	41-C	34-C			41-C	34-C				34-C				
" 4-4	99-A	86-B	75-B	66-B	58-C	84-B	75-B	65-B	56-C	48-C	75-B	65-B	55-C	47-C	40-D	65-B	55-C	46-C	39-D	32-D	56-C	47-C	39-D	32-D		48-C	39-D	32-D		
" 4-5	118-B	104-B	92-B	82-B	72-C	104-B	92-B	81-B	71-C	62-C	92-B	80-B	70-C	61-C	53-D	80-B	70-C	60-C	52-D	44-D	71-C	61-C	51-D	44-D	37-D	62-C	52-D	44-D	37-D	30-E
" 4-6	139-B	124-B	110-B	99-B	88-C	124-B	110-B	97-B	87-C	77-C	110-B	97-B	86-C	76-C	67-D	97-B	86-C	75-C	66-D	57-D	86-C	76-C	65-D	56-D	49-D	76-C	65-D	55-D	48-D	42-E
" 4-7	162-C	144-C	129-C	116-C	105-C	144-C	129-C	114-C	103-C	92-C	129-C	114-C	102-C	90-D	81-D	114-C	102-C	90-D	80-D	70-D	102-C	90-D	80-D	70-D	61-D	91-C	79-D	70-D	61-D	54-E
" 4-8		161-C	151-C	137-C	122-C	169-C	148-C	133-C	120-C	107-C	146-C	132-C	118-C	106-D	95-D	132-C	119-C	106-D	94-D	84-D	120-C	107-D	94-D	84-D	74-D	108-D	96-D	84-D	74-D	65-E

SEE MARKING NOTES

WORKING STRESSES
fs —18,000 lb. per sq. in. (Max.)
f's—20,000 lb. per sq. in. (Max.)
fc — 650 lb. per sq. in. (Max.)
n — 15
Shear 17 lb. per sq. in. from applied load. Shear from wt. of slab taken by the joists.

MARK'NG 4-5D
4 Nominal depth of joist.
-5 Bottom chord and web.
D Top chord.
4-5 as found in left margin.
D as found to right of load.

SAFE APPLIED LOADS PER SQ. FT. D = 7½" THICK SLAB H = 5¼" WEIGHT = 55 LB. PER SQ. FT.

SPAN IN FT.	13′-0″						13′-6″						14′-0″						14′-6″						15′-0″					
SPACING IN IN.	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51
JOISTS 5-5	136-B	121-B	107-B	95-B	80-B	68-C	121-B	107-B	94-B	84-B	74-C	63-C	107-B	95-B	83-B	73-C	64-C	56-D	96-B	84-B	73-C	64-C	55-D	47-D	84-B	74-C	64-C	55-D	47-D	40-D
" 5-6	160-B	143-B	128-B	115-B	103-B	92-C	144-B	129-B	114-B	102-B	91-C	81-C	130-B	115-B	101-B	90-C	80-C	71-D	117-B	103-B	90-C	79-C	70-D	62-D	104-B	91-C	79-C	69-D	61-D	53-D
" 5-7			150-C	134-C	121-C	109-C		150-C	134-C	120-C	109-C	98-C	151-C	135-C	120-C	107-C	96-C	86-D	136-C	121-C	107-C	96-C	85-D	75-D	122-C	108-C	96-C	85-D	75-D	66-D
" 5-8				152-C	141-C	130-C			154-C	139-C	126-C	114-C		155-C	138-C	124-C	112-C	101-D	156-C	139-C	124-C	112-C	100-D	89-D	141-C	126-C	112-C	100-D	89-D	79-D
" 5-9					162-D	147-D				160-D	146-D	133-D			159-D	145-D	131-D	117-D		160-D	144-D	130-D	117-D	105-D	162-D	145-D	130-D	117-D	105-D	94-D

SPAN IN FT.	15′-6″						16′-0″						16′-6″						17′-0″						17′-6″					
SPACING IN IN.	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51	36	39	42	45	48	51
JOISTS 5-5	75-C	65-C	55-D	47-D	39-D		66-C	56-D	47-D	40-D			58-D	48-D	40-D				51-D	42-D					44-D					
" 5-6	92-C	80-C	69-D	60-D	52-D	45-E	82-C	71-D	61-D	52-D	45-E	38-E	73-D	63-D	53-D	45-E	38-E		65-D	55-D	46-E	39-E			58-D	48-E	40-E			
" 5-7	110-C	97-C	85-D	75-D	66-D	58-E	99-C	86-D	76-D	66-D	58-E	50-E	89-D	77-D	67-D	58-E	50-E	43-E	81-D	69-D	59-E	50-E	43-E	37-F	72-D	62-E	52-E	43-E	37-F	
" 5-8	127-C	113-C	101-D	89-D	79-D	70-E	115-C	101-D	90-D	79-D	71-E	62-E	104-D	91-D	80-D	71-E	63-E	54-E	94-D	82-D	72-E	63-E	55-E	46-F	85-D	73-E	64-E	55-E	47-F	40-F
" 5-9	148-D	132-D	117-D	105-D	94-D	84-E	135-D	120-D	105-D	94-D	84-E	75-E	123-D	109-D	94-D	84-E	75-E	67-F	112-D	99-D	85-E	75-E	67-F	60-F	102-D	89-E	77-E	67-F	60-F	53-F

SAFE APPLIED LOADS PER SQ. FT. D = 8½" THICK SLAB H = 6¼" WEIGHT = 60 LB. PER SQ. FT.

SPAN IN FT.	15′-0″							15′-6″							16′-0″							16′-6″						
SPACING IN IN.	36	39	42	45	48	51	54	36	39	42	45	48	51	54	36	39	42	45	48	51	54	36	39	42	45	48	51	54
JOISTS 6- 7	153-C	136-C	115-C	98-C	87-C	79-D	68-D	138-C	121-C	108-C	97-C	82-D	72-D	62-D	125-C	110-C	97-C	87-D	77-D	68-D	60-E	113-C	99-C	87-D	77-D	68-D	60-E	52-E
" 6- 8		158-C	142-C	128-C	115-C	102-D	93-D	157-C	143-C	127-C	115-C	102-D	92-D	83-D	145-C	129-C	115-C	103-D	92-D	82-D	74-E	133-C	118-C	104-D	93-D	82-D	73-E	66-E
" 6- 9			162-D	157-D	133-D	120-D	108-D			148-D	133-D	120-D	108-D	99-D		149-D	134-D	120-D	108-D	98-D	88-E	152-D	136-D	122-D	109-D	98-D	88-E	79-E
" 6-10					174-E	160-E	146-E				174-E	158-E	145-E	133-E			174-E	160-E	144-E	132-E	120-E		176-E	161-E	145-E	132-E	120-E	109-E

SPAN IN FT.	17′-0″							17′-6″							18′-0″							18′-6″						
SPACING IN IN.	36	39	42	45	48	51	54	36	39	42	45	48	51	54	36	39	42	45	48	51	54	36	39	42	45	48	51	54
JOISTS 6- 7	103-C	89-D	78-D	69-D	60-E	52-E	45-E	93-D	80-D	70-D	61-E	52-E	45-E	39-F	84-D	72-D	62-E	53-E	45-E	39-F		76-D	64-E	55-E	46-E	39-F		
" 6- 8	121-C	107-D	94-D	83-D	73-E	65-E	58-E	110-D	96-D	85-D	74-E	65-E	58-E	51-F	100-D	87-D	76-E	66-E	58-E	51-F	44-F	91-D	79-E	68-E	59-E	51-F	44-F	37-G
" 6- 9	140-D	124-D	110-D	98-D	88-E	79-E	70-E	128-D	113-D	100-D	89-E	79-E	70-E	62-F	116-D	102-D	90-E	80-E	70-E	62-F	55-F	106-D	93-E	82-E	72-E	63-F	55-F	48-G
" 6-10		163-E	146-E	132-E	120-E	109-E	99-F	169-E	150-E	134-E	121-E	109-E	99-F	89-F	156-E	138-E	123-E	110-E	99-F	89-F	80-F	143-E	126-E	112-E	100-F	89-F	80-F	72-G

SPAN IN FT.	19′-0″							19′-6″							20′-0″													
SPACING IN IN.	36	39	42	45	48	51	54	36	39	42	45	48	51	54	36	39	42	45	48	51	54							
JOISTS 6- 7	68-D	57-E	48-E	40-F				61-E	51-E	42-F					54-E	46-F												
" 6- 8	82-E	71-E	60-E	52-F	45-F	37-G		75-E	64-E	53-F	46-F	39-G			68-E	57-F	47-F	40-G										
" 6- 9	97-E	85-E	74-E	64-F	56-F	48-G	42-G	89-E	77-E	67-F	57-F	49-G	42-G	36-H	82-E	70-F	60-F	50-G	43-G	36-H								
" 6-10	131-E	115-E	102-F	91-F	81-F	72-G	65-G	121-E	107-F	94-F	82-F	73-G	65-G	58-H	112-F	99-F	87-F	76-G	66-G	58-H	52-H							

1.) In figuring any concentrated applied loadings, max. allowable reactions may be taken as those reactions which are produced by the uniform loadings shown in this table for the spacings given.

2.) Calculations are based on forms hung from joists (which are designed to take the dead load of slab).

3.) All joists shall be cambered as noted.

AEROCRETE "RS" FLOOR CONSTRUCTION

SAFE APPLIED LOADS PER SQ. FT. D = 9½" THICK SLAB H = 7¼" WEIGHT = 66 LB. PER SQ. FT.

SPAN IN FT.	17′-6″								18′-0″								18′-6″								19′-0″							
SPACING IN IN.	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57
JOISTS 7- 9	154-D	137-D	122-D	109-D	98-E	88-E	78-E	71-F	141-D	125-D	111-D	99-E	88-E	78-E	70-F	63-F	130-D	114-D	101-E	89-E	79-E	70-F	62-F	55-G	120-D	104-E	91-E	80-E	71-F	62-F	55-G	47-G
" 7-10		178-E	161-E	146-E	132-E	120-E	109-F	99-F		165-E	148-E	133-E	121-E	109-F	99-F	89-F	170-E	151-E	136-E	122-E	110-F	99-F	89-F	80-G	158-E	140-E	125-E	112-F	100-F	90-F	81-G	72-G
" 7-11				184-F	168-F	154-F	141-F	129-F			184-F	169-F	155-F	141-F	129-F	118-G			172-F	156-F	142-F	129-F	118-G	108-G			165-F	160-F	144-F	131-F	118-G	108-G	99-G

SPAN IN FT.	19′-6″								20′-0″								20′-6″								21′-0″							
SPACING IN IN.	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57
JOISTS 7- 9	110-D	95-E	83-E	72-F	63-F	55-G	48-G	40-G	100-E	86-E	75-E	65-F	56-F	48-G	42-G		91-E	78-E	67-F	58-F	50-G				83-E	71-F	60-F	51-G				
" 7-10	146-E	129-E	115-F	102-F	91-F	8'-G	73-G	65-G	136-E	119-F	105-F	93-F	82-G	73-G	65-G	58-H	125-F	109-F	96-F	84-G	74-G	66-G	58-H	51-H	115-F	100-F	88-F	77-G	67-G	59-H	51-H	
" 7-11		156-F	148-F	133-F	120-G	108-G	98-G	90-H	157-F	153-F	137-F	123-G	110-G	99-G	90-H	82-H	149-F	142-F	126-G	113-G	101-G	91-H	82-H	74-H	142-F	132-G	116-G	103-G	92-H	83-H	74-H	66-J

SPAN IN FT.	21′-6″								22′-0″								22′-6″								23′-0″							
SPACING IN IN.	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57	36	39	42	45	48	51	54	57
JOISTS 7- 9	75-F	64-F	54-G						69-F	57-F	48-G						63-F	51-G							57-F	45-G						
" 7-10	106-F	92-F	80-G	70-G	61-H				98-F	84-G	73-G	63-H	55-H				90-G	77-G	66-G	56-H	49-H				83-G	70-G	60-H	50-H				
" 7-11	139-G	122-G	107-G	95-H	84-H	75-H	66-J	59-J	129-G	113-G	99-H	87-H	77-H	67-J	60-J		120-G	104-H	91-H	80-H	70-J	60-J	54-J		112-H	96-H	84-H	73-J	64-J	54-J		

SAFE APPLIED LOADS PER SQ. FT. D = 10½" THICK SLAB H = 8¼" WEIGHT = 75 LB. PER SQ. FT.

SPAN IN FT.	20′-0″					20′-6″					21′-0″					21′-6″					22′-0″					22′-6″				
SPACING IN IN.	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60
JOISTS 8-10	154-E	117-F	92-G	74-G	57-H	141-E	107-F	84-G	66-H	50-H	130-F	99-F	76-G	59-H	42-J	120-F	91-G	69-H	53-H		111-F	83-G	62-H	46-J		102-F	75-G	55-H		
" 8-11		153-F	125-G	101-H	83-H	180-F	141-F	115-G	93-H	75-H	167-F	131-G	104-H	85-H	68-J	156-F	121-G	97-H	77-H	61-J	145-G	112-G	88-H	69-J	54-J	135-G	104-H	81-H	63-J	48-J
" 8-12			159-H	132-H	112-H		176-G	146-H	122-H	102-J		166-H	136-H	112-H	93-J		156-H	126-H	103-J	85-J		146-H	116-H	95-J	77-J	169-G	134-H	107-J	87-J	70-J

SPAN IN FT.	23′-0″					23′-6″					24′-0″					24′-6″					25′-0″				25′-6″			26′-0″		
SPACING IN IN.	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	36	42	48	36	42	48
JOISTS 8-10	94-G	68-H	50-H			86-G	62-H	46-J			80-G	56-H				73-H	50-H				67-H	45-J			61-H			55-H		
" 8-11	125-G	96-H	74-J	57-J		116-H	88-H	67-J	50-J		108-H	81-H	61-J			100-H	74-J	55-J			93-H	67-J			86-H	62-J		79-J	57-J	
" 8-12	159-H	124-H	99-J	80-J	63-J	149-H	115-J	91-J	73-J	57-K	139-H	107-J	84-J	66-J	51-K	130-H	100-J	78-J	60-K		121-J	93-J	71-J	54-K	113-J	86-J	65-K	106-J	79-J	59-K

SAFE APPLIED LOADS PER SQ. FT. D = 11½" THICK SLAB H = 9¼" WEIGHT = 82 LB. PER SQ. FT.

SPAN IN FT.	23′-0″					23′-6″					24′-0″					24′-6″					25′-0″					25′-6″				
SPACING IN IN.	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60
JOISTS 9-11	146-G	113-H	88-H	69-J	53-J	136-G	105-H	81-J	62-J	47-J	127-G	97-H	74-J	56-J		118-H	89-H	67-J	50-J		109-H	82-J	61-J	44-J		102-H	76-J	55-J		
" 9-12	184-H	148-H	118-J	95-J	77-J	173-H	139-H	108-J	87-J	70-J	162-H	130-J	99-J	80-J	63-K	152-H	122-J	92-J	73-J	57-K	143-J	114-J	85-J	66-K		134-J	106-J	78-J	60-K	
" 9-13		170-J	149-J	124-J	96-J		170-J	139-J	114-J	91-K		159-J	130-J	106-J	85-K		150-J	121-J	98-K	79-L	167-J	141-J	112-J	90-K	72-L	161-J	132-J	104-K	83-L	66-L

SPAN IN FT.	26′-0″					26′-6″					27′-0″					27′-6″					28′-0″				28′-6″			29′-0″		
SPACING IN IN.	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	60	36	42	48	54	36	42	48	36	42	48
JOISTS 9-11	95-H	70-J	49-J			88-J	64-J	44-J			81-J	58-J				75-J	52-J				70-J	47-J			65-J			60-J		
" 9-12	126-J	98-J	72-J	55-K		118-J	91-J	66-K			110-J	84-J	61-K			103-J	77-K	55-K			96-J	71-K			90-J	66-K		84-K	61-K	
" 9-13	154-J	123-J	97-K	77-L	60-L	148-J	115-K	90-L	71-L		139-J	107-K	83-L	65-L		131-J	100-K	77-L	55-L		123-K	93-L	71-L		116-K	87-L	66-L	109-K	81-L	59-L

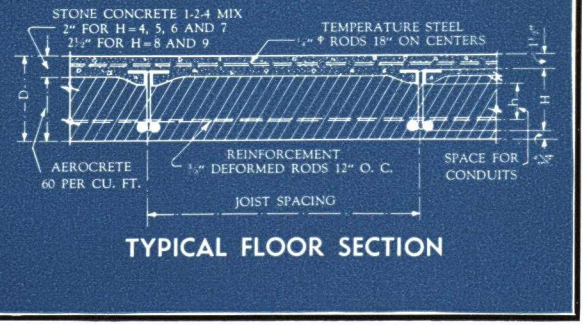
DIMENSIONS AND PROPERTIES OF "RS" JOISTS

Joists	Wt.	h	Joists	Wt.	h	Joists	Wt.	h	Joists	Wt.	h	Joists	Wt.	h	Joists	Wt.	h
4-1A	5.8	2¼	4-6E	11.5	1⅝	5-7F	12.8	2⅝	6-9D	13.7	3¾	7-11F	19.4	4¼	9-11G	20.0	5¾
4-2A	6.3	2⅛	4-7C	10.8	1⅝	5-8C	11.9	2½	6-9E	14.4	3½	7-11G	20.0	3¾	9-11H	20.9	6¼
4-2B	6.7	2⅛	4-7D	11.6	1⅞	5-8D	12.6	2¾	6-9F	15.0	3½	7-11H	20.9	4¼	9-11J	22.7	5¾
4-3A	6.8	2⅛	4-7E	12.2	1⅝	5-8E	13.3	2½	6-9G	15.6	3	7-11J	22.7	3¾	9-12G	22.5	5⅝
4-3B	7.3	2⅛	4-8C	11.9	1½	5-8F	13.9	2½	6-9H	16.5	3½	8-10E	16.5	5⅜	9-12H	23.4	6⅛
4-3C	7.7	1⅞	4-8D	12.6	1¾	5-9D	13.7	2¾	6-10E	16.5	3⅜	8-10F	17.1	5⅜	9-12J	25.2	5⅝
4-4A	7.7	2	4-8E	13.3	1½	5-9E	14.4	2½	6-10F	17.1	3⅜	8-10G	17.7	4⅞	9-12K	26.0	5⅛
4-4B	8.1	2	5-5B	8.8	3	5-9F	15.0	2½	6-10G	17.7	2⅞	8-10H	18.6	5⅜	9-13H	25.6	6
4-4C	8.5	1¾	5-5C	9.2	2¾	6-7C	10.8	3⅝	6-10H	18.6	3⅜	8-11F	19.4	5¼	9-13J	27.5	5½
4-4D	9.2	2	5-5D	9.9	3	6-7D	11.6	3⅞	7-9D	13.7	4¾	8-11G	20.0	4¾	9-13K	28.3	5
4-5B	8.8	2	5-6B	9.7	2⅞	6-7E	12.2	3⅝	7-9E	14.4	4½	8-11H	20.9	5¼	9-13L	29.1	5
4-5C	9.2	1¾	5-6C	10.1	2⅝	6-7F	12.8	3⅝	7-9F	15.0	4½	8-11J	22.7	4¾			
4-5D	9.9	2	5-6D	10.8	2⅞	6-8C	11.9	3½	7-9G	15.6	4	8-12G	22.5	4⅝			
4-5E	10.6	1¾	5-6E	11.5	2⅝	6-8D	12.6	3¾	7-10E	16.5	4⅜	8-12H	23.4	5⅛			
4-6B	9.7	1⅞	5-7C	10.8	2⅝	6-8E	13.3	3½	7-10F	17.1	4⅜	8-12J	25.2	4⅝			
4-6C	10.1	1⅝	5-7D	11.6	2⅞	6-8F	13.9	3½	7-10G	17.7	3⅞	8-12K	26.0	4⅛			
4-6D	10.8	1⅞	5-7E	12.2	2⅝	6-8G	14.5	3	7-10H	18.6	4⅜	9-11F	19.4	6¼			

MATERIAL FOR JOIST MARKS

Diam's Bot. Chord & Web			Top Chords	
Mark	Bot. Chord	Web	Mark	2 Angles
1	2— ¾	7/16	A	1¼x1¼x⅛
2	2—13/16	7/16	B	1¾x1¼x⅛
3	2— ⅞	7/16	C	2 x1½x⅛
4	2—15/16	½	D	1¾x1¼x3/16
5	2—1	½	E	2 x1½x3/16
6	2—1 1/16	9/16	F	2½x1½x3/16
7	2—1⅛	9/16	G	2½x2 x3/16
8	2—1 3/16	5/8	H	2½x1½x¼
9	2—1¼	11/16	J	3 x2 x¼
10	2—1⅜	¾	K	3 x2½x¼
11	2—1½	13/16	L	3½x2½x¼
12	2—1⅝	⅞		
13	2—1¾	⅞		

Example 6-7C indicates H = 6¼" B.C. = 2-1⅛" rods Web = 1-9/16" rod Top Chord = 2 Angles 2x1½x⅛



TYPICAL FLOOR SECTION

STRUCTURAL AEROCRETE IN SHORT SPAN CONSTRUCTION

Structural Aerocrete is a highly satisfactory and suitable material for so-called Short Span Construction. That is to say, for spans up to 8 ft. between structural steel framing, as illustrated in the attached sketch. The thickness of the slab is generally 4″, the reinforcement consisting of welded wire fabric.

A SPEEDY AND ECONOMICAL FLOOR SYSTEM

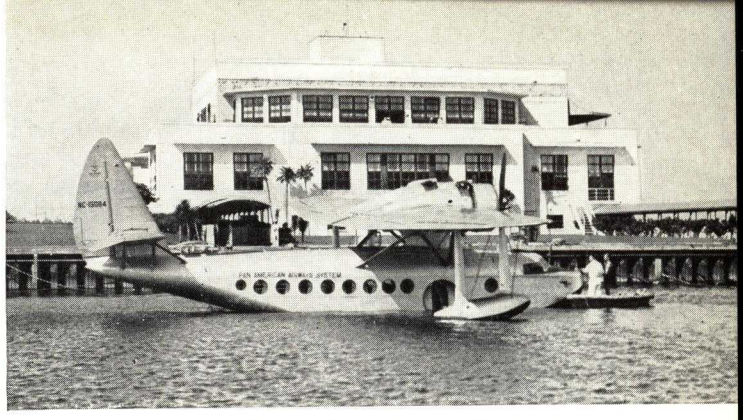
Construction of this type is extremely adaptable to the various conditions of design that occur in practice. It is, in addition, one of the most economical types of fireproof systems to install. It is speedy to erect, and as the forms are hung from the structural steel, the work goes forward rapidly without interfering with the progress or co-ordination of the other trades.

AEROCRETE IS EXCEPTIONALLY SUITED TO THIS CONSTRUCTION

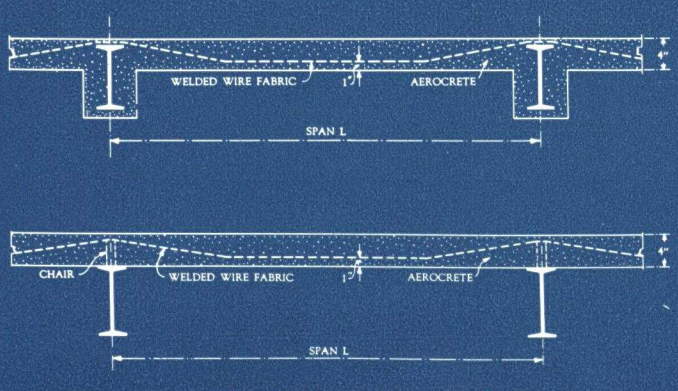
Aerocrete is particularly suited for use in this type of floor system. Its natural plasticity insures the filling of the forms surrounding the structural steel. Its cellular structure provides increased fire resistance. On account of the relatively light weight of the Aerocrete, a reduction in the dead load of the floor slabs can be effected. For buildings designed for human occupancy, this saving in dead load will usually be reflected in a considerable reduction in the structural steel, and in the foundation costs. For such loadings, the load-bearing capacity of structural Aerocrete has been thoroughly tested over the past ten years in the field. At the bottom of Page 3 is shown a test slab supporting a superimposed load of 900 lbs. per sq. ft. This test was made in 1929 for the Building Department of New York City under the supervision of Columbia University.

NINE YEARS OF SUCCESSFUL INSTALLATIONS

The first major installation of Aerocrete Short Span Arches was made in 1928 in the six top stories of the top addition of the Bethlehem Steel Company's office building at Bethlehem, Pa. The original design of the building permitted an addition of only four stories, but by using Aerocrete a total of six badly needed floors was added. Since that time, nine years ago, a large number of installations have been made, some of which are illustrated herewith. A full list will be gladly sent to anyone interested upon request.



Pan American's Thoroughly Modern Air Station at Miami, Florida, Used Aerocrete in the Roof as Permanent Insulation Against the Tropical Sun and the Moist Climate



TYPICAL SLAB CONSTRUCTION

STYLES OF WELDED WIRE FABRIC FOR VARIOUS LOADS AND SPANS

AEROCRETE 80 lbs. per cu. ft.

Ult. Stress in Compression		800 lbs./sq. in.
Working Stress—Aerocrete		300 lbs./sq. in.
	Wire	18,000 lbs./sq. in.
	Shear	17 lbs./sq. in.
Computations	Moment	= wL x L ÷ 12
	Shear	= wL ÷ 2bjd

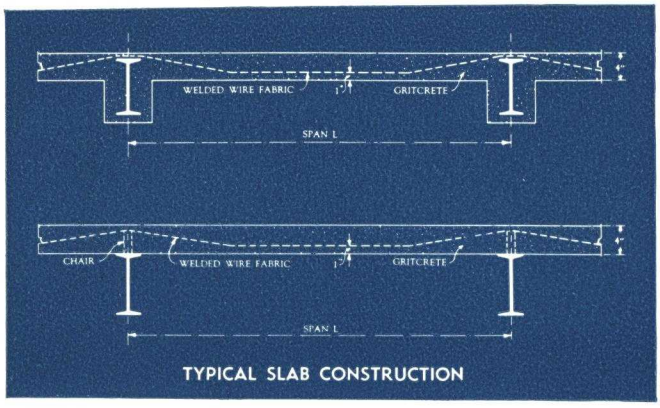
w \ L	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	
80#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #7 & #11	4″x16″ #6 & #10	4″x16″ #5 & #10	4″ Slab
100#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	
120#/□′	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	2″x16″ #6 & #10	
140#/□′	4″x12″ #8 & #12	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	2″x16″ #6 & #10	3″x16″ #4 & #9	4½″ Slab
160#/□′	4″x16″ #7 & #11	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	2″x16″ #6 & #10	3″x16″ #4 & #9	3″x16″ #3 & #8	
180#/□′	3″x16″ #8 & #12	4″x16″ #5 & #10	2″x16″ #8 & #12	3″x16″ #4 & #9	2″x16″ #7 & #11	2″x16″ #6 & #10	2″x16″ #4 & #9	

AEROCRETE 60 lbs. per cu. ft.

Ult. Stress in Compression		650 lbs./sq. in.
Working Stress—Aerocrete		250 lbs./sq. in.
	Wire	18,000 lbs./sq. in.
	Shear	17 lbs./sq. in.
Computations	Moment	= wL x L ÷ 12
	Shear	= wL ÷ 2bjd

w \ L	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	
80#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #6 & #10	3″x16″ #7 & #11	4″ Slab
100#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	2″x16″ #8 & #12	3″x16″ #4 & #9	
120#/□′	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	2″x16″ #8 & #12	2″x16″ #8 & #12	3″x16″ #5 & #10	4½″ Slab
140#/□′	4″x12″ #8 & #12	3″x16″ #8 & #12	3″x16″ #7 & #11	2″x16″ #8 & #12	2″x16″ #8 & #12	3″x16″ #5 & #10	2″x16″ #6 & #10	
160#/□′	4″x16″ #7 & #11	4″x16″ #6 & #10	3″x16″ #6 & #10	2″x16″ #8 & #12	3″x16″ #5 & #10	2″x16″ #6 & #10	3″x16″ #4 & #9	5″ Slab
180#/□′	3″x16″ #8 & #12	3″x16″ #7 & #11	2″x16″ #7 & #11	3″x16″ #5 & #10	2″x16 ″ #6 & #10	3″x16″ #4 & #9	2″x16″ #6 & #10	

GRITCRETE IN SHORT SPAN CONSTRUCTION



TYPICAL SLAB CONSTRUCTION

A NEW STRUCTURAL MATERIAL

Gritcrete is a new material developed by the Aerocrete Corporation of America during the year 1936. It has been designed to compete with and take the place of structural 1:2:5 cinder concrete. No cinders, however, are used in its production. Gritcrete consists of a mixture of portland cement and substantially 5½ parts aggregate. The aggregate is composed of one part concrete sand to one and a half parts pea gravel. This aggregate comes to the job ready-mixed, as there is no danger of segregation of a mixture of sand and pea gravel in these proportions.

A PREFERRED MATERIAL FOR ARCHES

Gritcrete is a superior material for so-called short span arches and for fireproofing the structural steel. It can be specified for use wherever sand and gravel are available. With a water-cement ratio of 7 gallons to the bag of cement, a slump of from eight to nine inches is obtainable, and this excellent factor of workability insures a highly economical placing cost.

THE NEW FEDERAL TRADE COMMISSION BUILDING

Gritcrete uses the well-proven Aerocrete principle in the production of a concrete to weigh 108 lbs. per cubic foot. The first installation on a large scale was made early in 1937 in the new building to house the Federal Trade Commission. The Procurement Division of the Treasury Department specified a concrete to weigh 108 lbs. per cu. ft. with an ultimate strength of 800 lbs. per sq. in., as well as a load test on a completed panel. Gritcrete was selected by the contractor, McCloskey & Company, of Philadelphia, to whom we are pleased to refer anyone interested in how Gritcrete worked out on this project.

THE NEW CHRONIC DISEASE HOSPITAL, NEW YORK CITY

The New Chronic Disease Hospital being erected on Welfare Island was designed by Butler & Kohn, York & Sawyer, Architects; H. G. Balcom & Associates, Consulting Engineers. In direct competition with cinder concrete, Gritcrete was selected due to its superior features. Tests, before and during construction, were made for the New York City Building Department, under the supervision of the Department of Hospitals, and the results obtained are matters of record. Further information concerning the serviceability and utility of Gritcrete can be obtained from the General Contractors, Cauldwell-Wingate Company or from the Concrete Sub-contractor, the Knickerbocker Fireproof Arch Company, both of New York City.

We take considerable pride in the ready acceptance that has been given to this new material. We will be pleased to supply those interested with any further data required in addition to the tables and details shown herewith.

STYLES OF WELDED WIRE FABRIC FOR VARIOUS LOADS AND SPANS

BASED ON FORMULAS OF 1938 CODE OF NEW YORK CITY

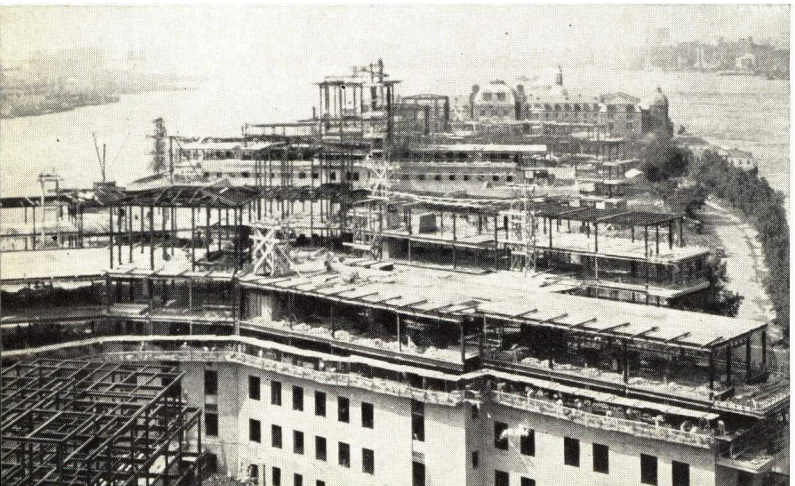
Weight ..... 108 lbs./cu. ft.
Ult. Stress in Compression ..... 800 lbs./sq. in.
Computations $w = 3 \times As \times 20{,}000 \div L \times L$

w \ L	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	
80#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	4″x16″ #6 & #10	4″ Slab
100#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #6 & #10	3″x16″ #7 & #11	3″x16″ #6 &#10	
120#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #6 & #10	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	
140#/□′	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #6 & #10	4″x16″ #5 & #10	3″x16″ #6 & #10	3″x16″ #5 & #10	3″x16″ #4 & #9	
160#/□′	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	3″x16″ #4 & #9	2″x16″ #6 & #10	
180#/□′	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	3″x16″ #5 & #10	2″x16″ #7 & #11	2″x16″ #6 & #10	2″x16″ #5 & #10	

BASED ON REINFORCED CONCRETE FORMULAS

Weight ..... 108 lbs./cu. ft.
Ult. Stress in Compression ..... 800 lbs./sq. in.
Working Stress—Gritcrete ..... 300 lbs./sq. in.
Wire ..... 18,000 lbs./sq. in.
Shear ..... 30 lbs./sq. in.
Computations Moment $= wL \times L \div 12$
Shear $= wL \div 2bjd$

w \ L	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	
80#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	4″x16″ #6 & #10	8″x16″ #7 & #11	4″ Slab
100#/□′	4″x12″ #8 & #12	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #6 & #10	2″x16″ #6 & #10	
120#/□′	4″x12″ #8 & #12	4″x16″ #7 & #11	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #5 & #10	2″x16″ #5 & #10	2″x16″ #7 & #11	4½″ Slab
140#/□′	4″x12″ #8 & #12	3″x16″ #8 & #12	3″x16″ #7 & #11	3″x16″ #5 & #10	2″x16″ #4 & #9	2″x16″ #7 & #11	2″x16″ #4 & #9	
160#/□′	4″x16″ #7 & #11	4″x16″ #6 & #10	3″x16″ #6 & #10	2″x16″ #5 & #10	2″x16″ #7 & #11	2″x16″ #4 & #9	2″x16″ #6 & #10	5″ Slab
180#/□′	3″x16″ #8 & #12	4″x16″ #5 & #10	2″x16″ #6 & #10	2″x16″ #7 & #11	2″x16″ #5 & #10	2″x16″ #6 & #10	2″x16″ #4 & #9	


New Chronic Disease Hospital, Welfare Island, New York City

ROOF CONSTRUCTION

Aerocrete is an ideal material for structural roof or roof fill. Its low weight results in a saving of structural steel while its excellent heat insulating qualities obviate the need for including expensive impermanent insulation materials. Aerocrete is not only permanent, but moisture and vermin proof. It gives an excellent base for built-up roofing.

For a flat roof, Aerocrete poured-in-place on forms is generally to be recommended in accordance with one of the three designs outlined herein. For a sloping roof, precast Aerocrete slabs should be specified. They give a smooth under-surface for plastering.

Aerocrete is one of the cheapest kinds of permanent roof for heated buildings. In specifying Aerocrete, the Architect is specifying structural roof and insulation at the same time.

U. S. P. O. Annex, 32nd Street & Ninth Avenue, New York City
Roof:-Poured-in-Place Structural Aerocrete
Architects: McKim, Mead & White
Builders: James Stewart & Co.

SOUNDPROOF PARTITION SLABS

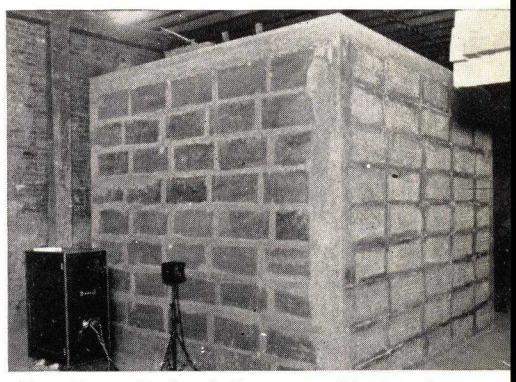
We manufacture Aerocrete partition blocks for use in apartment houses, hotels, hospitals, and other buildings in which good sound insulation is a factor of primary importance. Architects, owners, and loaning institutions are all paying increasing attention to this important factor in building construction.

Aerocrete is highly resistant to sound. At 1000 sound cycles per second, a 4-in. unplastered Aerocrete partition block showed a sound attenuation of 42 decibels. This resistance factor is equal to that of a double wall of 7-in. thickness consisting of materials principally used in the past.

Therefore a sound insulating partition of Aerocrete is more economical to erect. The architect or builder is also able to maintain standard thickness of partition walls, thereby saving valuable rentable space.

Aerocrete partition blocks are made in 3, 4 and 6-in. thicknesses. We will gladly submit a list of the large number of important buildings in which Aerocrete partition blocks have been used with the most satisfactory results.

As back-up blocks behind spandrels, Aerocrete partition blocks will reduce wall thickness for recessing radiators and give better heat insulation.



Test Room Built of Aerocrete Blocks. Over a Quarter of a Million Feet of Aerocrete Partition Blocks Were Installed in the National Broadcasting Studios in Rockefeller Center

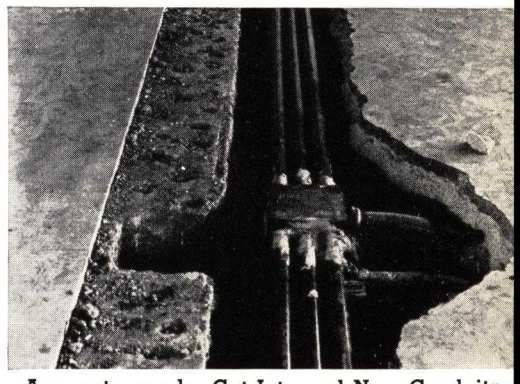
AEROCRETE FLOOR AND ROOF FILL

Dependent on the purpose for which it is used, Aerocrete fill is made in weights from 50 to 90 lbs. Like all Aerocrete, the fill is chemically pure, therefore no danger of corrosion is present when piping and conduits are embedded in the fill.

Compared to other kinds of fill, Aerocrete is considerably lighter. This saving in dead weight means a saving in structural steel and in foundations.

Aerocrete fill gives a more soundproof floor. When poured, the Aerocrete mass is quite fluid and fills easily every crevice in the floor around pipes, ducts, etc. This property makes Aerocrete a superior material for sleeper fill and also acts to restrain the telephoning of sounds along plumbing and heating pipes and structural members.

Aerocrete gives a monolithic job, highly soundproof and heat insulating, vermin proof and permanent.



Aerocrete can be Cut Into and New Conduits Placed With a Minimum of Delay and Inconvenience

AEROCRETE SPECIFICATIONS

I. AEROCRETE "L. S." FLOOR CONSTRUCTION

1) Structural floors shall consist of steel beams encased in light weight concrete reinforced with welded wire fabric as shown on the plans.
2) Where a satisfactory grade of hard coal cinders is available, the light weight concrete shall be composed of a mixture of portland cement, sand, and cinders, properly proportioned, and expanded by the action of Aerocrete Compound to weigh 60 lbs. per cubic foot. Otherwise the light weight concrete shall consist of a mixture of portland cement, and concrete sand, properly proportioned, and expanded by the action of Aerocrete Compound to weigh 70 lbs. per cu. ft.
3) The proportioning of the materials making up the light weight concrete and the installation thereof shall be done at the direction and under the supervision of a qualified representative of the Aerocrete Corporation of America.

II. AEROCRETE "R. S." FLOOR CONSTRUCTION

1) Structural floors shall consist of open truss joists, the top chord of which shall be encased in a slab of 1:2:4 stone concrete, and the bottom chord and web in light weight concrete, reinforced with reinforcing rods, all as shown on the plans.
2) Where a satisfactory grade of hard coal cinders is available, the light weight concrete shall be composed of a mixture of portland cement, sand, and cinders, properly proportioned, and expanded by the action of Aerocrete Compound to weigh 60 lbs. per cubic foot. Otherwise the light weight concrete shall consist of a mixture of portland cement, and concrete sand, properly proportioned, and expanded by the action of Aerocrete Compound to weigh 70 lbs. per cubic foot.
3) The proportioning of the materials making up the light weight concrete and the installation thereof shall be done at the direction and under the supervision of a qualified representative of the Aerocrete Corporation of America.

III. STRUCTURAL AEROCRETE SHORT SPAN CONSTRUCTION

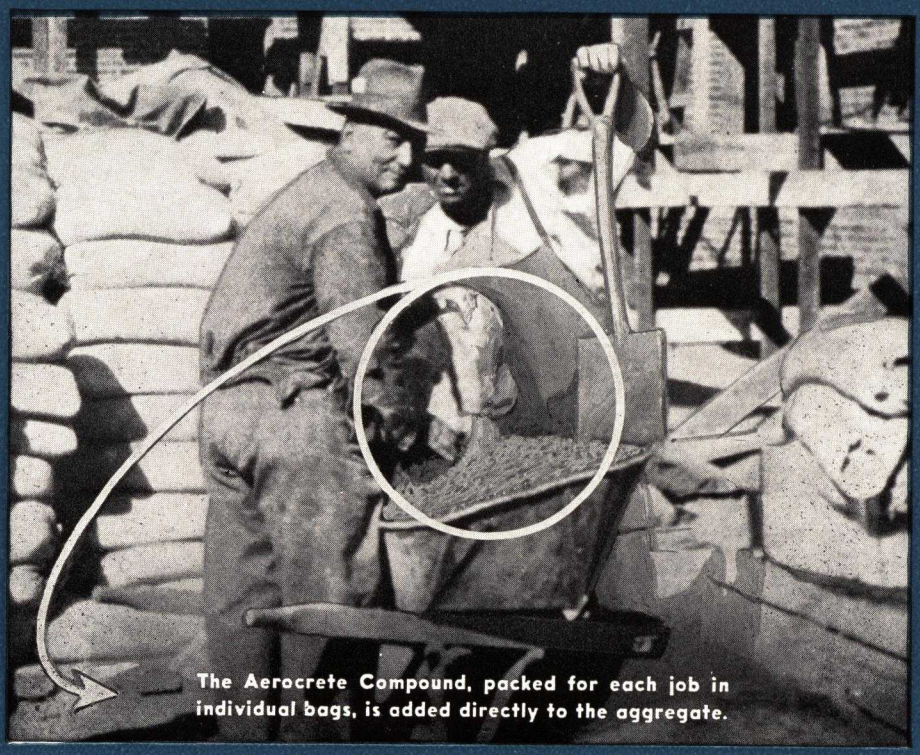
1) Structural arches and fireproofing of beams and girders shall consist of structural light weight concrete reinforced with welded wire fabric, as shown on the plans.
2) Where a satisfactory grade of hard coal cinders is available, the light weight concrete shall be composed of a mixture of portland cement, sand, and cinders, properly proportioned and expanded by the action of Aerocrete Compound to weigh 60 lbs. per cubic foot. Otherwise the light weight concrete shall consist of a mixture of portland cement, and concrete sand, properly proportioned, and expanded by the action of Aerocrete Compound to weigh 80 lbs. per cubic foot.
3) The proportioning of the materials making up the light weight concrete and the installation thereof shall be done at the direction and under the supervision of a qualified representative of the Aerocrete corporation of America.

IV. GRITCRETE SHORT SPAN CONSTRUCTION

1) Structural arches and fireproofing of beams and girders shall consist of Gritcrete reinforced with welded wire fabric as shown on the plans.
2) The Gritcrete shall consist of a mixture of portland cement, concrete sand, and pea gravel sized up to 3/8", properly proportioned, and expanded by the action of Gritcrete Compound to weigh 108 lbs. per cubic foot.
3) The proportioning of the materials making up the Gritcrete, and the installation thereof shall be done under the direction of and under the supervision of a qualified representative of the Aerocrete Corporation of America.

V. AEROCRETE FLOOR AND ROOF FILL

1) Floor fill shall consist of light weight concrete weighing lbs. per cubic foot. (Note: any suitable weight from 50 to 90 lbs. per cubic foot may be selected. In general, the heavier weights are somewhat more economical than the lighter.)
2) The light weight concrete shall be composed of a mixture of portland cement and properly graded sand, proportioned as directed, and expanded by the action of Aerocrete Compound to produce the weight specified.
3) The proportioning of the materials making up the light weight concrete and the installation thereof shall be done at the direction of and under the supervision of a qualified representative of the Aerocrete Corporation of America.



The Aerocrete Compound, packed for each job in individual bags, is added directly to the aggregate.

AEROCRETE
LIGHTWEIGHT CONCRETE

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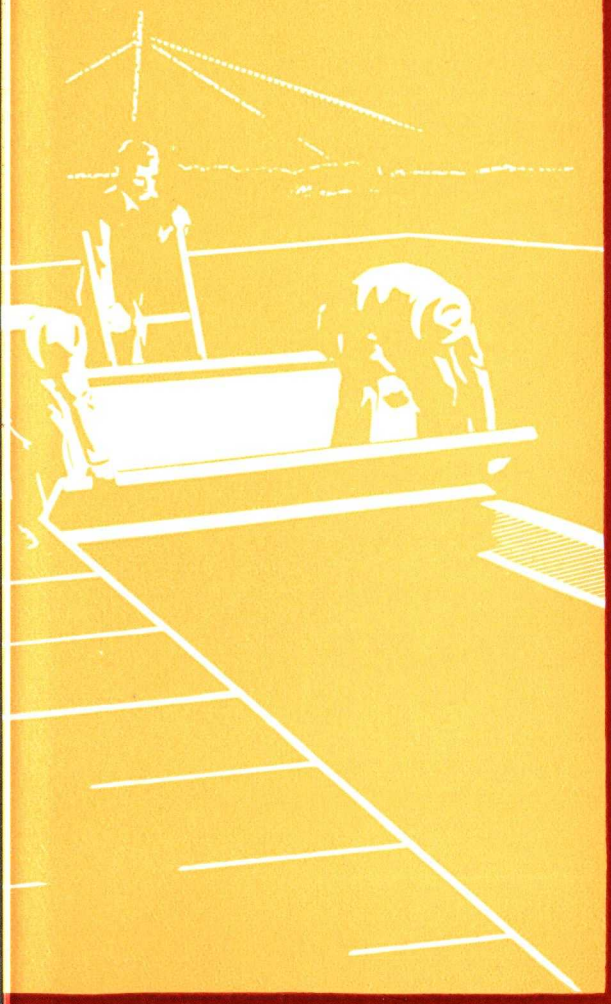


Featherweight CONCRETE INSULATING ROOF SLABS

FEDERAL-AMERICAN CEMENT TILE CO.

CHICAGO • ILLINOIS

CATALOG 103
ROOF STANDARDS ★

FEDERAL-AMERICAN CEMENT TILE CO.

Featherweight Precast Concrete Roof Slabs

Executive Offices: 608 SOUTH DEARBORN STREET, CHICAGO, ILL.

Plants near: CHICAGO - NEW YORK - PITTSBURGH - BIRMINGHAM - Sales Offices in all Principal Cities

THE ROOF FOR PERMANENCE

Featherweight Roof Slabs are Precast of Haydite aggregate, are unusually light in weight, strong, and possess insulating value unique in concrete. They represent the latest development in permanent, fireproof, no-maintenance roof construction.

They are manufactured in our own four modern strategically located plants where conditions for mixing and casting concrete are ideal. Temperature and moisture as well as all other factors are held under strict control at all seasons of the year. A scientifically proportioned mix is placed in a rigid steel mold with the steel reinforcing mechanically held in its proper position. The form is then vibrated at the rate of 2500 blows per minute, giving a strong, dense, impervious concrete. Vibration also imparts a smooth underfinish to the slab, producing an attractive ceiling effect of natural cement color. No painting is necessary.

A ***Featherweight*** Precast Concrete Roof is laid on the same light steel frame that supports other roofs. The slabs carry a load well above all building code requirements. It is a low cost permanent roof deck. **Over two hundred and fifty million square feet are in use today.**

One of the following roof slabs will meet your roof deck requirement.

FEATHERWEIGHT **CONCRETE CHANNEL ROOF SLABS**—Used for flat or sloping roofs. Composition covering is required. See details on sheets 33 to 42.

FEATHERWEIGHT **NAILING CONCRETE SLABS**—A concrete roof deck to which slate, ornamental tile, copper or other roofing can be directly nailed. See details on sheets 43 to 45.

FEATHERWEIGHT **CONCRETE INTERLOCKING SLABS**—A complete waterproof roof eliminating all composition covering. For roofs of not less than 1/6 pitch. See details on sheets 46 to 48.

FEATHERWEIGHT **GLASS INSERT SLABS**—Used in combination with Interlocking Slabs for top lighting. The ¼ x 21 x 35 in. wire glass insert is embedded in the concrete during manufacture. See details on sheet 46.

SERVICE AND STRUCTURAL DETAILS—Our engineers will gladly suggest the most economical layout of both steel and slabs without charge or obligation. "Catalog and Roof Standards" will be sent on request.

STANDARD SPECIFICATIONS

FEATHERWEIGHT **CONCRETE CHANNEL ROOF SLABS**—The roof decks shall be precast ***Featherweight*** Concrete Insulating Channel Slabs 2¾" deep for spans up to 6' 4" and 3½" deep or more for longer spans. The web thickness shall be a full one inch, composed of an approved brand of portland cement and the highest grade Haydite aggregate accurately graded and thoroughly mixed and vibrated so as to obtain the greatest possible density. Each leg shall be reinforced with one deformed bar accurately centered so as to have at least one-half inch of dense, impervious concrete on all sides. The web of the slab shall be reinforced with a sheet of galvanized welded wire mesh accurately placed.

All joints of the channel slabs shall be cemented on the upper side with an approved brand of asphaltic cement and the finished deck shall present a smooth surface ready for the application of the composition covering.

All slabs shall carry not less than 250 pounds per square foot, ultimate load uniformly distributed when resting on supports spaced the same as the purlins.

No warped, cracked or broken slabs shall be placed in the roof. All slabs shall be as nearly perfect as good workmanship will permit.

All slabs shall be natural water and air cured under cover at a constant temperature of not less than 65° F.

This contractor shall submit details based on the steel fabricator's shop drawings as well as the architect's drawings for approval before proceeding with manufacture.

All slabs shall be erected by or under the supervision of the manufacturer in a thorough, workmanlike manner.

FEATHERWEIGHT **NAILING CONCRETE ROOF SLABS**—Where specified, the roof decks shall be precast ***Featherweight*** NAILING Concrete Flat Slabs of Haydite aggregate designed for the spans shown, with a top section of 1¼" of Nailing Concrete cast integral with the ***Featherweight*** concrete bottom section.

Each slab shall be reinforced with a sheet of galvanized cold drawn wire mesh accurately placed in the slab. The longitudinal wires shall be spaced not more than 1⅜" apart and cross wires not more than 2" apart woven around the longitudinal wires.

All slabs shall carry not less than 250 pounds per square foot ultimate load uniformly distributed when resting on supports spaced the same as the purlins.

All slabs shall be as nearly perfect as good workmanship will permit. No cracked, broken or warped slabs shall be placed in the roof.

All slabs shall be natural water and air cured under cover at a constant temperature of not less than 65° F.

This contractor shall submit details based on the steel fabricator's shop drawings as well as the architect's drawings for approval before proceeding with manufacture.

All slabs shall be erected by or under the supervision of the manufacturer, in a thorough, workmanlike manner.

FEATHERWEIGHT **INTERLOCKING AND GLASS INSERT SLABS**—Where specified, sloping roofs shall be ***Featherweight*** Reinforced Concrete Interlocking Slabs, the exposed surface of which is to present a smooth, permanent, red finish, and this color to penetrate the top one-half of the slab.

Each slab shall be reinforced with a sheet of galvanized cold drawn wire mesh accurately centered in the slab. The longitudinal wires shall be spaced not more than 1⅜" apart and cross wires not more than 2" apart woven around the longitudinal wires.

The longitudinal joints shall be cemented with a high grade oil cement and a weather cap coat of highest grade elastic compound. The lap or cross joint shall be a squeeze joint of high grade oil cement.

All trimmings, such as ridge roll, flashing slabs, finishing slabs, sawtooth ridges and ventilator collar slabs of the same specification as above, shall be furnished as shown on the drawings.

All slabs shall carry not less than 250 pounds per square foot ultimate load uniformly distributed when resting on supports spaced the same as the purlins.

All slabs shall be as nearly perfect as good workmanship will permit. No cracked, broken or warped slabs shall be placed in the roof.

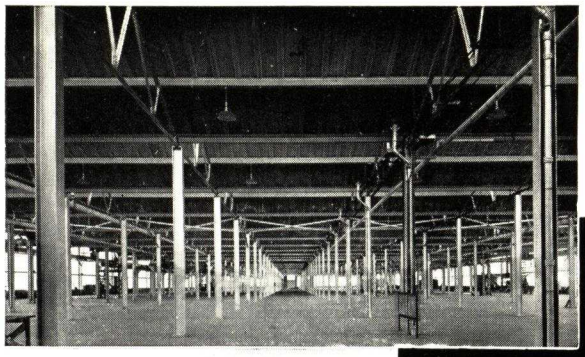
All slabs shall be natural water and air cured under cover at a constant temperature of not less than 65° F.

This contractor shall submit details based on the steel fabricator's shop drawings as well as the architect's drawing for approval before proceeding with manufacture.

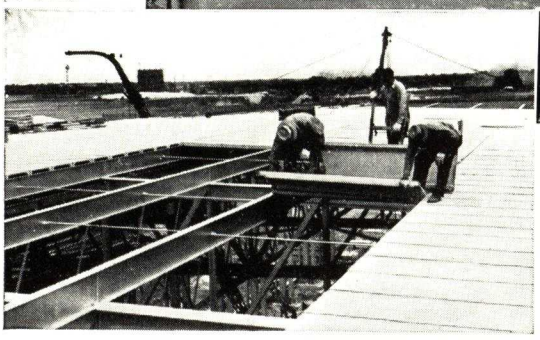
All slabs shall be erected by or under the supervision of the manufacturer in a thorough, workmanlike manner.

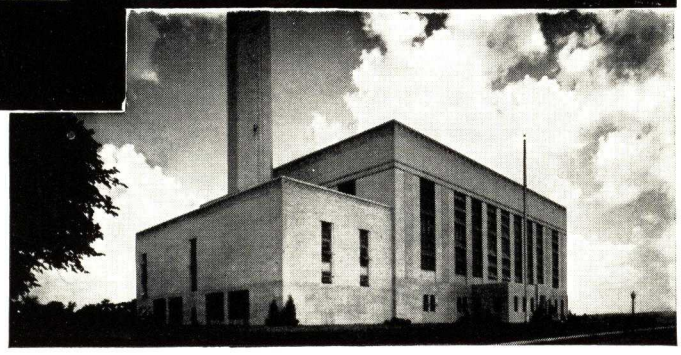
Where specified, top lighting shall be provided by Interlocking Slabs with ¼" x 21" x 35" wire glass inserts. Locate as shown on drawings.

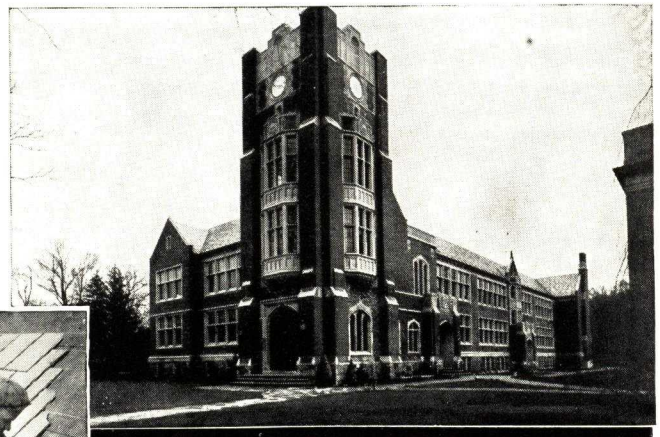
TYPICAL INSTALLATIONS



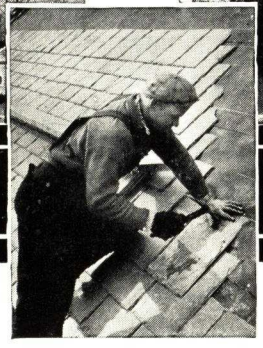
Featherweight PRECAST CONCRETE CHANNEL SLABS



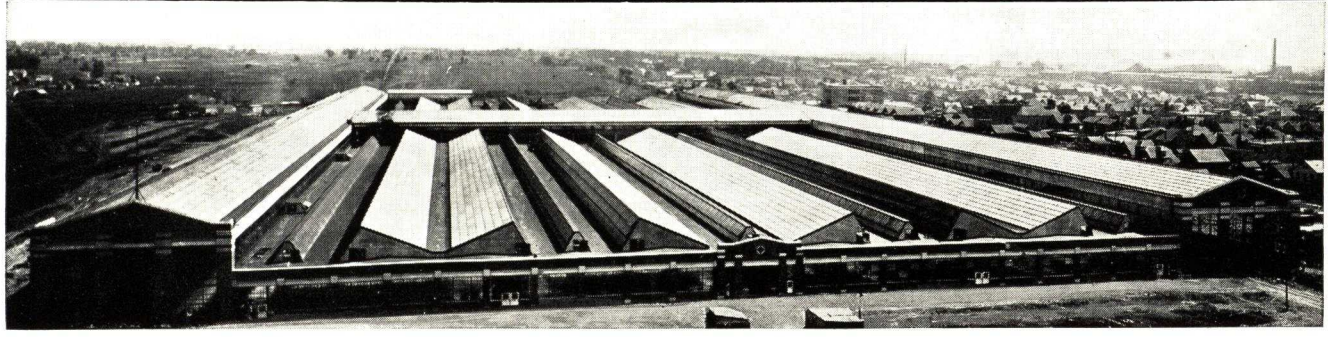




Featherweight NAILING CONCRETE SLABS



Featherweight CONCRETE INTERLOCKING SLABS

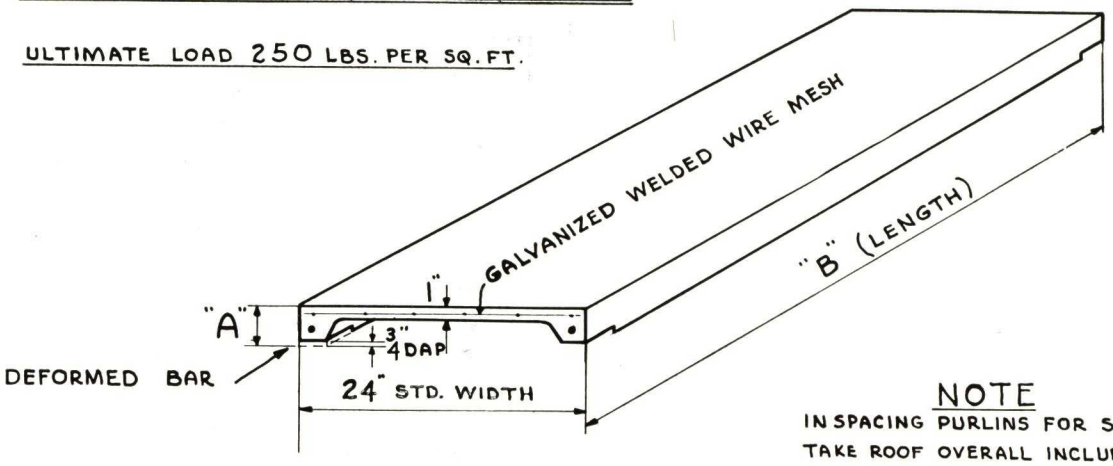


FEDERAL-AMERICAN CEMENT TILE CO. - CHICAGO

CHANNEL SLAB DETAILS

FEATHERWEIGHT CHANNEL SLABS

ULTIMATE LOAD 250 LBS. PER SQ. FT.

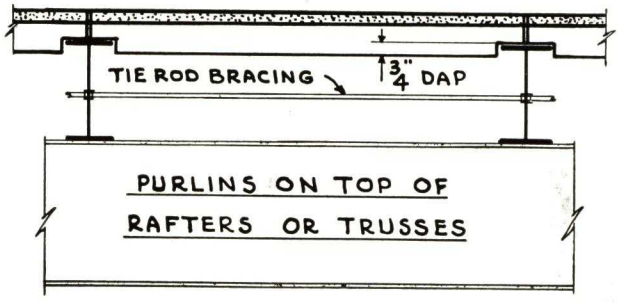


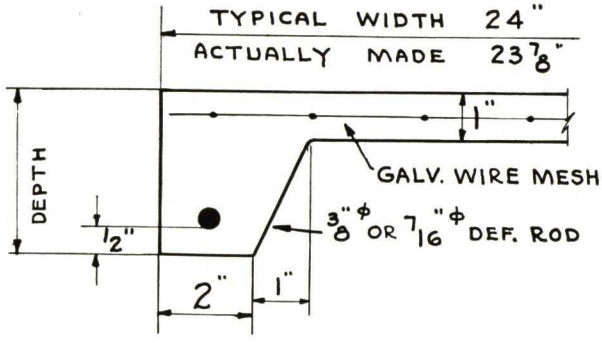
"A" DEPTH	"B" LENGTH	MAXIMUM LENGTH	WEIGHT PER SQ. FT.
$2\frac{3}{4}$"	SEE NOTE	6'-4"	10 LBS.
$3\frac{1}{2}$"	SEE NOTE	8'-4"	12 LBS.

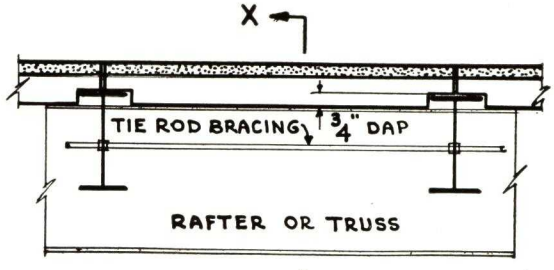
NOTE

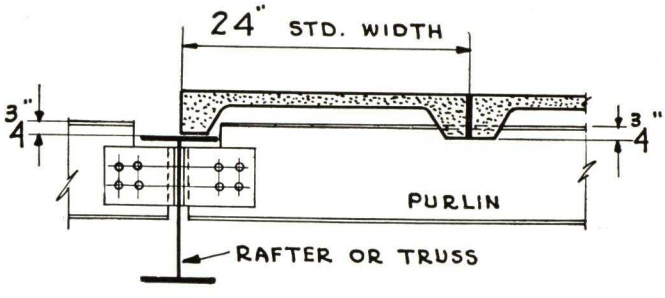
IN SPACING PURLINS FOR SLABS TAKE ROOF OVERALL INCLUDING OVERHANG EQUALIZING SLAB LENGTHS. LENGTHS TO 6'-4" USE $2\frac{3}{4}$" DEPTH. LENGTHS OVER 6'-4" USE $3\frac{1}{2}$" DEPTH. AVOID COMBINATION OF BOTH DEPTH SLABS TOGETHER.

SLABS CAN BE FURNISHED FOR SPECIAL CONDITIONS





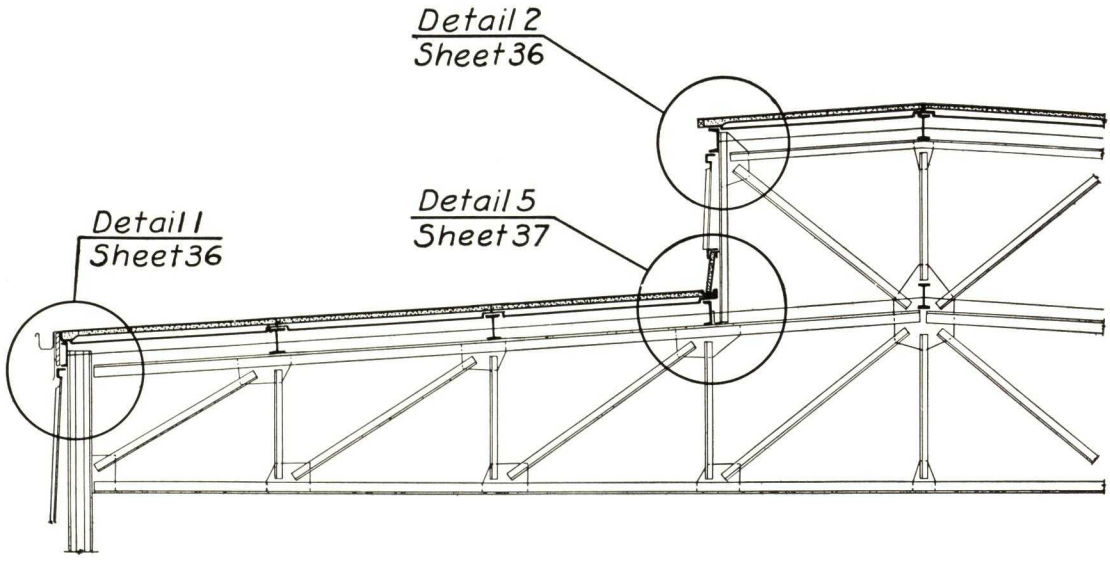




SECTION "X-X"

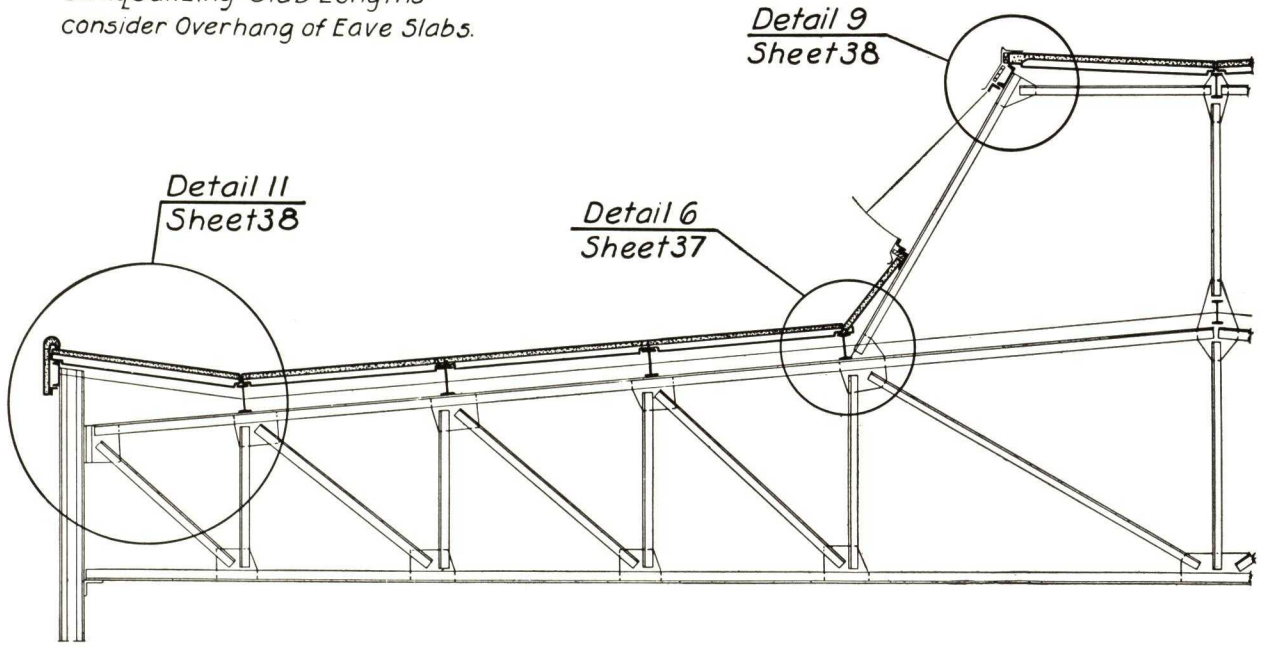
WHEN PURLINS FRAME TO RAFTERS OR TRUSSES
PLACE TOP OF PURLINS $\frac{3}{4}$" ABOVE
(RAFTER ALSO USED FOR SLAB SUPPORT)

CHANNEL SLAB DETAILS



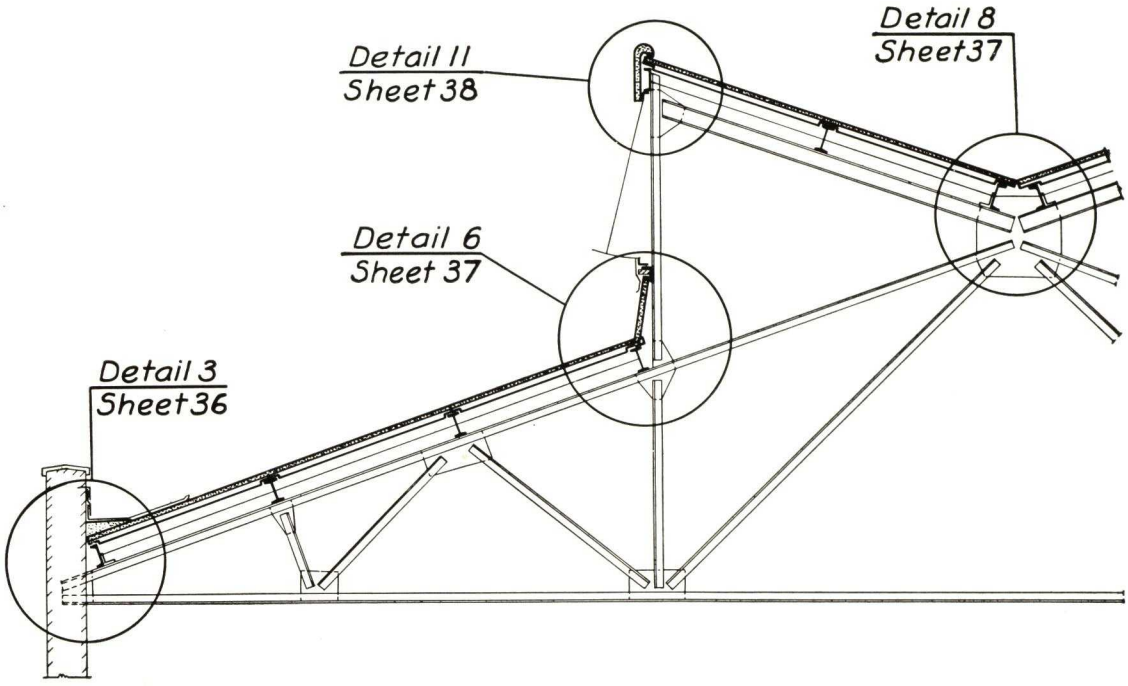
MONITOR TYPE ROOF

In Equalizing Slab Lengths
consider Overhang of Eave Slabs.



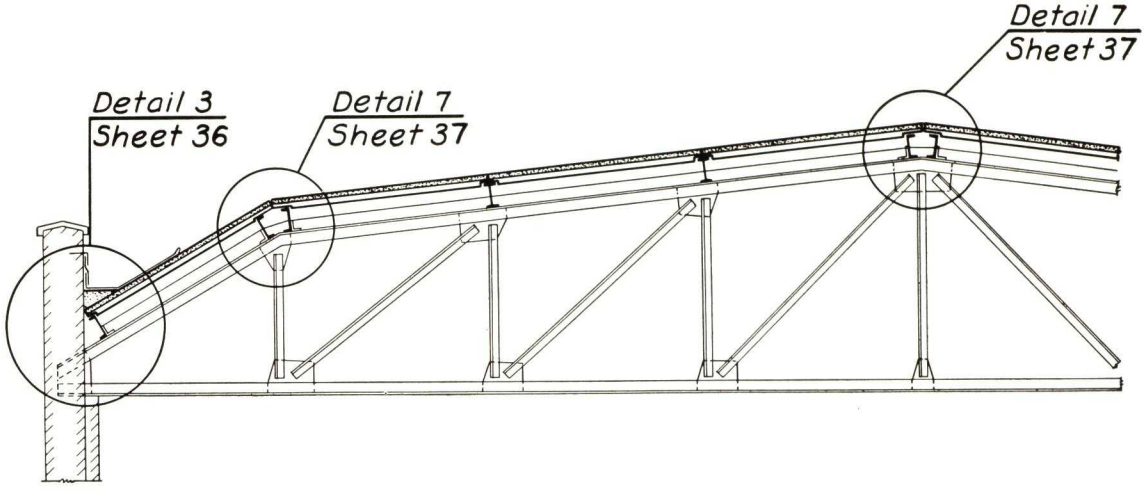
"A" FRAME MONITOR

CHANNEL SLAB DETAILS



INVERTED MONITOR

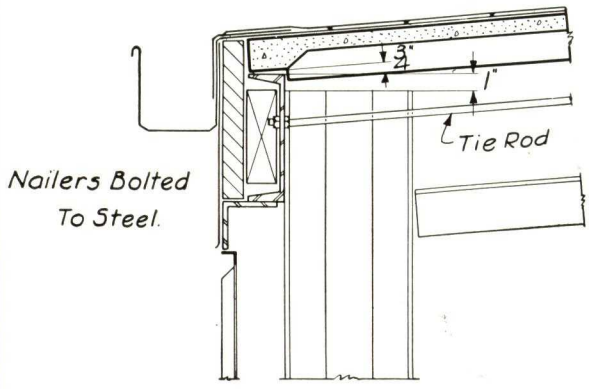
In Equalizing Slab Lengths consider Overhang of Eave Slabs.



HIP ROOF

CHANNEL SLAB DETAILS

Note Stop Cols 1" Below Top of Purlins
Slabs Notched $\frac{3}{4}$" for Locking



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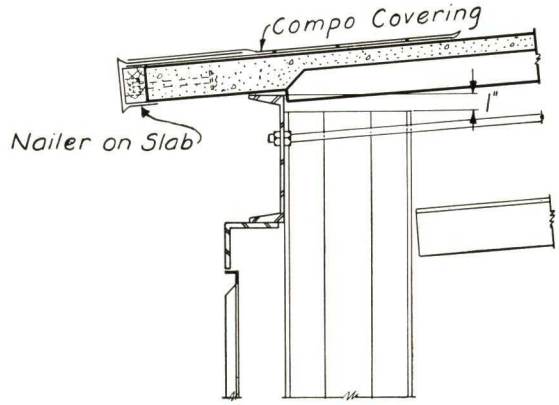

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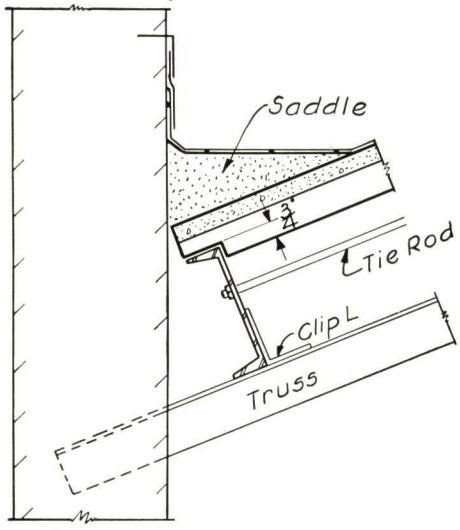

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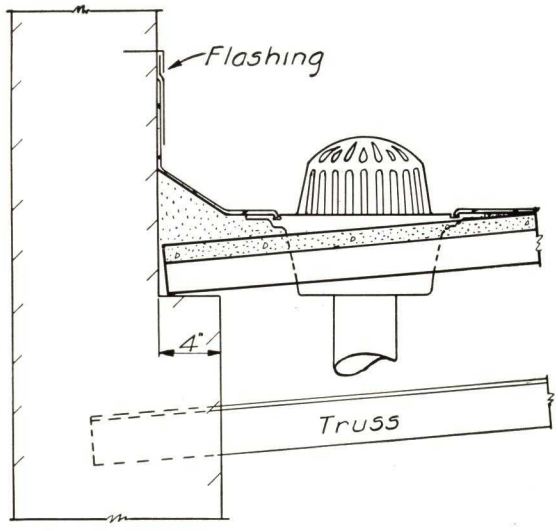

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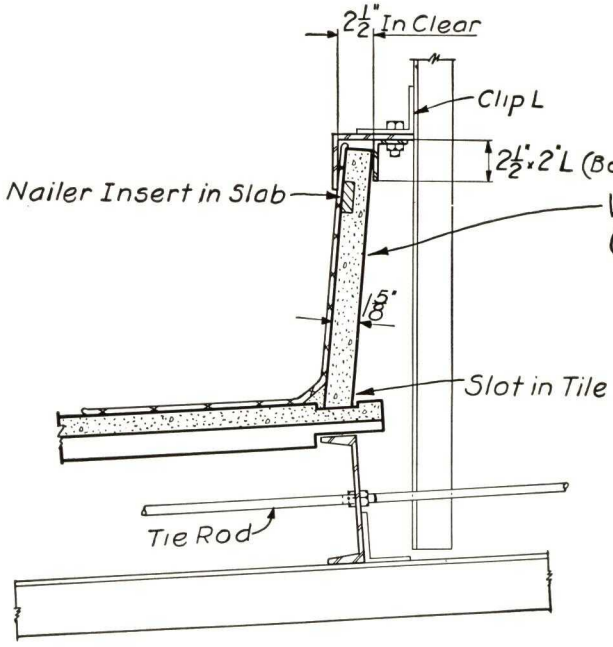
CHANNEL SLAB DETAILS



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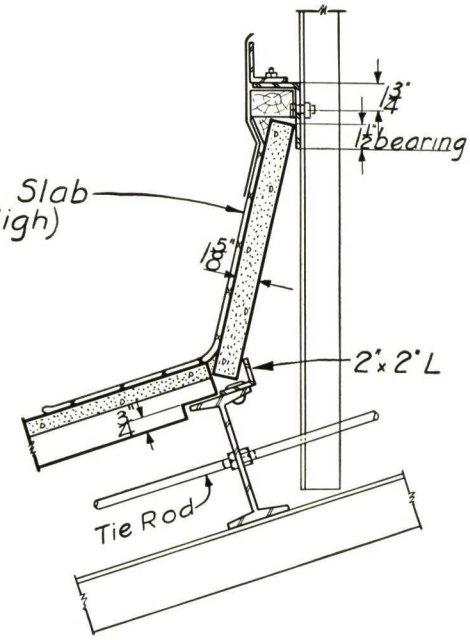

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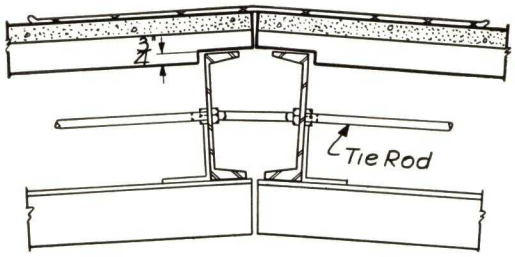

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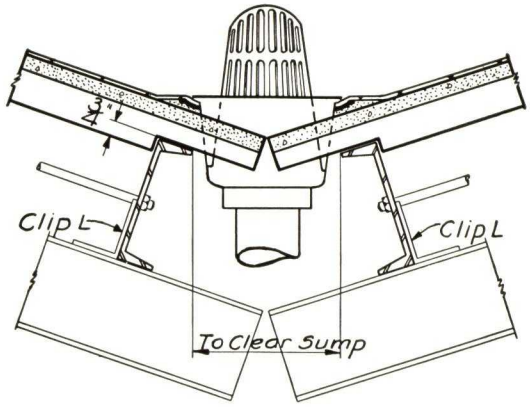

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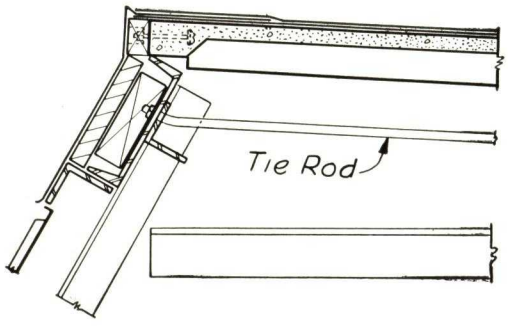
CHANNEL SLAB DETAILS



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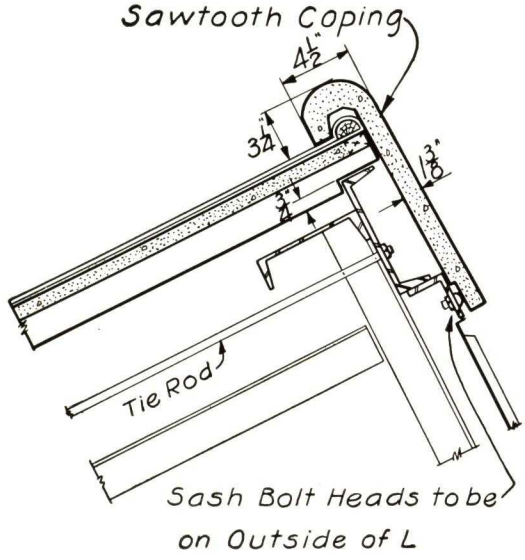

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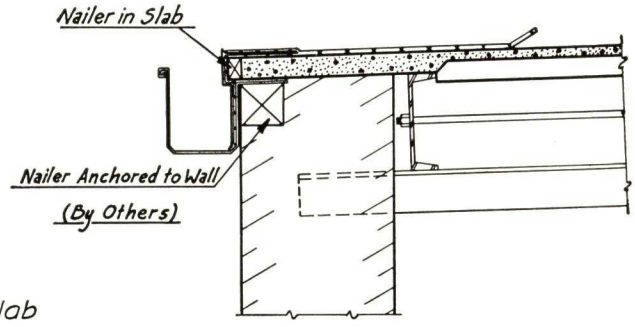
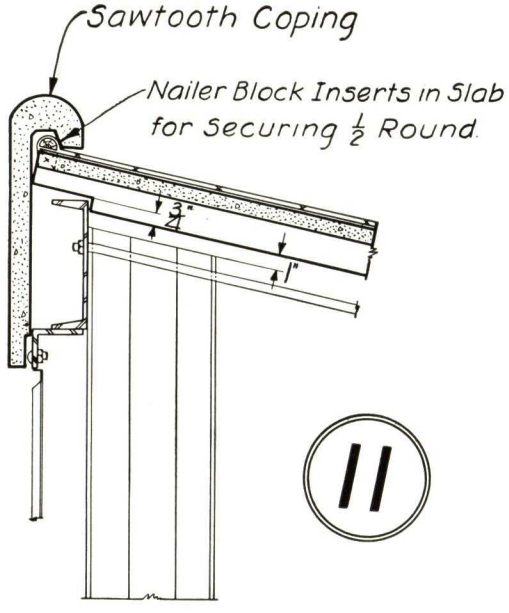
Brace Top Purlin against Pull down of Roof



EAVE DETAIL



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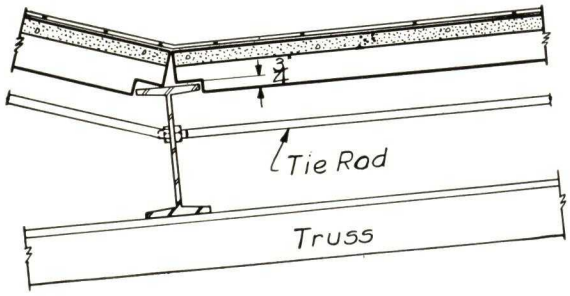
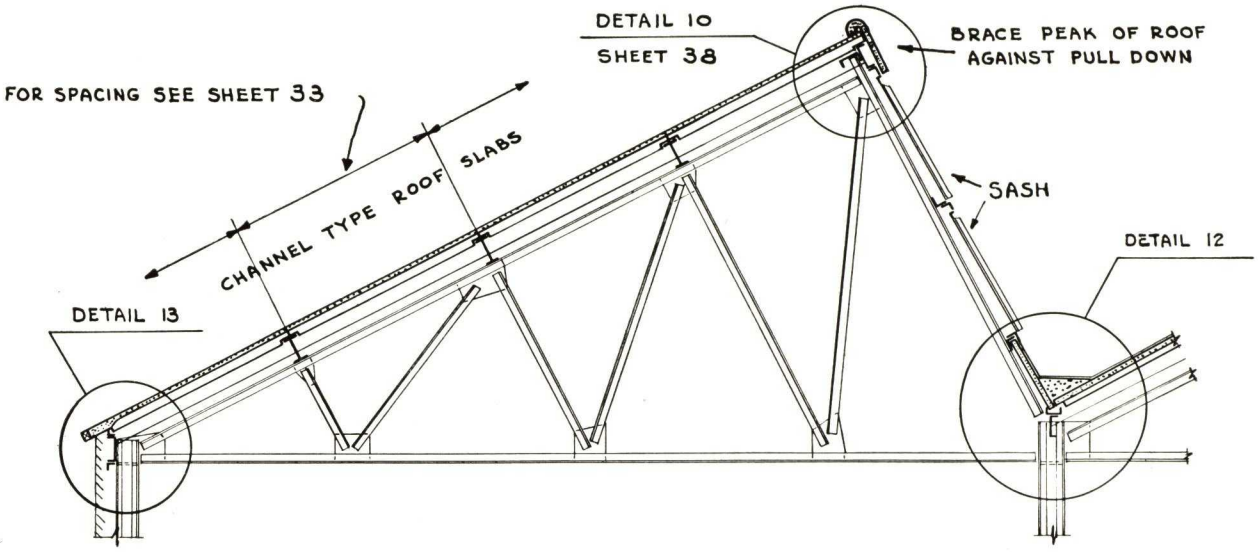
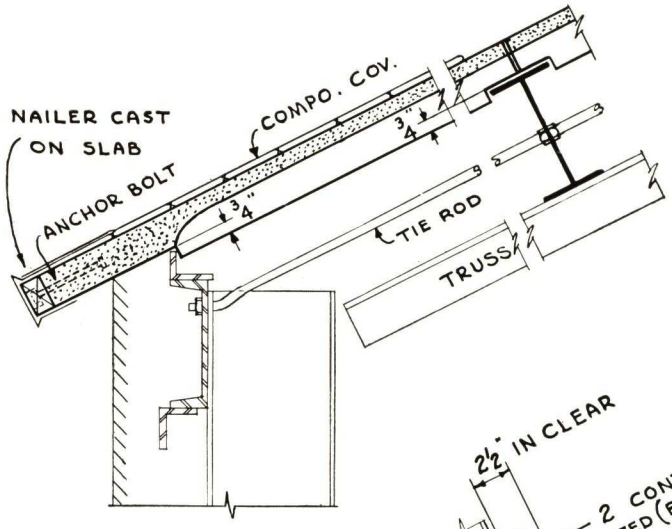


CHANNEL SLAB DETAILS



SAWTOOTH ROOF



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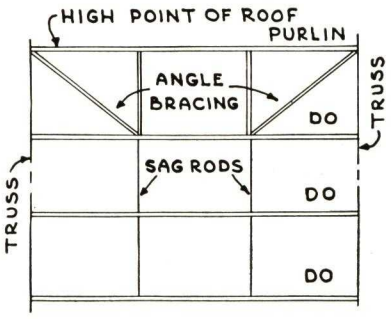
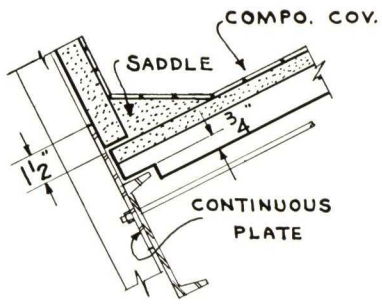
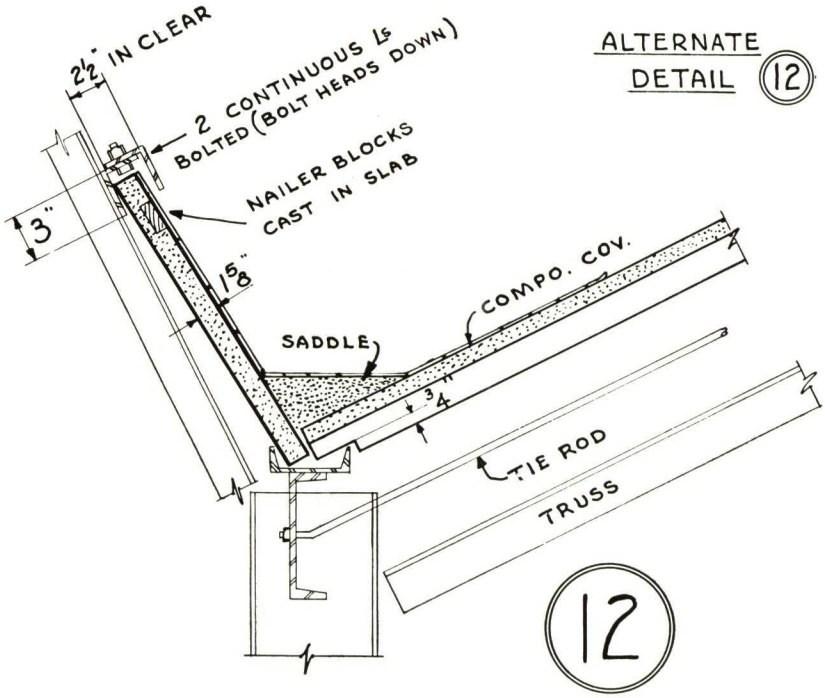


DIAGONAL TOP BRACING

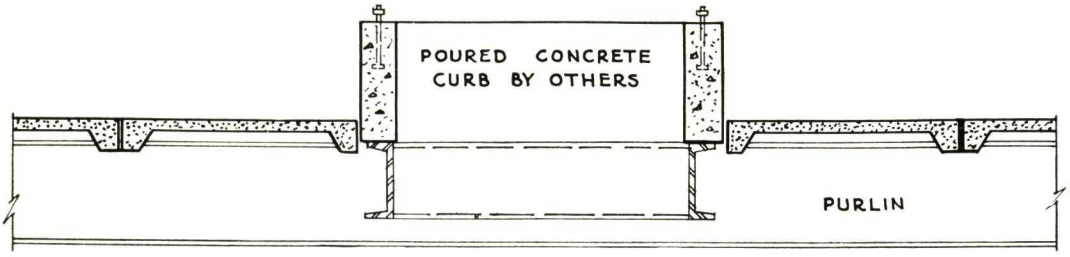


ALTERNATE DETAIL (12)

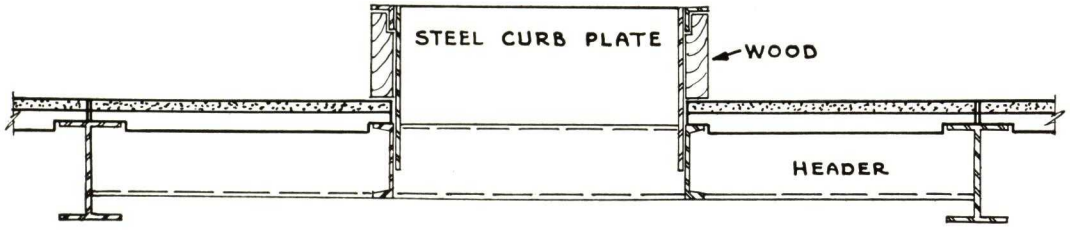


12

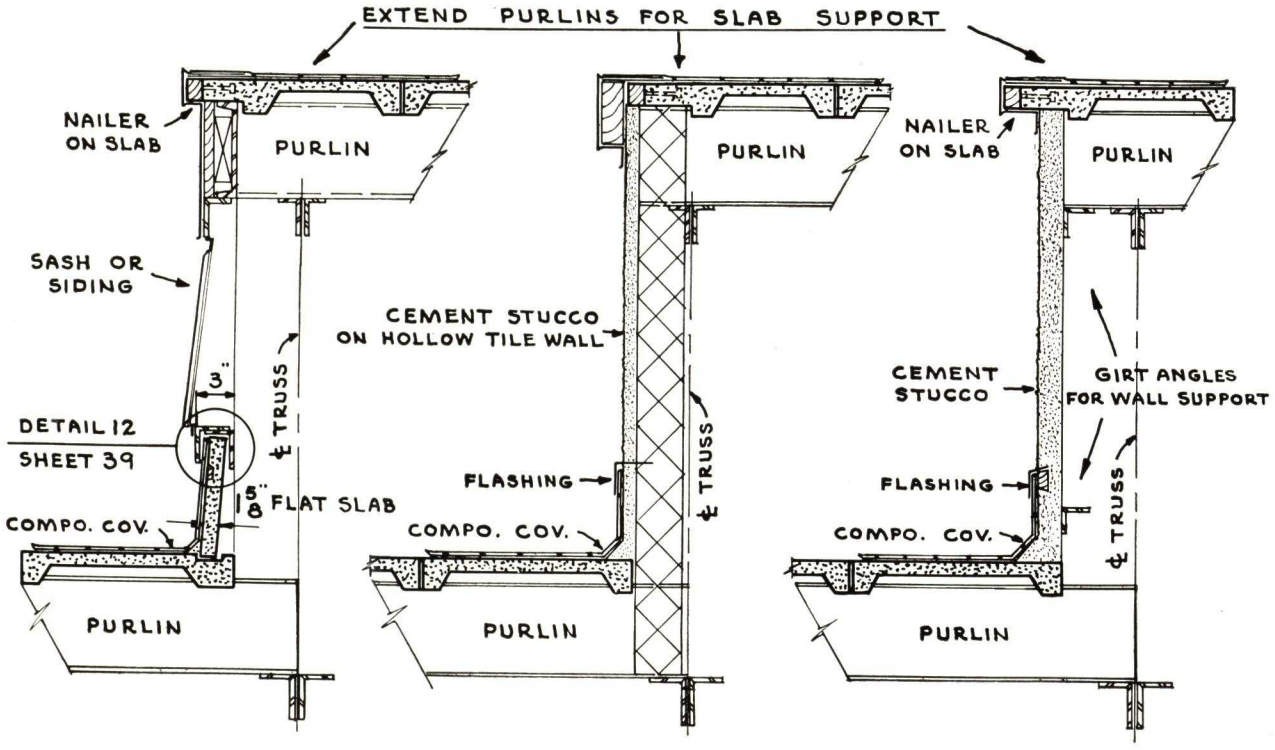
CHANNEL SLAB DETAILS



FRAMING ON ALL 4 SIDES OF OPENING
FLUSH WITH TOP LINE OF PURLINS



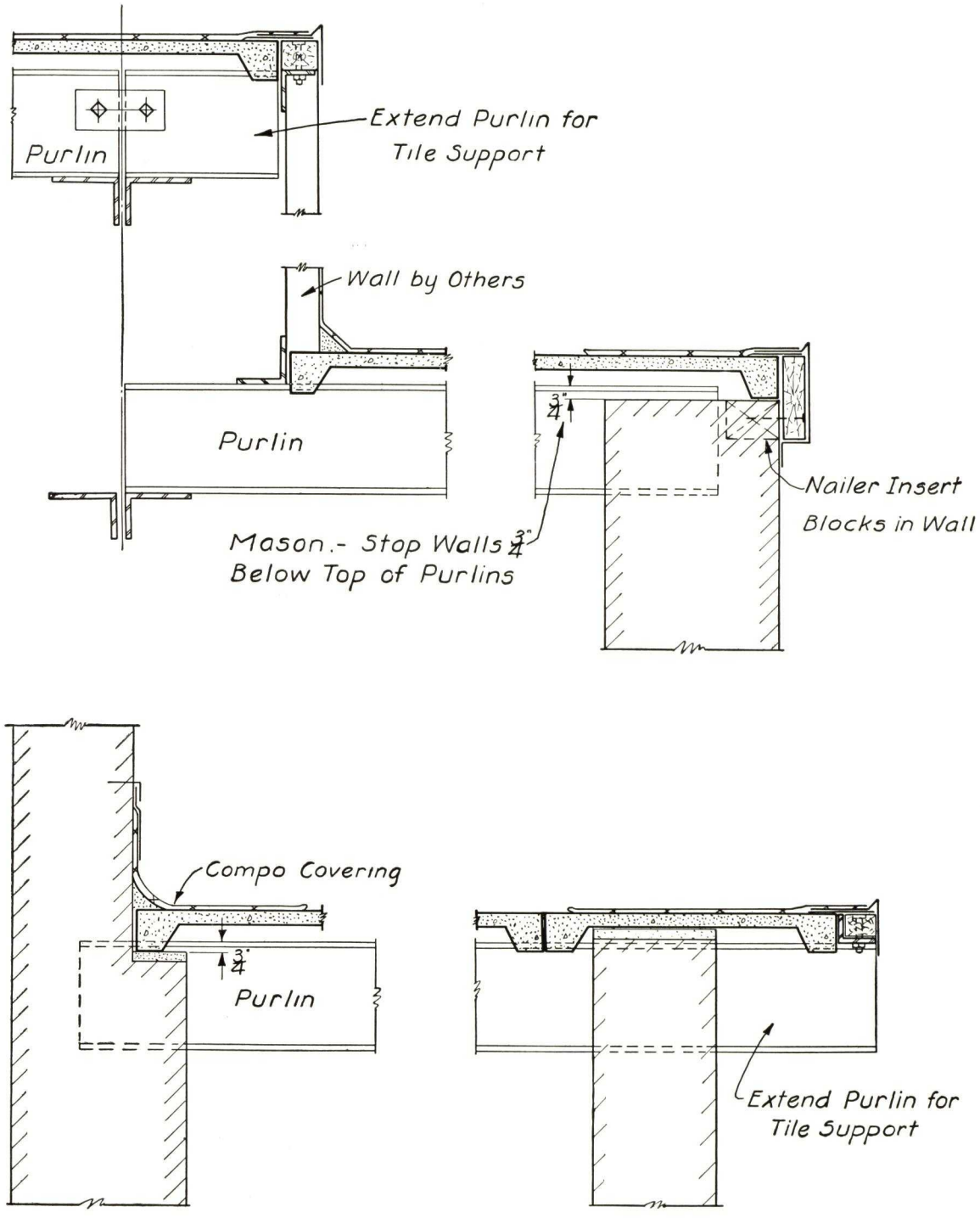
CURB DETAILS (OPENINGS FOR VENTILATORS, STACKS, SCUTTLES, SKYLIGHTS, ETC.)



END WALL OF MONITOR OR BETWEEN HIGH AND LOW BAYS

FEDERAL-AMERICAN CEMENT TILE CO. - CHICAGO

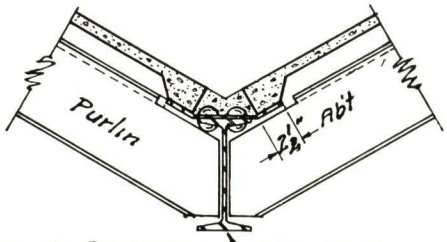
CHANNEL SLAB DETAILS



GABLE END DETAILS

CHANNEL SLAB DETAILS

Flatten Rivet Heads to 4" Top Side

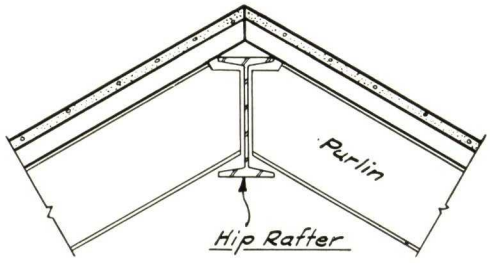


Provide $\frac{3}{16}$" Valley Plate When Flange of Rafter is Less Than 4"

Valley Rafter

TYPICAL VALLEY SECTION

If channel hip rafter is used, angle should be provided ℐ.

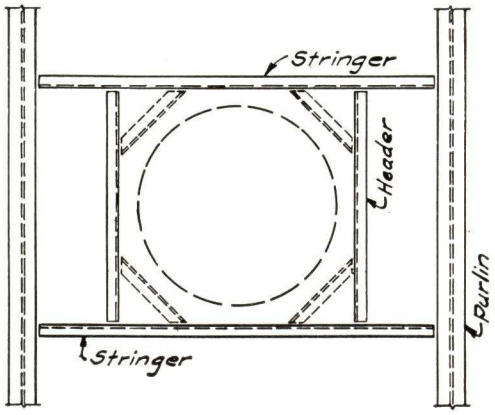


Top Line of Purlins to Intersect Outer Edge of Hip Rafter to Support Roof Slabs

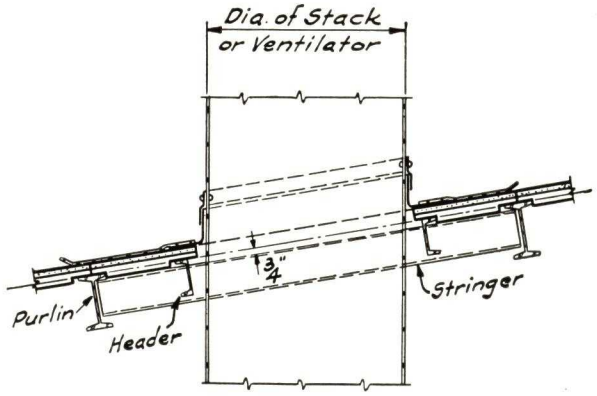
TYPICAL HIP SECTION

No Framing Needed For Openings 24" Dia. or Less

Diagonal Members Needed For Openings Over 42" Dia.



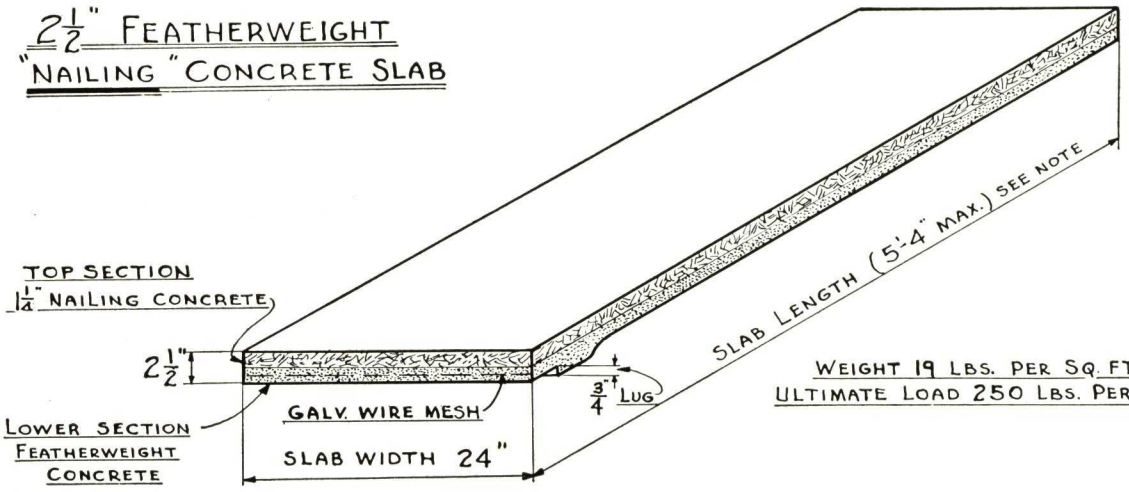
All Framing Flush Top With Purlins Except Stringer Members to be $\frac{3}{4}$" Below



TYPICAL FRAMING AROUND STACK OR VENTILATOR OPENINGS

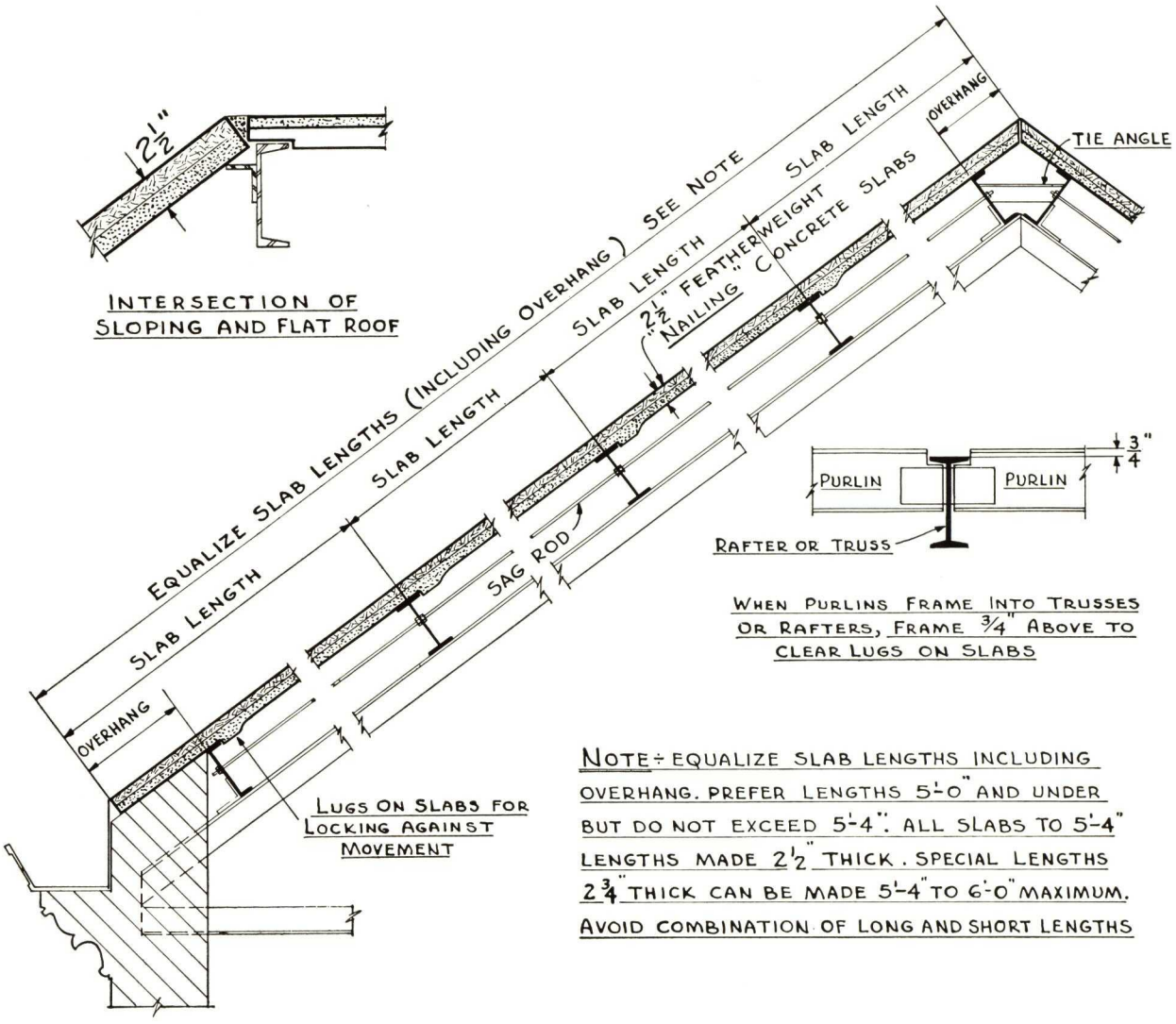
NAILING CONCRETE SLAB DETAILS

2½" FEATHERWEIGHT "NAILING" CONCRETE SLAB



WEIGHT 19 LBS. PER SQ. FT.
ULTIMATE LOAD 250 LBS. PER SQ. FT.

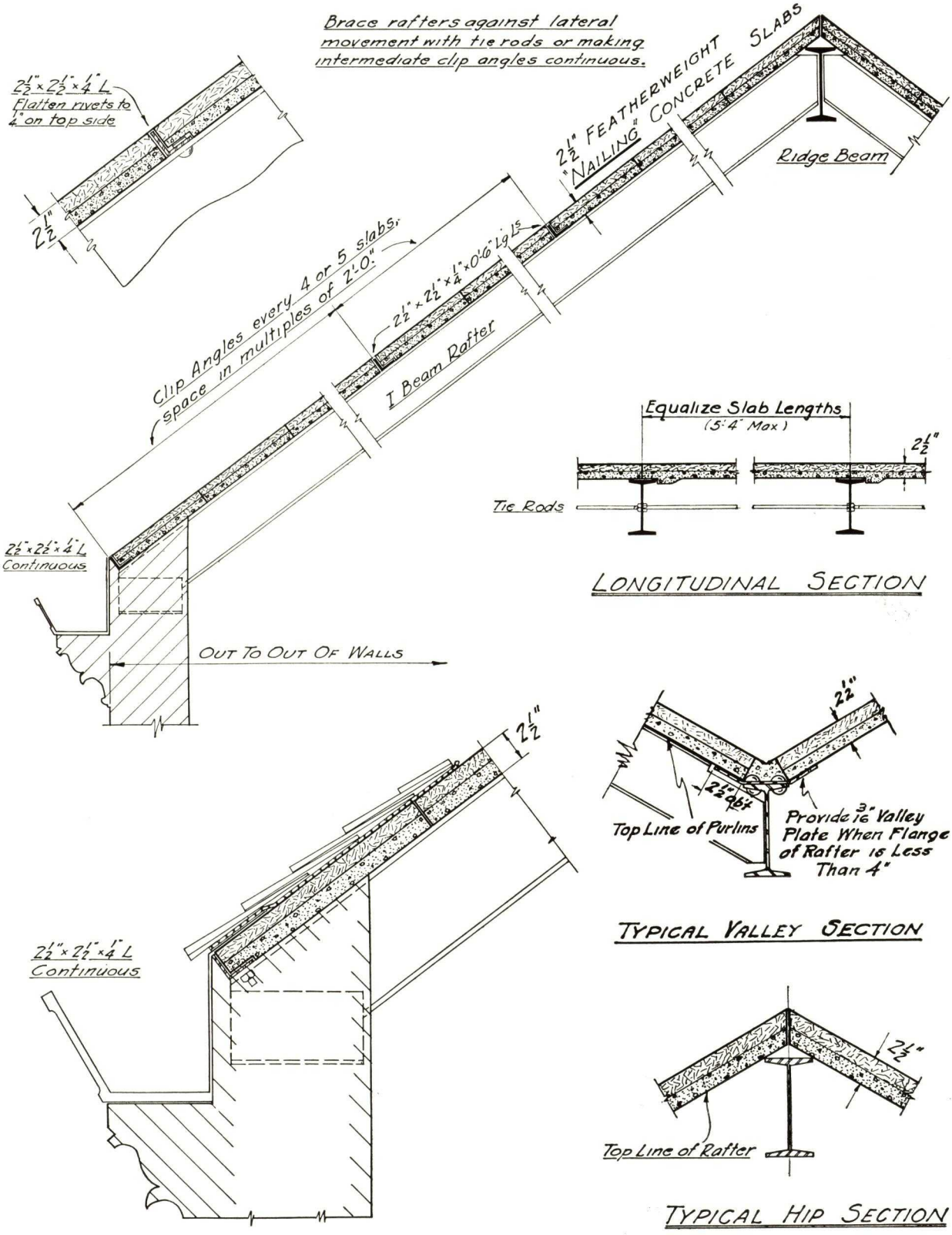
INTERSECTION OF SLOPING AND FLAT ROOF



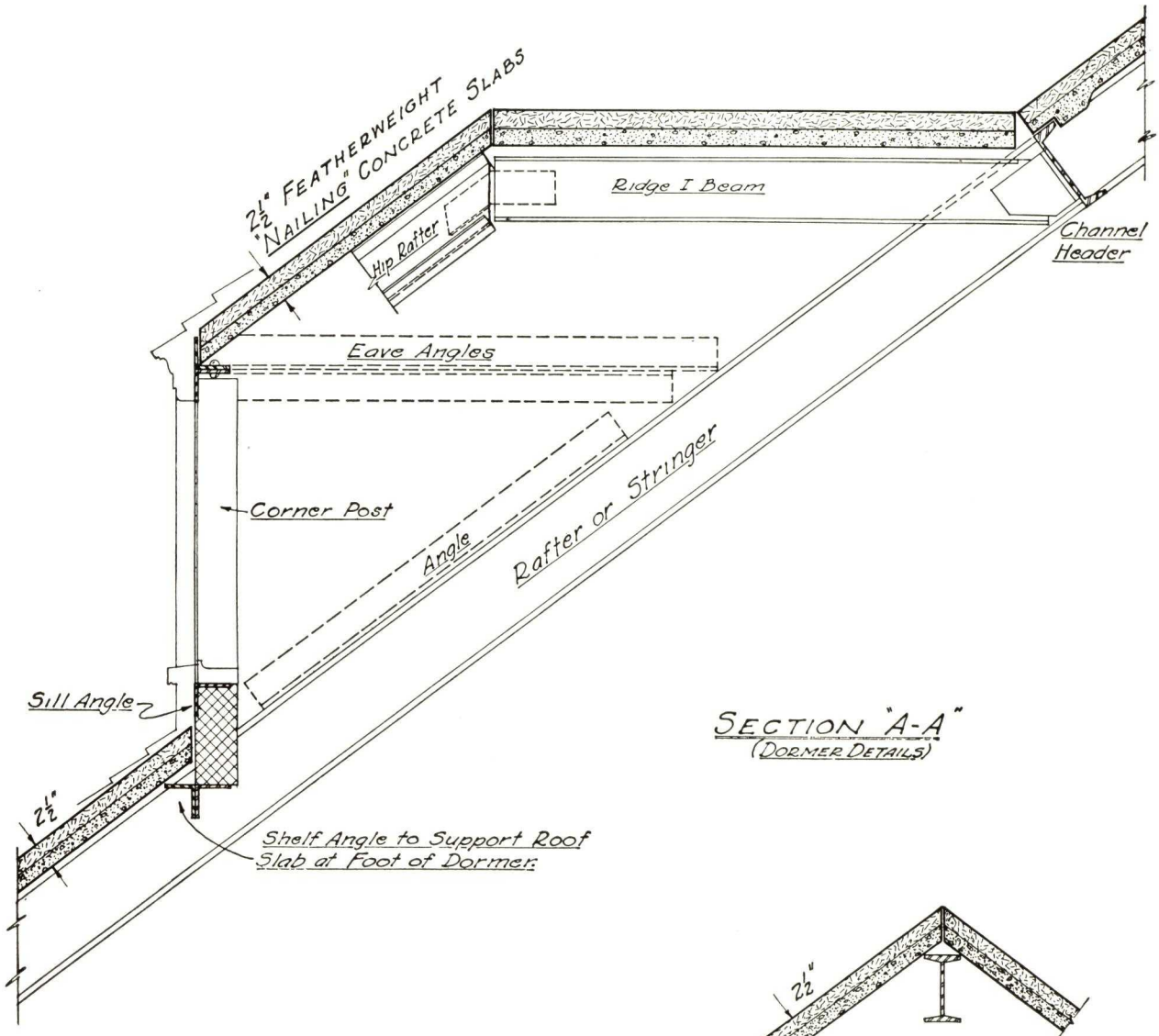
WHEN PURLINS FRAME INTO TRUSSES OR RAFTERS, FRAME ¾" ABOVE TO CLEAR LUGS ON SLABS

NOTE: EQUALIZE SLAB LENGTHS INCLUDING OVERHANG. PREFER LENGTHS 5'-0" AND UNDER BUT DO NOT EXCEED 5'-4". ALL SLABS TO 5'-4" LENGTHS MADE 2½" THICK. SPECIAL LENGTHS 2¾" THICK CAN BE MADE 5'-4" TO 6'-0" MAXIMUM. AVOID COMBINATION OF LONG AND SHORT LENGTHS

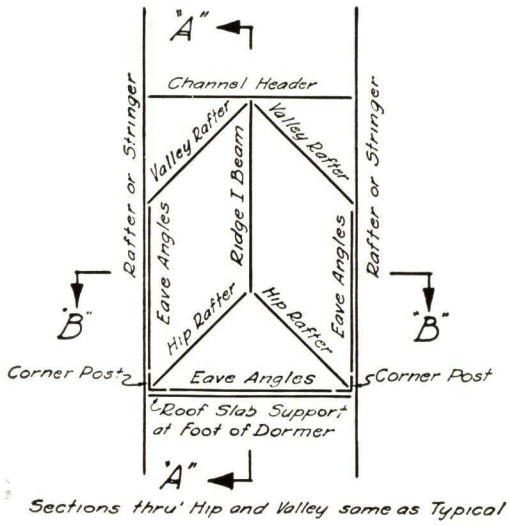
NAILING CONCRETE SLAB DETAILS



NAILING CONCRETE SLAB DETAILS

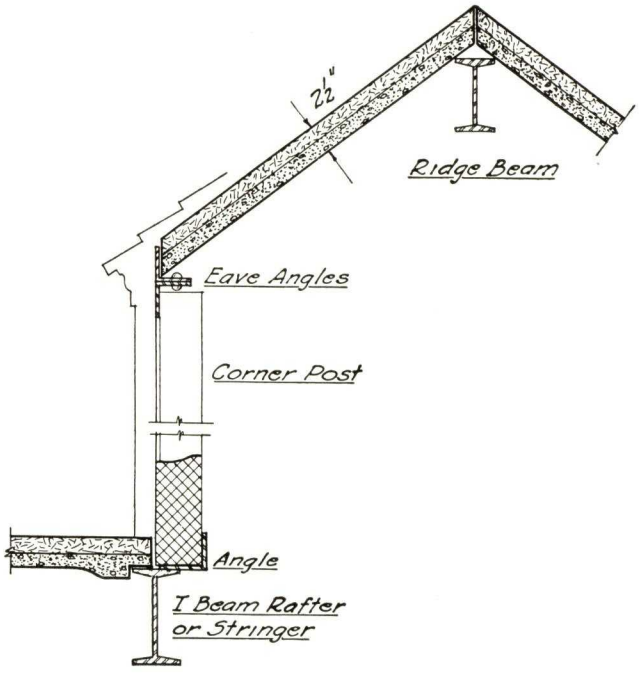


SECTION "A-A"
(DORMER DETAILS)



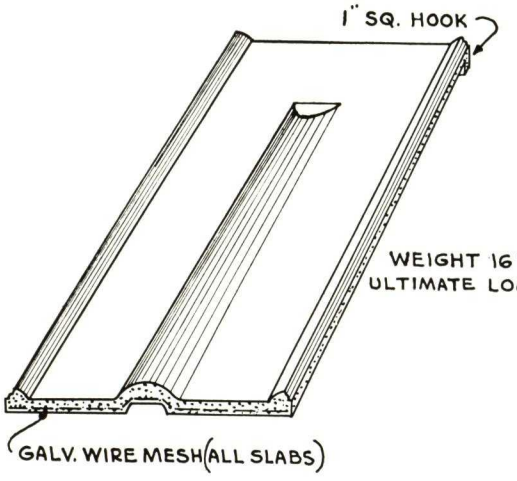
Sections thru' Hip and Valley same as Typical

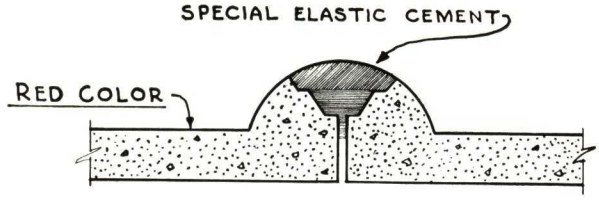
DORMER STEEL FRAMING PLAN



SECTION "B-B"
(DORMER DETAILS)

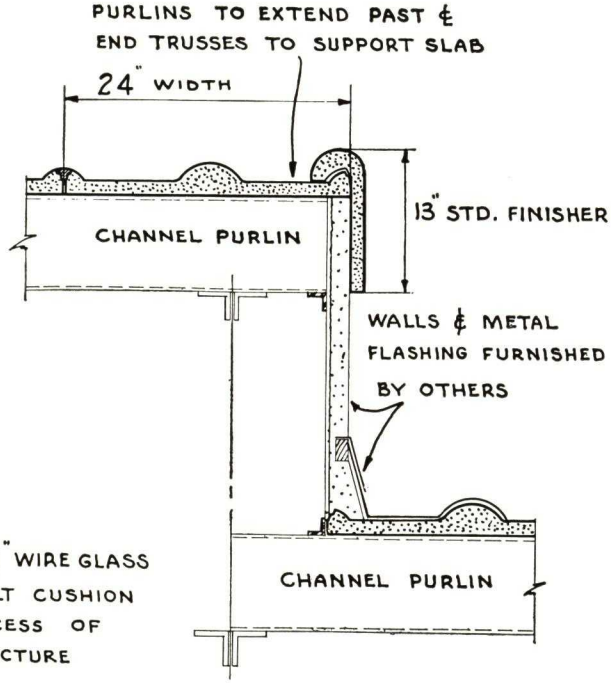
RED INTERLOCKING SLAB DETAILS

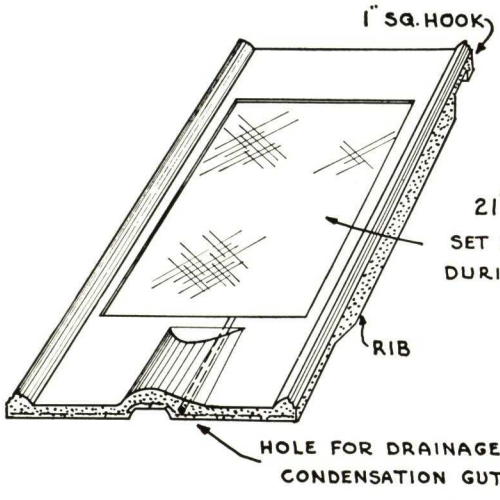




SECTION AT JOINT

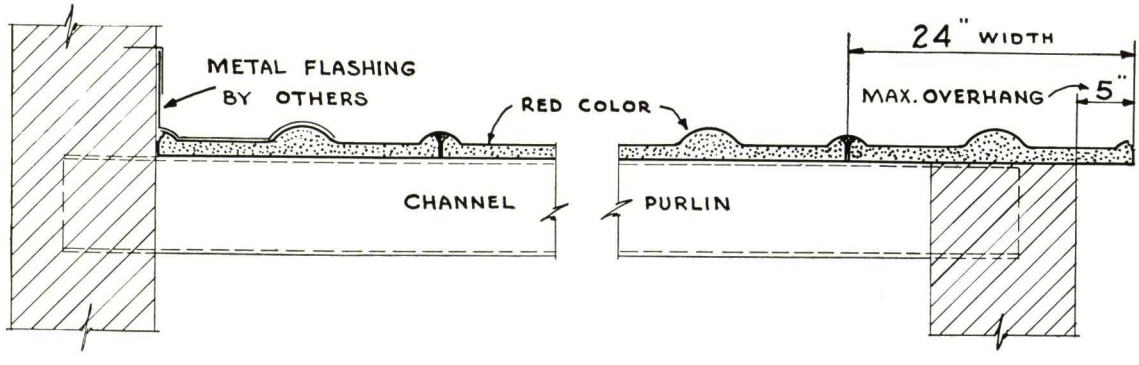
STD. SLAB 52" LONG - 24" WIDE - 1⅛" THICK
(SPACE ROOF PURLINS 3'-9" TO 4'-0½")
EXPOSED SURFACE OF SLABS AND TRIM
HARD WATERPROOF RED COLOR FINISH
(NO COMPOSITION COVERING REQUIRED)





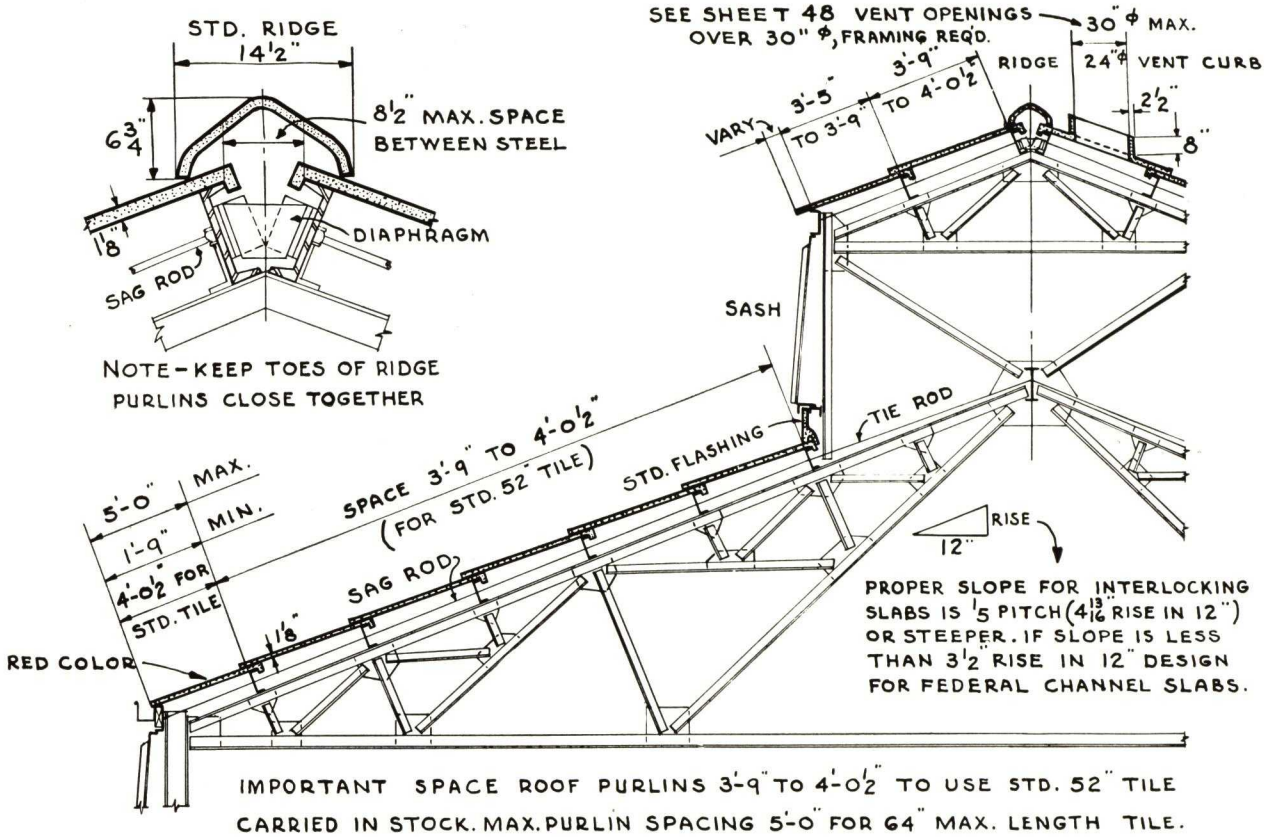
NOTE - METAL FLASHING
RECOMMENDED IN
SEPARATE SHEETS FOR
LENGTH OF SLAB.

STD. GLASS SLAB 52" LONG - 24" WIDE
(SPACE ROOF PURLINS 3'-9" TO 4'-0½")
(INTERCHANGEABLE WITH STD. SLABS)

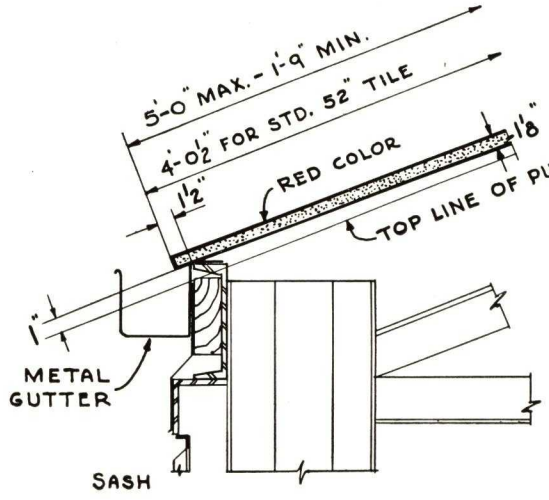


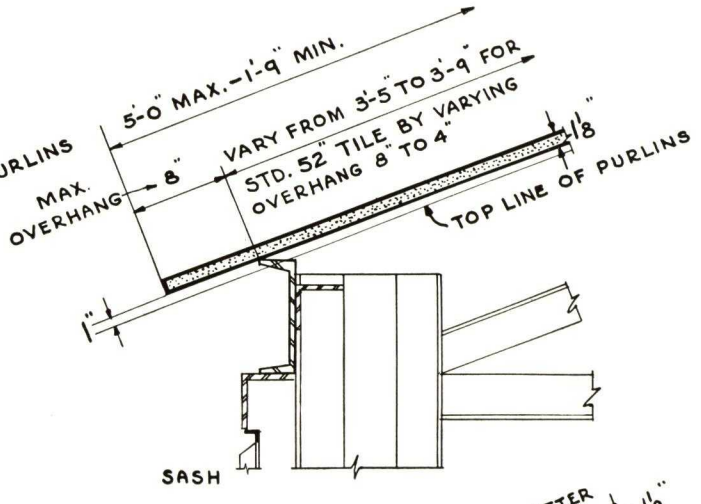
GABLE END DETAILS

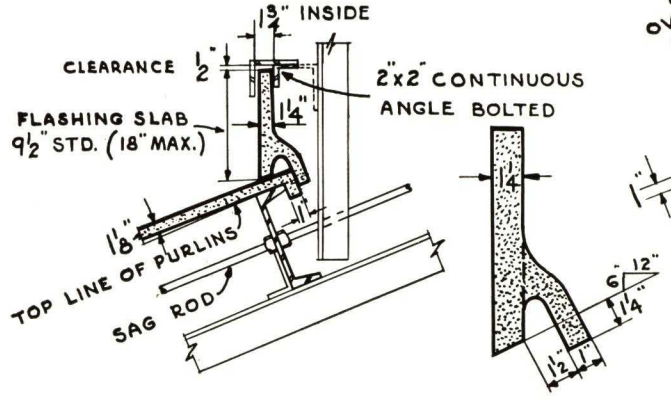
RED INTERLOCKING SLAB DETAILS

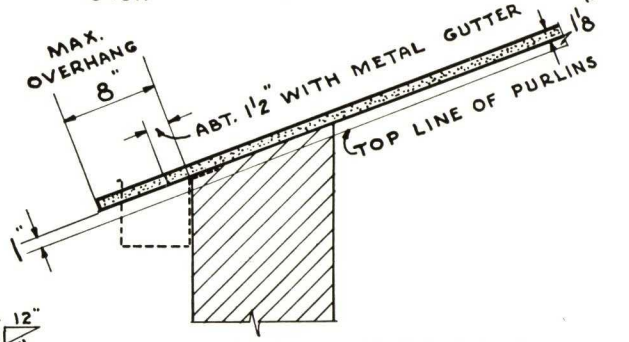


IMPORTANT SPACE ROOF PURLINS 3'-9" TO 4'-0½" TO USE STD. 52" TILE CARRIED IN STOCK. MAX. PURLIN SPACING 5'-0" FOR 64" MAX. LENGTH TILE.





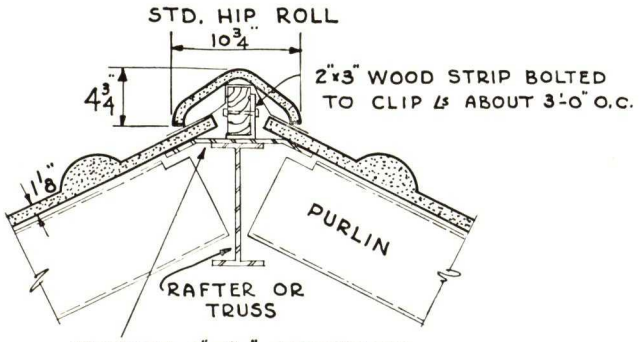




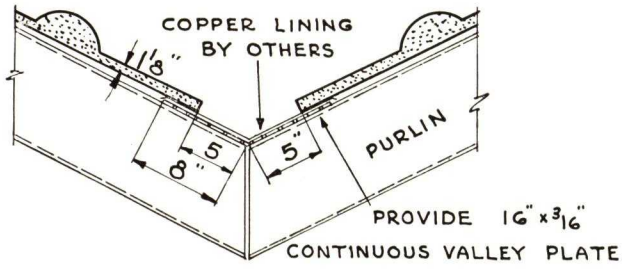
EAVE DETAILS

FEDERAL-AMERICAN CEMENT TILE CO. - CHICAGO

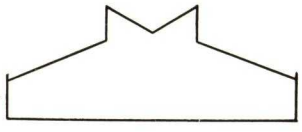
RED INTERLOCKING SLAB DETAILS



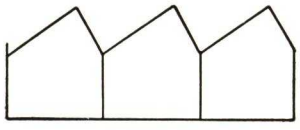
TYPICAL "HIP" SECTION



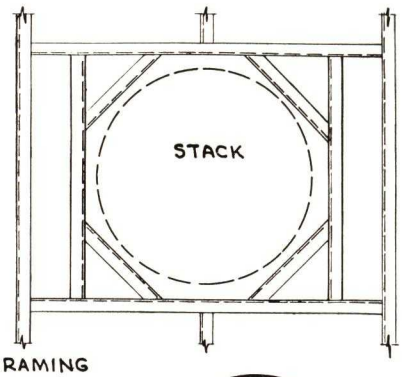
TYPICAL "VALLEY" SECTION



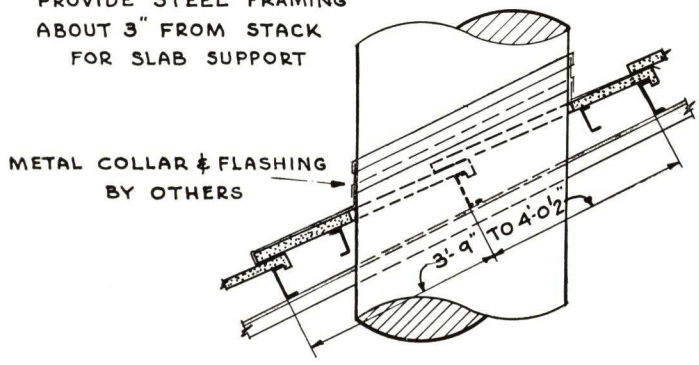
INVERTED MONITOR



SAWTOOTH

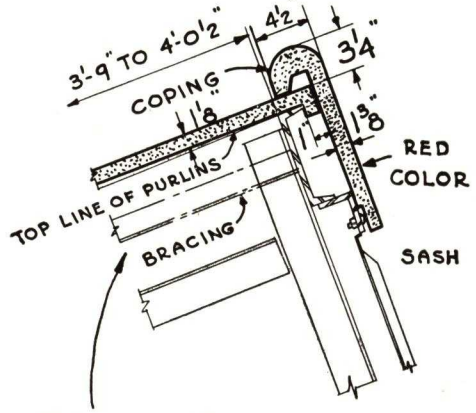


PROVIDE STEEL FRAMING ABOUT 3" FROM STACK FOR SLAB SUPPORT

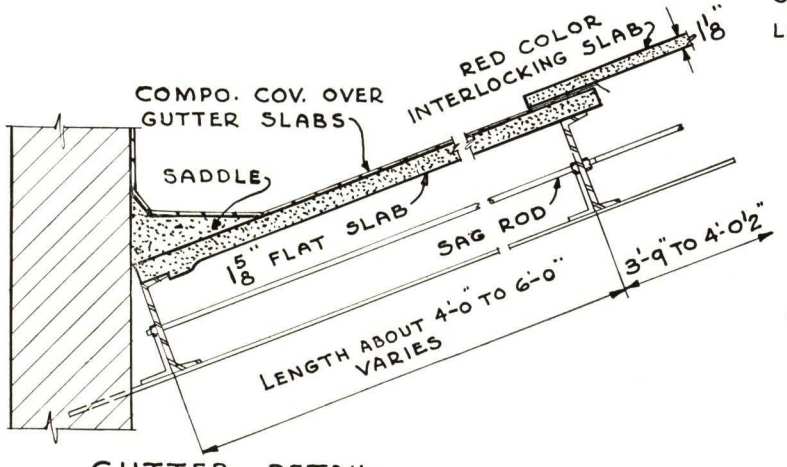


TYPICAL "STACK" FRAMING

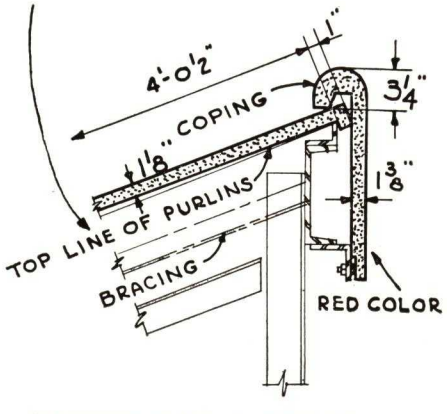
LARGE VENTILATOR FRAMING SIMILAR



SEE SHEET 39 FOR DETAIL OF LATTICE DIAGONAL BRACING



GUTTER DETAIL



SAWTOOTH COPING

FEDERAL-AMERICAN CEMENT TILE CO.

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THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete and Nailcrete Blocks

105 West 40th Street, NEW YORK, N. Y.

SELLING AGENTS IN ALL THE PRINCIPAL CITIES IN THE UNITED STATES

NAILCRETE (NAILING CONCRETE)

Nailcrete—Developed after extended laboratory research and tests in connection with economic construction methods has been in successful commercial use for over 20 years.

NAILCRETE
PATENTED • NAME REG.

Nailcrete is a cementitious, fibrous, all-mineral fireproof compound, containing no animal or vegetable matter, no acids, alkalis or any substance injurious to metals, wood or other construction materials coming in contact with it. Nailcrete is supplied in bags containing the correct quantity for the unit mix. It is mixed on the job with portland cement, screened sand and clean water, and screeded smooth and level.

Advantageous Qualities and Physical Properties—Nailcrete is absolutely fireproof and verminproof; will not shrink, swell, or rot; is unaffected by dampness, a poor conductor of heat and an effective sound deadener.

Nailcrete has the same compressive strength as 1-3-6 cinder concrete and is 20% lighter (weighs about 96 lb. per cu. ft.). Coefficient of expansion, also setting and drying periods are substantially the same as those of cinder concrete. Nailcrete calls for the same precautions against freezing, quick drying, etc., as are necessary with ordinary concrete.

Uses of Nailcrete—*(a) Subfloors*—Nailcrete is laid as a subfloor on top of the structural slab or floor arch, to which is directly applied wood flooring, cork tile, etc.

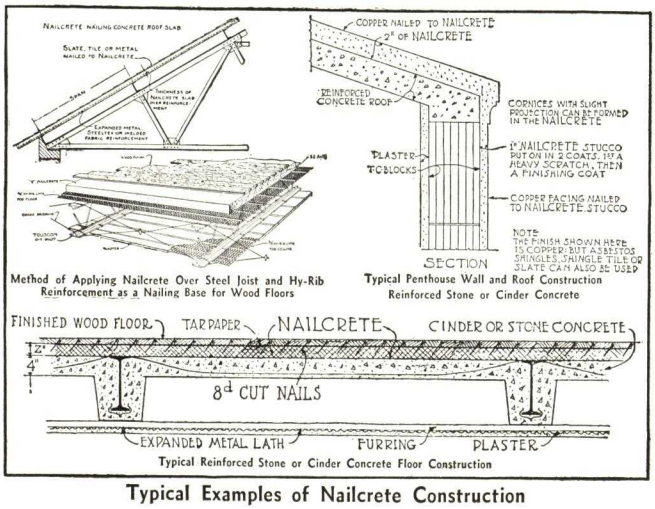
(b) Reinforced Floor Slabs for Metal Lumber—Nailcrete is used 2 in. thick on top of metal lath placed on metal lumber or bar joist floor beams.

(c) Roof Coating—A fireproof, rotproof nailing base 1½ to 2 in. thick directly on top of roof slab to receive tile, slate, copper, etc.

(d) Reinforced Roof Slab—A poured-in-place construction on rafters of steel, metal lumber or bar joists.

(e) Precast Lightweight Roof Slabs—Manufactured with reinforced all mineral Nailcrete Cinder Concrete in sizes to meet requirements. A structural slab and nailing base.

(f) Plaster, Interior and Exterior—For interior plastering, especially for fireproofing, sound-insulating, and as a nailing base for wood paneling; for exterior plastering or penthouse walls, skylight curbs, etc., to receive the sheet metal covering.



Method of Applying Nailcrete Over Steel Joist and Hy-Rib Reinforcement as a Nailing Base for Wood Floors

Typical Penthouse Wall and Roof Construction Reinforced Stone or Cinder Concrete

Typical Reinforced Stone or Cinder Concrete Floor Construction

Typical Examples of Nailcrete Construction

Specifications for Nailcrete

Note: Always specify Nailcrete by name.

Materials—Nailcrete shall be made with portland cement and sand strictly in accordance with the specifications of the manufacturer. All sand shall be sharp, clean, and screened through ¼-in. mesh.

Preparatory Work—Immediately before Nailcrete is laid, the surface to be covered shall be swept broom-clean, thoroughly wetted and grouted.

Setting—All Nailcrete shall be allowed to set properly before being walked on.

Note: Ordinarily 2 days in summer and 3 days in winter.

Nailcrete Subfloors—On structural floor construction Nailcrete shall be laid 2 in. thick and screeded, and, if necessary, troweled to a level.

When Nailcrete is dry, the surface shall be given a brush coat of asphaltic waterproofing before flooring is laid. Flooring to be nailed with 8d cut nails, driven at an angle of approximately 45°.

Note: For high class work specify (under the heading of Carpentry) 1 layer of tarred paper (not less than 2-ply) additional deadening felt, if desired, and the finish wood flooring to be used. Underflooring is never necessary with strip flooring but is recommended where parquet flooring is to be used.

On Metal Lumber Beams—Cover the floors of rooms, etc. (specify which ones are to be covered), with metal lath secured directly to the beams (not over 2 ft. apart) and on top of the metal lath put a bed of Nailcrete not less than 2 in. thick at the thinnest point, screeded level to receive the finish flooring specified under Carpentry.

Note: In high class work specify paper as above. Even in work of the highest class underflooring is unnecessary, as stated.

Nailcrete Roof Coating—The structural roof construction shall be covered with 2 in. of Nailcrete.

Note: If slate are thicker than ¾ in., consult THE NAILCRETE CORPORATION as to the thickness of the Nailcrete.

Reinforced Sloping Roof Slab—Cover steel rafters with self-centering lath (as specified by manufacturers) or pour in place fabric-reinforced Nailcrete slab ..... in. thick. (See table for areas of steel and safe loads.)

Plaster—*Interior*—Plaster interior walls to an approved finish, true and even as per instructions of THE NAILCRETE CORPORATION.

Exterior—Plaster the exterior of penthouse walls, skylight curbs, etc., with Nailcrete plaster 1 in. thick in 2 coats, scratch and finish, troweled (or floated) true and even.

Note: If the Nailcrete plaster is to be applied to gypsum blocks, the blocks should be covered first with proper bonding material, and the Nailcrete is then to be applied while the bonding material is still tacky.

NAILCRETE SLABS—SAFE LOADS IN POUNDS PER SQUARE FOOT

Gross sectional area of steel in sq. in. per ft. slab	Thickness of Nailcrete above steel	Span in feet									
		1½	2	2½	3	3½	4	4½	5	5½	6
⅜-in. Hy-Rib, Ribplex or equal, .061 sq. in.	2 in.	480	312	176	122	....	....	....	....	....	....
	2½ in.	....	....	232	161	118	91	....	....	....	....
	3 in.	....	....	....	....	144	110	87	70	....	....
¾-in. Hy-Rib, Ribplex or equal, .1407 sq. in.	2 in.	....	....	....	158	114	87	....	....	....	....
	2½ in.	....	....	....	230	171	130	102	....	....	....
	3 in.	....	....	....	....	233	177	139	113	....	....
	3½ in.	....	....	....	....	....	228	180	146	121	....
	4 in.	....	....	....	....	....	....	238	193	159	134

Nailcrete weighs about 96 lb. cu. ft. or 8 lb. per in., 1 ft. square.

Table based on WL/10. For WL/8 (or simple span), deduct 20% from above.

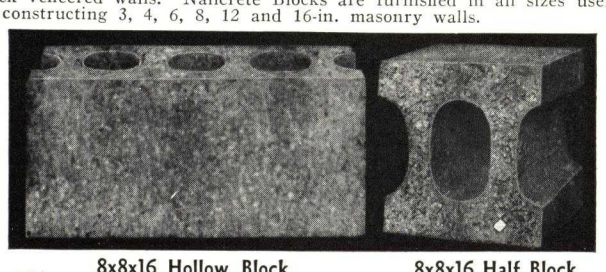
Brace self-centering lath to support wet Nailcrete.

Safe loads on spans above 6 ft. furnished on request.

Total live and dead load on tile roofs: 2-ft. slab, 66 lb.; 2½-ft., 70 lb.; 3-ft., 74 lb.; 3½-ft., 78 lb.; 4-ft., 82 lb. per sq. ft.

NAILCRETE NAILABLE CINDER CONCRETE BUILDING BLOCKS

Uses—Nailcrete Blocks are used in load-bearing walls, partition walls, and as an efficient and economical backup of cut stone, cast stone, and brick veneered walls. Nailcrete Blocks are furnished in all sizes useful in constructing 3, 4, 6, 8, 12 and 16-in. masonry walls.



8x8x16 Hollow Block 8x8x16 Half Block

8J

Fireproof—Cinder concrete is accepted as one of the best fireproofing materials. Nailcrete Cinder Blocks, made of cinders, Nailcrete and cement are incombustible and extremely fire resisting.

Nailability and Nailholding—These outstanding features are largely due to the presence of Nailcrete in the blocks. *They take and they hold nails.* The lightest trim and moulding can be attached to interior walls; and shingles, siding or weatherboards to exterior walls.

Lightness—Because of the inherent lightness of the aggregates used—Nailcrete Blocks are among the lightest load-bearing masonry units made. This reduces the dead load and often permits the use of lighter steel with subsequent savings.

Underwriters' Blocks—Nailcrete Blocks have been tested and approved by the Underwriters' Laboratories, Inc., Chicago, and certified blocks can be supplied.

Specifications—*For Plastered, Stuccoed or Exposed Exterior or Interior Walls*—Load-bearing exterior and interior walls and partition walls will be of Nailcrete Nailable Cinder Concrete Blocks.

For Backup of Cut Stone, Cast Stone and Brick Walls—Backing of outside walls will be of Nailcrete Nailable Cinder Concrete Blocks.

NATIONAL GYPSUM COMPANY

Monolithic Poured-in-Place Gypsum Floor and Roof Construction

GENERAL OFFICES
BUFFALO, N. Y.

For our Catalog on Gypsum Products, see File Index

This Type of Construction, in Use for Almost a Half Century, Has Been Further Improved by a Patented Method Which Makes This System Preferable from Every Standpoint . . . Quickly Constructed, Permanent, Fireproof, Inexpensive

Poured-in-Place Gypsum Roof Construction Which Actually Becomes An Integral Part of the Main Steel Construction
Withstands vibrations and will resist storms and cyclones sufficient in force to destroy roofs of conventional design

SIX OUTSTANDING ADVANTAGES

1. **Light Weight**—Slab weighs only one-third as much as concrete, thus reducing the dead load and decreasing the cost of supports and foundations.
2. **Rapid Construction**—Slab may be used within an hour, and the roof covering can be placed if desired the following day.
3. **High Insulation Value**—Four times the insulation value of concrete. Reduces fuel consumption and heating equipment requirements. A building that is warmer in winter and cooler in summer.
4. **Fireproof**—Gypsum construction as fireproofing for steel has successfully passed numerous fire tests, and is generally recognized as being equal to other material as fireproofing for steel work, with a minimum of dead load.
5. **Vibration Crack Resistant**—Owing to the toughness and elasticity of the gypsum composition there is a noticeable absence of vibration cracks on all installations of this material.
6. **Low Maintenance Cost**—Repairing and maintenance cost is low. Slab is easily cut where changes in construction are necessary. Nails can be driven in slab to secure slate, tile, etc.

Monolithic Gypsum construction for floors and roofs (gypsum fibre concrete with steel reinforcing) has long been favored for its permanence and economy.

The natural advantages of this construction have been further enhanced by a patented method which permits of more rapid installation and incidentally may be designed for any required loading condition.

The roof construction design, absolutely perfect from an engineering standpoint, permits the roof to become an integral part of the main steel construction—the undersurface providing an attractive ceiling that requires no decoration.

Speed of erection, permanence, effective insulation and fireproofing, plus low initial cost combine to make this system outstanding. For further details, please write National Gypsum Company, Buffalo, N. Y.

NATIONAL NAYLEGRIP COMPANY, INC.

Nailing Concrete Compounds, Cement Paint Base, Roof Slabs, Building Blocks

1721 Ash Street, ERIE, PA.

Products

NAYLEGRIP
NAILBOND
BONDO
ROOF SLABS
BUILDING BLOCKS

Naylegrip and Nailbond

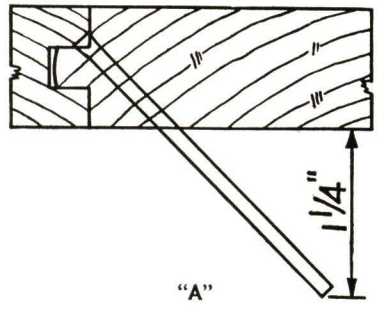
Years of scientific experimentation and further years of proven worth have established Naylegrip and Nailbond as ideal compositions for making permanent, efficient nailing concrete. Economy results from the fact that in purchasing either Naylegrip or Nailbond, you buy only one-fifth of the materials necessary for the concrete. The remainder is purchased at the nearest shipping point, a considerable saving in transportation costs.

Nailgrip Composition is made up of 90% pure mineral cementing substance, 10% vegetable substance. Combined with portland cement, a small amount of mason's sand, and cokebreeze (screenings or finer particles of commercial coke), it forms a perfect lightweight nailing concrete that readily receives nails and forms an increasingly firm bond with them. Fireproof, excellent for use with steel joist and rib lath or other suitable mesh.

Best used above grade, because of its porosity.

Nailbond Composition is a substance similar to Naylegrip and is ideal for use where cokebreeze is not obtainable. Mixed simply with mason's sand and portland cement to form Nailbond Concrete, it is a permanent nailing concrete of 600 to 900 lbs. compression. It is highly cementitious, makes a perfect bond with nails, and is not injurious to metals of any kind. It bonds well to a concrete sub-base and, poured on a well-tamped cinder bed, will lay clear and not settle into the cinders. Nailbond may be installed on metal lath and bar joist with very little waste.

Specifically recommended for ground floor installation.



Nailbond Installation Specifications

Nailbond Concrete on Ground Floors—Mix in a mechanical mixer one bag of Nailbond Composition with one bag of portland cement and 7 cu. ft. of washed mason's sand to a soft, plastic mixture. Install 3 in. of Nailbond Nailing Concrete (upon at least 4 in. of well tamped and tile drained cinders) to a level floated surface. Let cure under cover for at least 21 days, or until the surface is dry. Treat the surface with tar coating applied with a steel trowel, 2 gals. per 100 sq. ft. Apply a damp-proof paper directly upon the tar coating immediately after applying the tar coating. Flooring shall be nailed securely to the surface of the Nailing Concrete with 8d cut flooring nails spaced not more than 12 in. on centers and at an angle such that the point of the nails shall penetrate the Nailing Concrete to a depth of not less than 1¼ in. (See "A".)

Nailbond Concrete Above Grade on Bar Joist—Mixture same as above. Depth not less than 2 in. thick. For dampproofing, apply 1 gal. of tar coating to 75 sq. ft. of surface. Nailing: same, except nails may be spaced not more than 14 in. on centers.

Other Products

Bondo—Mixed half and half with water, Bondo forms a perfect bond coat for bonding new concrete floors to old ones.

Bondo Cement Paint—In combination with water and portland cement, Bondo forms a cement paint for waterproofing cement blocks, cinder blocks, concrete walls, tile, etc. If color is desired, oxide colors or pure mineral pigments may be added.

Roof Slabs — We manufacture lightweight precast fireproof roof slabs, either nailable, or non-nailable, for pitch or flat roof decks. Length, 5 ft. to 6 ft. 6 in., with shorter filler lengths. Width, 2 ft.; depth, 2½ in. Slabs are cured naturally, no chloride.

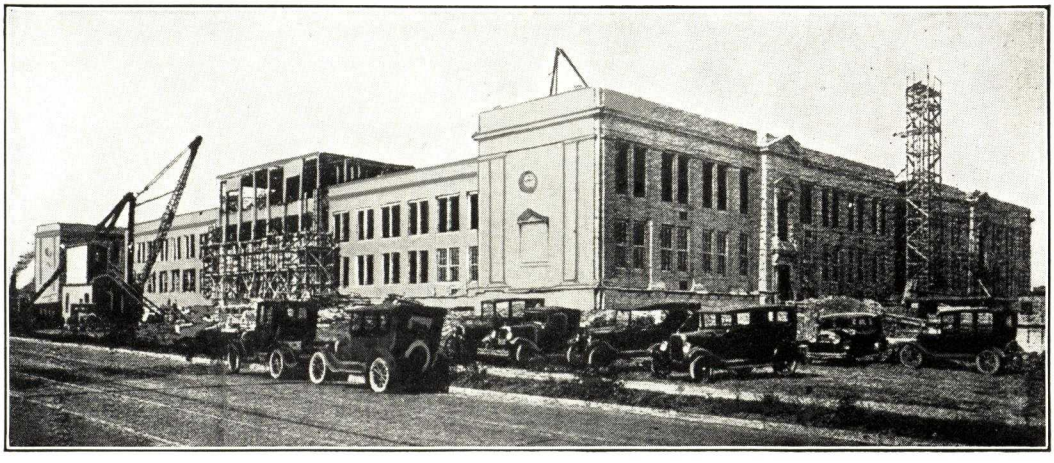
Building Blocks—Artificial limestone face building blocks are made in widths of 8 and 10 in., face 7¾ x 16 in. Between artificial stone facing and Naylegrip backing is an insulating filler. Coefficiency is approximately 92%.

Backup and Partition Blocks—For backing brickwork and for partitions, we make a wide range of sizes in building blocks. Made with either Naylegrip or Nailbond as a base.

Bondo Silica Colormix—For corridors, toilets, porch floors, stairs, basement floors, etc., we manufacture and install Bondo Silica Colormix. It has a cement base of hard durable finish of good appearance. Wears smooth and glossy.

At Your Service

More detailed description of any of our products and complete specifications are yours for the asking. Consult us on your particular problem.



Strong-Vincent High School

This fine building was erected in 1929.

45,000 sq. ft. of wood flooring secured to a Nailing Concrete sub-base furnished by NATIONAL NAYLEGRIP CO., INC.

It is as nailable today as it was 30 days after being installed—The nature of the composition insures nailability for centuries.

3/37

ESTABLISHED 1920

PORETE MFG. CO.

TELEPHONE
Kearny 2-4070

Manufacturers of Lightweight Concrete Products

Porete Avenue, NORTH ARLINGTON, N. J.

Products

PORETE LIGHTWEIGHT CONCRETE:
- Precast for Floor and Roof Slabs.
- Porete Fill (Poured in Place).
- Porete Floor Systems.

PORETHERM—Insulation.
PORETE NAILFILL—A Lightweight Nailing Concrete.
POREX SLABS—For Roofs, Floors, Ceilings and Walls.
CONCRETE DECKS for Stadiums.
SLABS OF HEAVY CONCRETE—Cast Stone.

What Porete Is

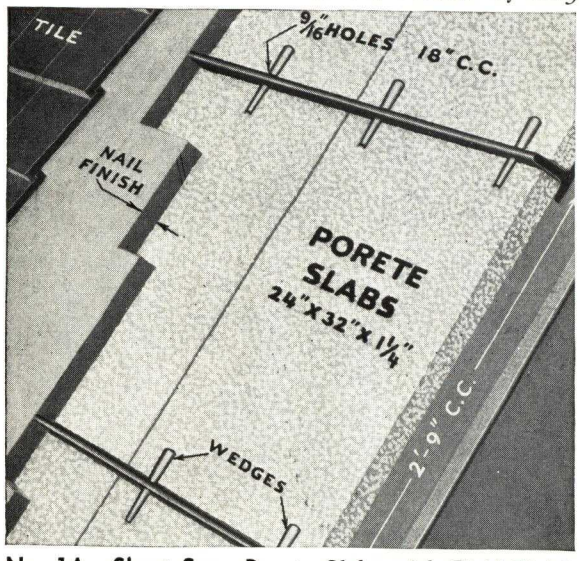
Porete is a lightweight cellular concrete made of Portland cement and sand. It is of uniformly honeycombed structure and combines the durability of concrete with the lightness of wood. Porete is made of a very rich cement mix and any reinforcing metal is thoroughly coated and protected against corrosion.

Porete can be cast in different weights from 19 lbs. per cu. ft. to 70 lbs. per cu. ft. and heavier. On account of the air cells which it contains, it is a good heat and sound insulator and a better fire resisting material than solid concrete. Its permanency is equivalent to that of concrete and its strength improves with age.

The PORETE MFG. CO., organized in 1920, is the pioneer in the development of lightweight cellular concrete and its adaptation to roofs and floors. The nailable Porete roof decks for steep roofs, as well as the various flat roof constructions, of which millions of square feet have been erected, are recognized as the best in the roofing field.

PRECAST FLOOR AND ROOF SLABS

Slabs Made of Lightweight Aerated Concrete

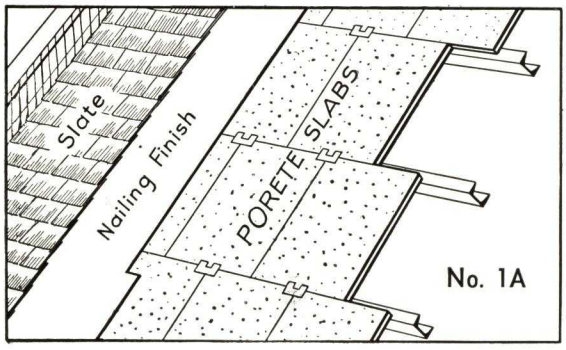


No. 1A—Short Span Porete Slabs with Field Finish

Purlin spacing 2 ft. 8 in., thickness 1¾ in., weight 10 lbs. per sq. ft.; nailable; good heat insulation.

These slabs are reinforced with welded galvanized wire fabric. 1¼-in. thick slabs are clipped to channels or laid on T-irons and covered with a ½-in. nailing finish. This is the best deck for roofs of complicated nature intersected by hips, valleys and dormers. On roofs above 45° pitch, we recommend the slabs to be laid on T-irons as shown.

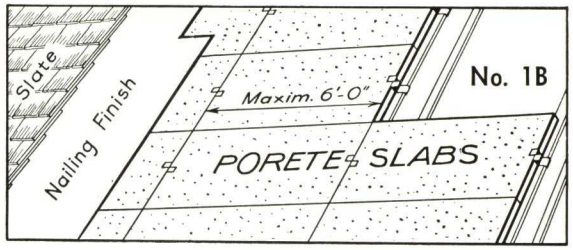
The short span precast slab construction with T-irons and wedge pins as shown in the cut on the right has become the standard for steep tower and mansard roofs. The exposure of such roofs to high winds at great heights demands a roof deck to which tile, slate, copper or lead roofing can be nailed with safety. Many of the most prominent skyscrapers with tower roofs in the east are covered with this construction.



No. 1B—Long Span Porete Slabs with Field Finish

Purlin spacing 3 to 6 ft., thickness 2 to 3½ in., weight 11 to 16 lbs. per sq. ft.; nailable; excellent heat insulation.

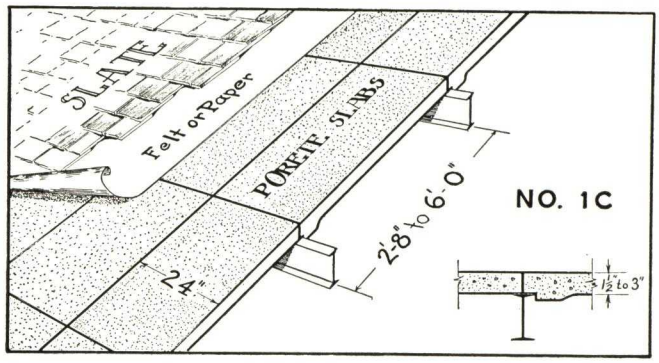
These slabs are reinforced with welded galvanized wire fabric. They are laid on channels or I-beams to which they are fastened with steel clips. They are covered with a ½-in. nailing finish. The steel purlins can be laid horizontally or in vertical planes. This is the best deck for sloped roofs with large unbroken areas as on school buildings, churches, etc. It is advisable to lay out the steel with a spacing as uniform as possible to avoid many different size slabs. This deck has very high heat insulating value. Due to the monolithic field finish it makes a first grade foundation for the roofing particularly where slate, tile or sheet metal roofing has to be nailed up.



No. 1C—Long Span Porete Slabs without Field Finish

Purlin spacing 3 to 6 ft., thickness 2 to 3½ in., weight 11 to 16 lbs. per sq. ft.; nailable; excellent heat insulation.

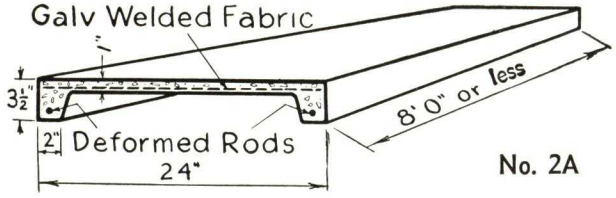
These slabs are reinforced with welded galvanized wire fabric. They are used on the same kind of roofs as the Long Porete Slabs with field finish under No. 1B. The main difference is that these slabs are cast to accurate thickness so that when they are laid tight together they form a smooth bed for the roofing which goes on top of it without the application of a field finish.



No. 2A—Channel Slabs

Made of dense vibrated concrete using lightweight aggregate. No field finish. Purlin spacing 5 to 8 ft., thickness 3½-in. leg, 1-in. web; weight, 12 to 14 lbs. per sq. ft. depending upon aggregate; not nailable; fair heat insulation.

These slabs are reinforced with a deformed steel bar in each leg and a welded wire fabric in the web. They are laid on channel or I-beam purlins, and the joints are pointed up with elastic cement. They make the most economical roof deck for large unbroken roof areas and are particularly well suited for warehouses, manufacturing plants, piers, etc.

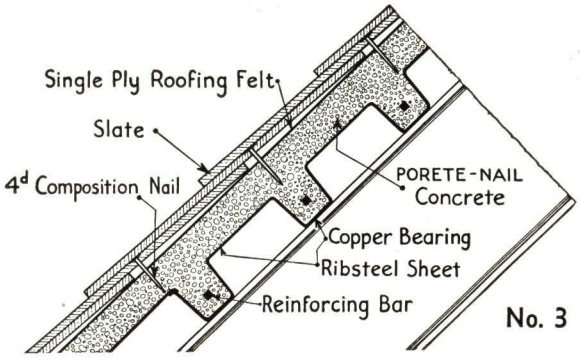


No. 2A

No. 3—Rib Steel Roof Decks

Made of copper bearing sheets of No. 20 to No. 24 gauge covered with a field concrete finish, purlin spacing 3 to 10 ft., thickness of slab 3 to 3½ in., weight 9 to 16 lbs. per sq. ft., can be made nailable; fair heat insulation.

These decks are recommended particularly on buildings for large unbroken roof areas with flat or sloped roofs where great rigidity of the roof deck is required. The ribs are 1½ in. deep on standard and 2 in. deep on supersheets, and are spaced 6 in. on centers. The sheets are laid on structural steel purlins and securely fastened to them with clips. After the sheets are laid, they are covered with concrete. On flat roofs, the usual application is 1 in. of cement grout, on sloped roof 1½ in. of nailing concrete suitable for the nailing of slate, tile or metal roofing. The ribs are reinforced with independent steel bars in each corrugation. The sheets are painted with a shop coat of either black asphaltum or aluminum paint on the bottom. This construction is suitable not only for medium spans but also purlin spacing up to 12 ft.



No. 3

PORETE FILL (Cast in Situ)

Porete is made by aerating a slurry of Portland cement and small aggregates. This aerated mixture is poured to the proper level where it sets; no expansion takes place afterwards. The weight per cu. ft. of the final cellular concrete is predetermined. *An ordinary concrete mixer of the tilting type can easily be adapted to pour this cellular concrete, also most truck or transit mixers are practical to use.*

Porete Fill can be made in any weight from 19 lbs. to 90 lbs. per cu. ft. Fills which weigh 32 lbs. per cu. ft. and less are designated as PORETHERM on account of their high insulating qualities. The table below gives the insulating value for different weights compared with other materials.

Materials	Wt. per cu. ft., lbs.	Coeff. Heat. Cond. B.T.U.'s	Wall thickness for same insulation, in.
Cork Boards	9	.30	1.
Poretherm 19	19	.37	1.3
Porex Board	24	.46	1.6
Poretherm 32	32	.63	2.1
Porete for Floor Fill	45	.80	2.7
Porete for Structural Slabs	65	1.1	3.7
Wood Dry	40	.9	3.0
Brick Wall	110	4.4	15.0
Concrete	140	8.0	27.0

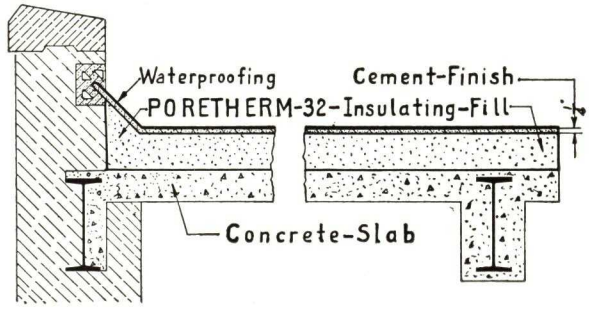
PORETHERM 19—Weighs 19 lbs. per cu. ft., is recommended for high and low temperature insulation, and is particularly economical on floors and roofs of refrigerating buildings.

Poretherm 32 As an Insulating Fill for Roofs and Floors

PORETHERM 32 is a low cost, high grade insulation material that can be poured on the job. It consists of almost nothing else but Portland cement. 2.1 in. in thickness have an insulation equivalent to 1 in. of cork. It is a heat and sound insulating materal par excellence, because it is permanent and fireproof. Unlike materials of vegetable or wood fibre, it does not deteriorate when continuously exposed to moisture. It is odorless, permanent and fungi proof. PORETHERM is solid, uncompressible under ordinary loads and does not settle or sag like loose insulating materials. It is cast monolithically without joints, which are liable to decrease the insulation.

When used as an insulating fill on roofs, it is not necessary to grade the structural slab accurately, as PORETHERM being not much more expensive than concrete, when poured on the structural slab will fill up all the irrgularities. It can also be used for forming crickets for drainage. On account of all these features and the low cost of the raw materials, PORETHERM 32 is today one of the most economical insulating materials on the market. The Roof Fill is usually covered with a 1:3 cement finish ¼ in. thick before the roofing is applied.

PORETHERM 32 is also made in precast blocks for heat and sound proof partitions. Size 12 in. x 30 in. x 3 in. to 6 in. thick.



Porete Fill 50 Lbs. Cu. Ft. and Heavier

Lightweight Concrete Fills are used between sleepers, under wood floors, also under cement and terrazzo finish.

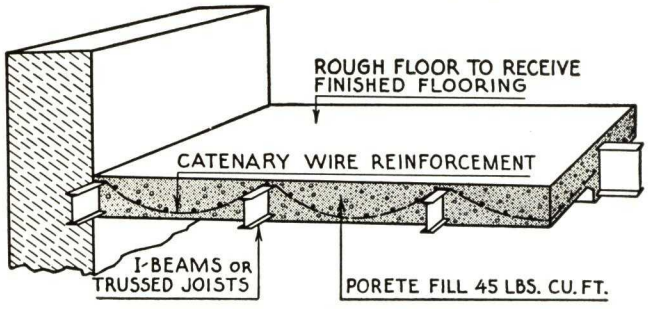
For these fills a heavier Porete is often preferred with a weight of 50 to 90 lbs. per cu. ft. These fills are made of Portland cement with an addition of sand or lightweight aggregates.

All these fills are mixed on the job and applied to the structural base to the final level at which the Porete sets. There is no expansion after pouring. As the Porete slurry when it comes from the mixer is a smooth emulsion of thick consistency, it will run around I-beam flanges and into corners very easily, and much better than ordinary concrete. The fill can be left rough on top for a cement or terrazzo finish, or it can be brought to a smooth level finish for a wood floor to be applied with mastic.

FLOOR SYSTEMS

Steel Beam and Lightweight Porete Fill Floor System

In this system the steel beams, which can be standard rolled sections, J & L Jr. Beams or Trussed Joists, are completely embedded in the lightweight concrete weighing 32 to 50 lbs. per cu. ft., the weight depending upon the loads and span. A catenary wire reinforcement over the beams is used.



Joists on Close Centers

This Floor System is exceedingly simple and flexible. The steel beams are designed to carry the necessary loads. A temporary centering is hung up from the steel beams, so that no expensive shoring is needed. Pipes and conduits can be directly embedded into the fill. Holes can easily be cut where required.

When the beams are on close centers (24 to 30 in.) the floor slab can be as thin as 6 in. When 4-in. beams are used this leaves 1 in. below and 1 in. above the beams.

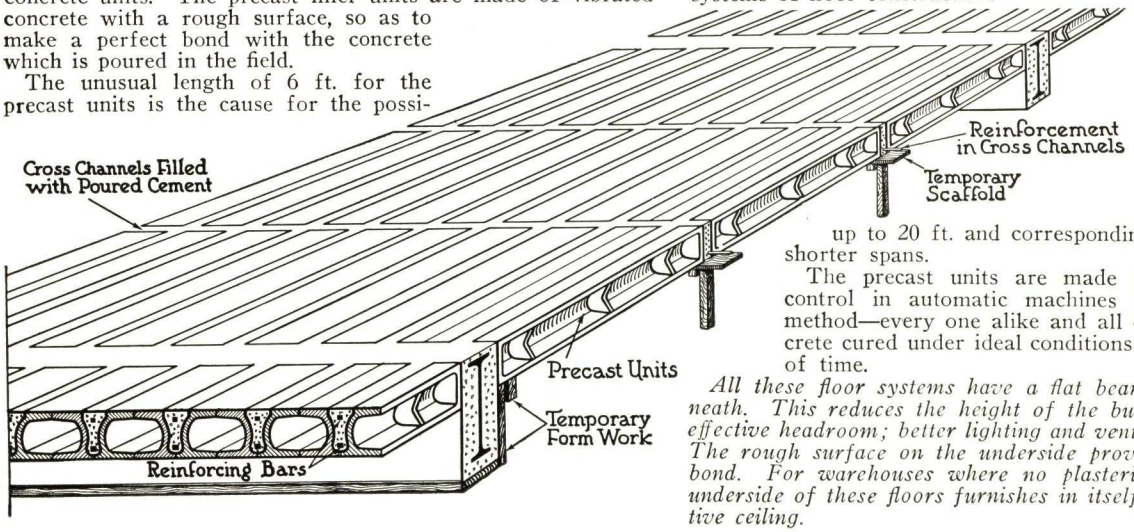
For close spacing of the beam centers, a fill weighing only 32 lbs. per cu. ft. will develop all the necessary strength to carry the usual live loads. This light fill is covered with ¼-in. thick 1:3 rough cement finish which serves as a construction floor until the finished floor is put on top. This makes an exceedingly light floor which weighs only about 20 lbs. per sq. ft. for a thickness of 6 ins.

For wider spacing of the beams up to 8 ft. the thickness of the fill should not be less than 8 in. and the weight 45-55 lbs. per cu. ft., depending upon the load and spacing.

Long Span Precast Unit Floor System

This is a one-way reinforced concrete slab consisting of T-beams poured in place between 6-ft. long precast hollow concrete units. The precast filler units are made of vibrated concrete with a rough surface, so as to make a perfect bond with the concrete which is poured in the field.

The unusual length of 6 ft. for the precast units is the cause for the possibility of quicker erection with less labor and for a minimum of temporary framing and shoring not possible with other systems of floor construction.



The Porete Long Span System is based on standard reinforced concrete practice. This floor system, without a cement finish on top, is good for 75 lbs. per sq. ft. live load for spans up to 20 ft. and correspondingly higher loads on shorter spans.

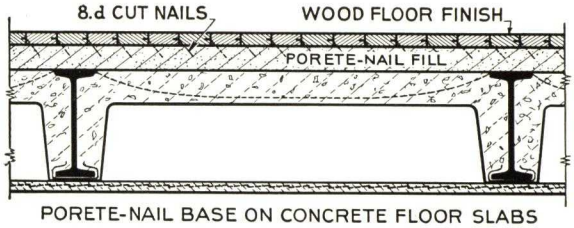
The precast units are made under rigid factory control in automatic machines using the vibrating method—every one alike and all of high quality concrete cured under ideal conditions for the right length of time.

All these floor systems have a flat beamless ceiling underneath. This reduces the height of the building for the same effective headroom; better lighting and ventilation is obtainable. The rough surface on the underside provides a good plaster bond. For warehouses where no plastering is required, the underside of these floors furnishes in itself a light and attractive ceiling.

PORETE NAILFILL

Porete Nailfill is an all-mineral compound principally composed of asbestos. When mixed with Portland cement, sand and water, it forms a plastic mortar that sets similar to concrete, and when matured it becomes an elastic, lightweight concrete, into which nails can be driven as readily as into wood, and in which the nails will hold. As it consists entirely of minerals, it is fireproof and verminproof. Like concrete its strength improves with age; it will not disintegrate and will always retain its nailing qualities.

Porete Nailfill concrete forms a permanent, resilient, lightweight nailing base. A 2-in. layer is placed on top of the concrete slab with which it forms an excellent bond. The wood flooring can be nailed directly to this base, as soon as it is set and dry. The weight of Porete Nailfill concrete is 96 lbs. per cu. ft.



PORETE-NAIL BASE ON CONCRETE FLOOR SLABS

The Porete Mfg. Co. *will furnish and erect all these products and systems and guarantee satisfactory results or it can furnish the necessary supervision for the erection.*

The Engineering Dept. of the Porete Mfg. Co. *is ready to make suggestions regarding the steel layout so as to attain the best co-operation for a most economical design.*

POREX SLABS

Made of Portland Cement and Mineralized Wood Fibre

Porex Slabs are made of high grade mineralized wood fibre bound under high pressure with Portland cement. Being bound with Portland cement, which is insoluble in water, the Porex Slabs will stand up under continuous exposure to water. For this reason they can be stored out of doors in the rain and frost without being damaged. The materials of which they are made are straight Portland cement with a tough mineralized wood fibre as an aggregate.

Porex Slabs are odorless, vermin and fungi proof; they are highly fire-resisting. Covered with ½-in. cement plaster on the fire side, they will resist a fire of 1700° Fahr. for over an hour.

Due to their light weight Porex Slabs are excellent for heat and sound insulation. They can be sawed like ordinary lumber. On account of the large size slabs, covering 11 sq. ft., the labor cost for erecting them is low.

Because of its porous texture, Porex has a high sound absorption. When used on ceilings or walls it will provide great acoustical qualities combined with an attractive surface finish of natural gray color. The exposed surface can be painted any suitable color, and it can be cleaned easily with a brush.

Porex Slabs are 20 in. wide x 80 in. long, 1 in. and 1¾ in. thick, covering an area of 11.1 sq. ft. Nine slabs have an area of 100 sq. ft. The 1-in. slabs weigh 2 lbs. per sq. ft. and the 1¾-in. slabs 4 lbs. per sq. ft.

Porex Roofs and Floors

1¾-in. Thick Porex

The 1¾-in. slabs are recommended as floor and roof slabs on wooden or steel joists up to 24-in. centers. When used in this way they are usually covered with a thin cement grout ¼ in. thick. On floors this makes a good construction floor until the finished floor is ready to be set up. This construction is light in weight, gives excellent resiliency and elasticity which is usually lacking in a concrete floor. This floor system is low in price.

On roofs when slate or tile has to be nailed up, a ½ in. thick Porete Nail Finish should be applied instead of the cement finish.

STRENGTH OF POREX FLOOR SLABS 1¾-IN. THICK

Cement Finish Thickness, in.	Total Thickness of Slab, in.	Spacing of Joists, in.	Breaking Load, lbs. per sq. ft., uniform
None	1¾	24	210
¼	2	24	240
¼	2	16	800

Porex Slabs for Stucco Walls

1-in. Thick Porex

Porex Slabs are nailed to the upright studs on 16-in. centers over a waterproofing paper, or they are fastened to steel framing with special clips. After they are erected they are covered with two coats of cement stucco. Their rough surface makes an excellent bond with stucco, and the stucco is not affected by the materials of which the Porex Slabs are made.

The 1-in. thick Porex Slabs are also economical for fireproof ceilings under wooden or steel joists in basements and attics; for forms or centering of concrete slabs; and for furring of brick and stone walls. Porex Slabs covered with cement stucco makes a low cost indestructible permanent wall with good heat insulating value. This construction is not only recommended for dwelling houses, but is particularly valuable for farm buildings where the fireproofness is an important factor.

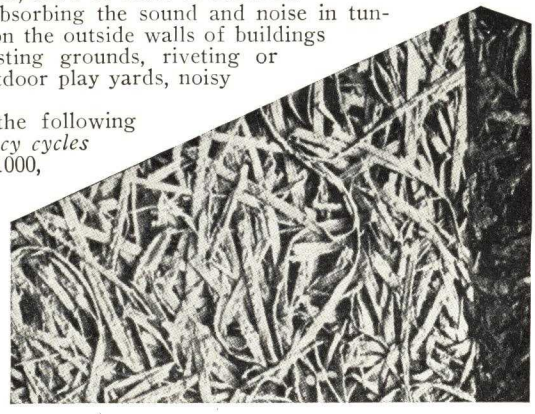
Silent-Porex

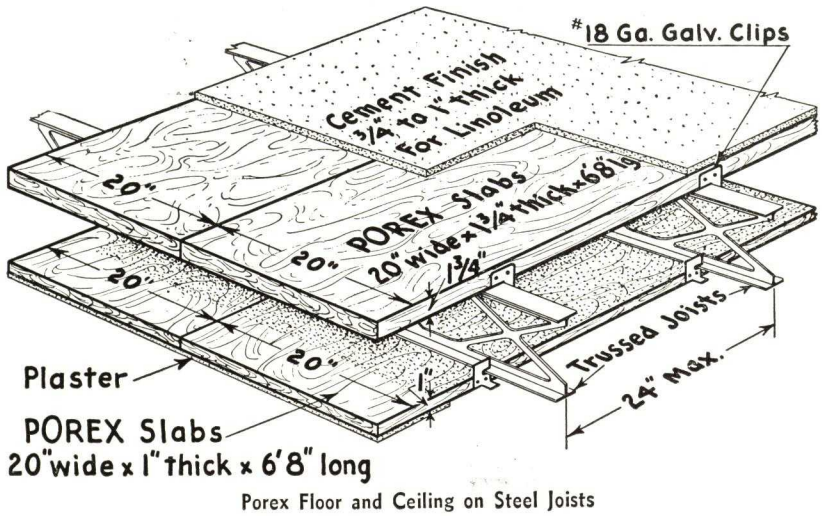
Acoustical for Outdoor Use

Silent-Porex Slabs, 1¾-in. thick, 20 x 80 in., are fastened against the outside walls of buildings where noise has to be reduced. Silent-Porex is the only material made in large sheets, which can be set up outdoors and which is not affected by rain, snow or frost or sunshine.

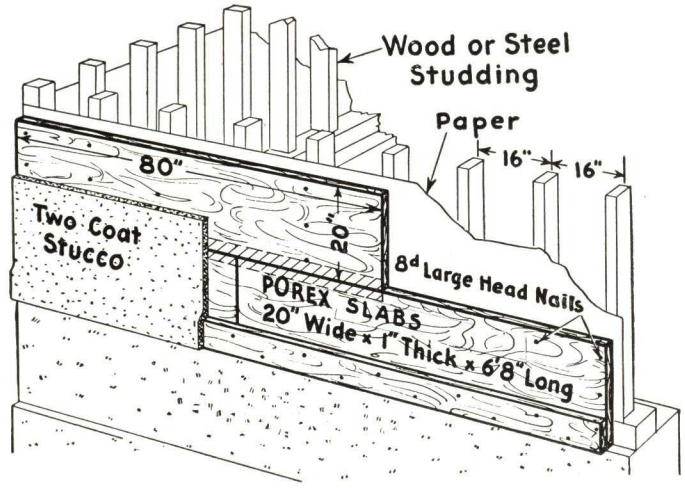
We recommend it for absorbing the sound and noise in tunnel ventilating shafts and on the outside walls of buildings near aeroplane engine testing grounds, riveting or air hammer operations, outdoor play yards, noisy radio sets, etc.

Laboratory tests show the following sound absorption: *Frequency cycles per second:* 120, 250, 500, 1000, 4000; percentage absorption: .23, .43, .90, .74, .65.





Porex Floor and Ceiling on Steel Joists



Porex Stucco Wall

PORETE MFG. CO.

ALPHA STEEL CONCRETE CONSTRUCTION

A New System for Buildings and Bridges

The Alpha System of steel concrete construction consists of a structural steel beam, a reinforced concrete slab, and a spiral electrically welded to the beam and solidly embedded into the concrete slab, thereby combining these three elements into one structural unit. Numerous tests have shown that the spiral is an ideal and reliable means for transmitting all the horizontal shear from concrete slab to steel beam.

In the commonly used floor systems supported by steel framing, the steel beams carry the total load, and they are stressed for both tension and compression, while in the Alpha System the steel section, bonded solidly by the spiral to the concrete slab, takes only the tensile stresses and the concrete slab all the compressive stresses. The system therefore combines the advantages of standard steel construction with those of reinforced concrete. It is obvious that for equal strength the Alpha System can thus make use of considerably lighter steel sections, while the combined unit has nevertheless greater stiffness.

For example: If we compare a typical bay, 18 to 24-ft. span, of an office or apartment building, using short span concrete slabs supported on fireproofed steel beams, we find a saving in weight of steel for the same floor depth of 35% to 55% which results in a saving of 9¢ to 13¢ per sq. ft. of floor area in favor of the Alpha System. In this analysis the cost of the slabs between the supporting beams, is practically the same for both systems. In addition to the above, there is a saving in concrete for the Alpha System since the haunches of the steel section of this system will be smaller due to the lighter steel section used.

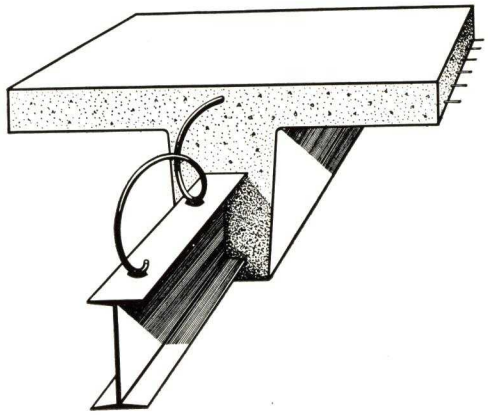
In heavier construction, such as warehouses and industrial buildings, the saving is even more pronounced and varies according to conditions from 17¢ to 30¢ per sq. ft. of floor area. In most cases the Alpha System effects a saving also in comparison to reinforced concrete structures.

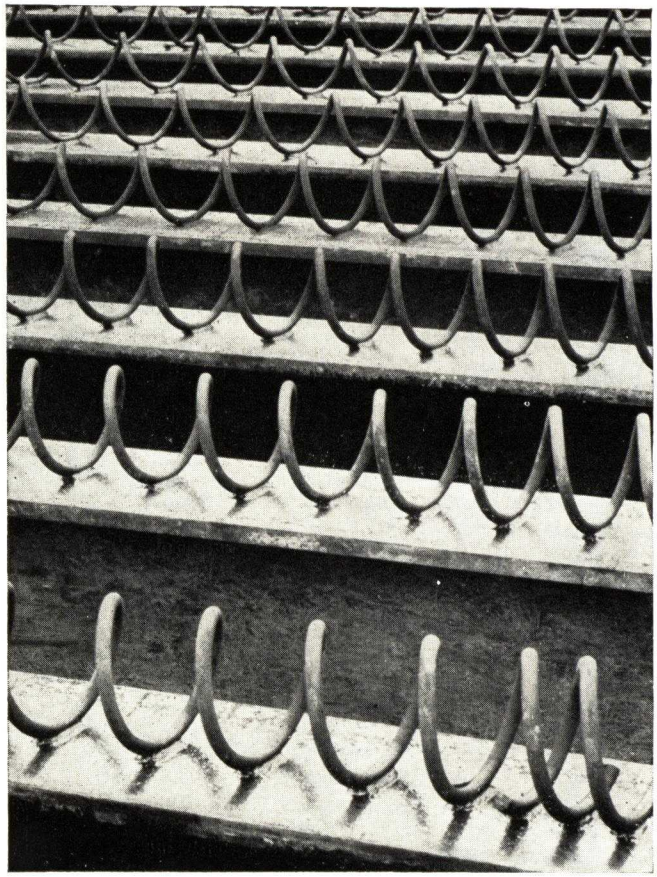
Standard structural shapes are used by the Alpha System. The erection of steel and concrete is done in the usual way and by the same trades, so that no established customs need be changed. Cover plates welded to the bottom flange of standard sections, special shapes, or riveted, or welded built-up sections with heavier bottom flanges make possible additional savings.

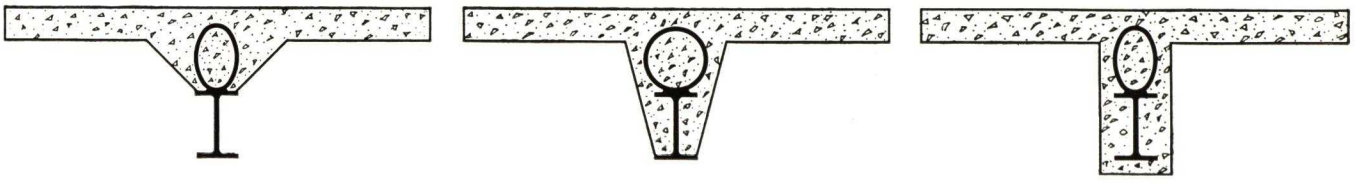
The Alpha System is suitable for any type of floor construction and no increase in floor depth is required. In fact, decreased depths are often obtainable. For instance, in bridges, whenever the girders can be adapted to the Alpha System, a reduced depth may be effected at the abutments, an important point with respect to the shortening of the approaches. In strengthening old bridges, the carrying capacity may be materially increased by the welding of a spiral to the existing beams and pouring a new concrete slab.

The designs and calculations for the Alpha System follow the standard formulas for reinforced concrete. We shall be glad to furnish comparative estimates and typical panel designs for building projects at no cost or obligation.

Numerous references.







Typical Alpha Beam Sections Showing Various Forms of Spirals and Beam Coverings

Porete Mfg. Co. is the Licensee of the Alpha System for Eastern United States. For other territories write Alpha Steel Concrete Construction, 55 West 42nd Street, New York, N. Y.

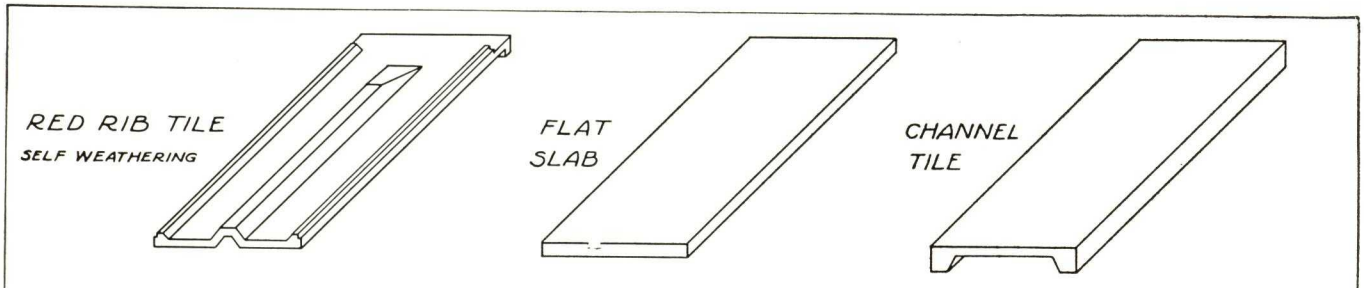
THE TRUSCON LABORATORIES

Cement Tile Division

WORKS AND GENERAL OFFICES

Caniff Avenue and Grand Trunk R. R., DETROIT, MICH.

OFFICES IN PRINCIPAL CITIES



TYPE	RIB TILE	FLAT SLAB	2¾" CHANNEL TILE	3¾" CHANNEL TILE
WIDTH	24" } STOCK SIZE	24" } STOCK SIZE	24"	24" | 18"
LENGTH	4'-4" } STOCK SIZE	5'-0" } STOCK SIZE	6'-8" MAX.	8'-0" MAX. | 9'-0" MAX.
THICKNESS	WEB - 1⅛"	1⅝"	LEG - 2¾" - WEB-1"	LEG - 3¾" - WEB-1"
WEIGHT PER SQ. FT. HAYDITE	16 LBS.	13.5 LBS.	10.5 LBS.	12 LBS. | 13.5 LBS.
WEIGHT PER SQ. FT. SAND	17 LBS.	19 LBS.	16 LBS.	17.5 LBS. | 19 LBS.
REINFORCEMENT	WELDED GALV. MESH	WELDED GALV. MESH	MESH & 2 DEF. BARS	MESH & 2 DEF. BARS
ROOF PITCH	⅓ PITCH OR GREATER	FLAT OR PITCHED	FLAT OR PITCHED	FLAT OR PITCHED
ROOFING	SELF WEATHERING	COMP. ROOFING REQ'D	COMP. ROOFING REQ'D	COMP. ROOFING REQ'D
PURLIN SPACING	4'-0½" MAX. - 3'-9" MIN.	5'-0" MAX.	6'-8" MAX.	8'-0" MAX. | 9'-0" MAX.

Truscon Rib Tile

This reinforced cement roofing tile is self-weathering and is laid directly on the roof purlins. It is fireproof, watertight, of light weight, economical, not only in first cost, but in its permanence without upkeep expense. These tile, together with the necessary trim, are furnished in red color and add materially to the architectural beauty of any building.

Truscon Glass Insert Tile

These reinforced tile are exactly the same dimensions as the standard rib tile and are interchangeable with them. The glass is inserted after the tile is laid and glazed from the outside. Provides increased light over entire roof area or over certain operations as required. Should a glass become broken it can readily be replaced without disturbing the tile.

Truscon Haydite Flat Slabs

These precast reinforced factory-made flat slabs are laid directly on the supporting structural steel. Joints are cemented ready for application of composition roofing. The erection labor is speedily performed without interference with the work of any other trade. No centering or costly form work is required. Light weight—made from Haydite aggregate—fireproof, economical first cost, with no maintenance. Vibrated to give extreme density and solidity. Adaptable for both flat and pitched roofs.

Truscon Haydite Channel Slabs

The channel section design of these slabs permit light weight construction, where longer spans than practical for flat tile are required.

This type of slab is used under the same conditions and present the same advantages as the flat slabs.

Truscon Nailing Concrete Slabs

Where it is desirable to nail an ornamental roof covering and at the same time retain fireproofness, Truscon Nailing Slabs have been developed. The lower portion is of structural concrete and the upper 1¼ ins. of nailing concrete. The base portion may be either the flat type or the channel type, with a maximum span of 5 ft. 4 ins. and 6 ft. 8 ins. respectively.

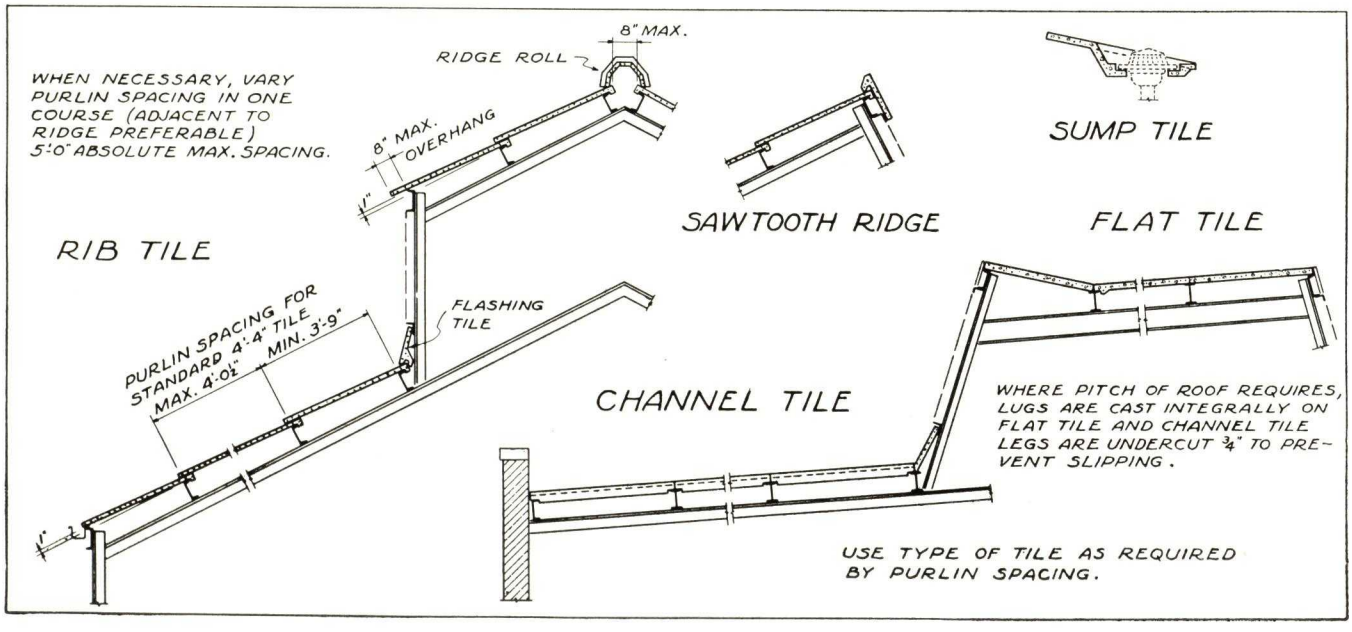
All of the foregoing types are properly reinforced and only the best materials are used.

Concrete mixes are all scientifically controlled by weight and all slabs are cured under constant temperature.

Being factory made, rigid inspection is enforced, which insures uniform excellence in composition, workmanship and results—a standardized product of extreme accuracy.

Installation made as easily in winter as in summer.

List of important installations, such as General Motors, Ford and others gladly sent on request.



ESTABLISHED 1870

THE GEO. RACKLE & SONS CO.

Newburg Station P. O.
CLEVELAND, OHIO

RACKLE ROOFS FOR MODERN CONSTRUCTION

Pre-cast concrete slabs as a base for membrane waterproofing have furnished desirable and trustworthy roofs for over a third of a century. First used by railroads for simple structures such as freight houses and storage sheds, they have been adapted successively to factories, theatres, schools and all buildings with structural steel roof support. THE GEO. RACKLE & SONS Co., pioneers in developing this useful new building material, have achieved many improvements in the quality, lightness and economy of this low-cost, permanent material.

Architects and Builders will find here a concise discussion of general characteristics, design and construction details for floor or roof decks made with Rackle Concrete or Haydite Slabs. The material is simple as its specifications, wide in adaptability.

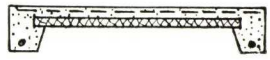
1. Permanency—and No Maintenance Cost!

First cost is last cost. Slabs are not affected by water, heat, condensation, steam, gases or rust. They never need to be painted, though can be if desired. They furnish a dry and even surface for the application of membrane covering. Rackle Slabs are fire resistant. Their merits in underwriter's tests have not been exceeded by that of any other building material used in masonry. There are cheaper roof decks, but none whose final economy and permanence compares with a Rackle Slab roof.

2. Speed of Erection

On buildings where time is important, the speed with which Rackle Slabs can be laid is an important factor in construction schedules. Large, easily handled units come to the job prefabricated, ready to be placed. Numerous high-speed building concerns rely completely on the Rackle organization to handle jobs of major importance.

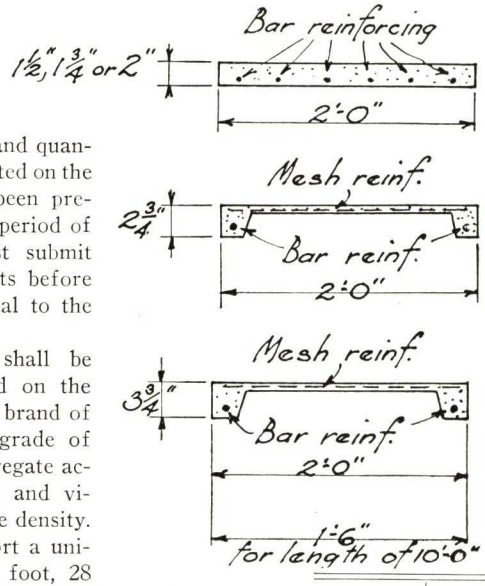
RACKLE ACOUSTICAL ROOF SLABS



These slabs, when used for roof decks for schools, churches, auditoriums, gymnasiums, factories, etc., accomplish three important objectives, namely, fireproofing, adequate insulation, and sound absorption, which is now recognized as being so important to meet modern ideas of efficiency and general welfare. This modern type of construction accomplishes in one unit what required three individual operations by former methods. Where economy is paramount no further decoration is necessary.

If further information on any phase of Rackle products or their application is needed, it will be gladly furnished on request.

Specifications for Rackle Floor and Roof Slabs



(1) Kind—All material furnished under this specification shall be the product of THE GEO. RACKLE & SONS CO., or a manufacturer whose capacity and facilities for furnishing the quality, size and quantities of precast concrete slabs indicated on the drawings and whose product has been previously used on similar work for a period of at least five years and who must submit tests, list of buildings and architects before being accepted by architects as equal to the material specified.

(2) Strength—The roof slabs shall be precast concrete slabs, as indicated on the drawings, composed of an approved brand of portland cement and the highest grade of (Haydite) (Nailing) (Gravel) aggregate accurately graded, thoroughly mixed and vibrated to obtain the greatest possible density. All slabs shall be designed to support a uniform load of 250 lbs. per square foot, 28 days after manufacture, when tested with the maximum span used on the roof.

(3) Dimensions—Outside dimensions shall correspond accurately to sizes shown on the plans. All slabs shall have straight, perpendicular edges and true, unwarped surfaces. All cracked and broken slabs shall be rejected.

(4) Details—This contractor shall design and submit details to the architect for approval. These details are to be based upon the architect's drawings and steel fabricator's details. Manufacture of special size or shaped slabs shall not be started until details have been approved.

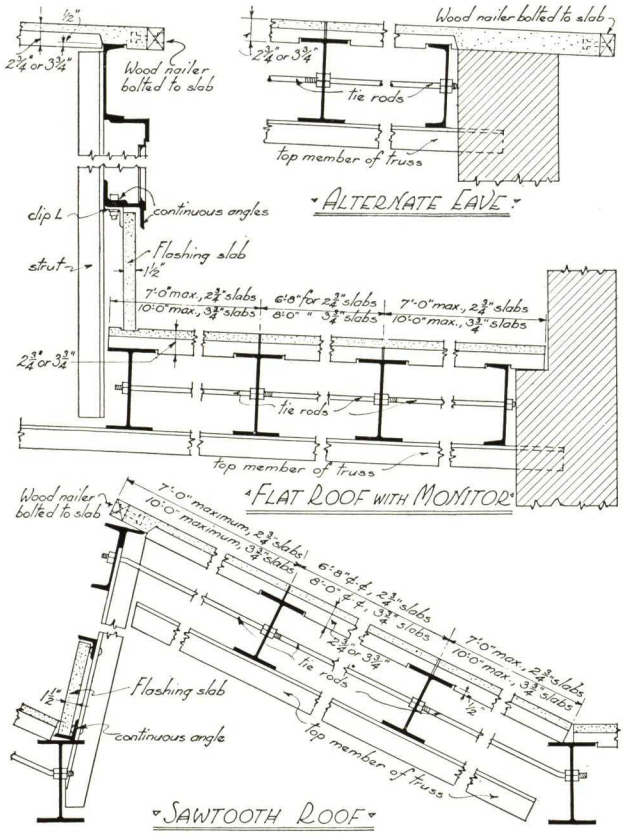
(5) Notification—The general contractor shall notify this contractor one week in advance when the roof will be ready for the application of slabs.

(6) Erection—All slabs are to be erected by this contractor in a thoroughly workmanlike manner. Joints are to be pointed on upper side with mastic cement and protected with 2½ in. strip of asphalt saturated duck over all joints. (Floor and nailing slabs do not require duck strip.) The completed work must present a smooth surface ready for the application of the composition or ornamental covering.

Type of slab	Standard length	Absolute max. length	Thickness	Width	Weight, sq. ft.	
					Gravel	Haydite
Flat	5'-0"	5'-6"	1½"	2'-0"	17 lbs.	12 lbs.
Flat	5'-6"	6'-0"	1¾"	2'-0"	19 lbs.	14 lbs.
Flat	5'-6"	6'-6"	2"	2'-0"	21 lbs.	16 lbs.
Channel	6'-0"	6'-8"	2¾"	2'-0"	15 lbs.	11 lbs.
Channel	6'-8"	9'-0"	3¾"	2'-0"	18 lbs.	14 lbs.
Channel	8'-0"	10'-0"	3¾"	1'-6"	20 lbs.	16 lbs.
Nailing Flat	5'-0"	6'-0"	2½"	2'-0"	22 lbs.	18 lbs.

Note: Add 7 lbs. per sq. ft. and 1¼" to thickness for nailing concrete on channel slabs.

RACKLE CHANNEL ROOF SLABS

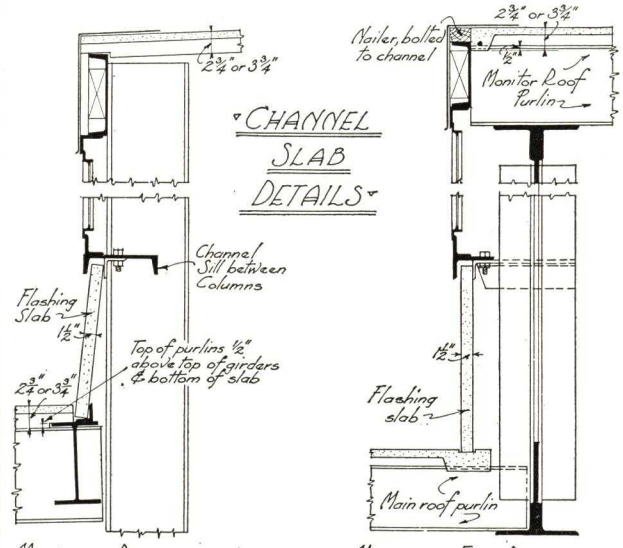


ALTERNATE EAVE

FLAT ROOF WITH MONITOR

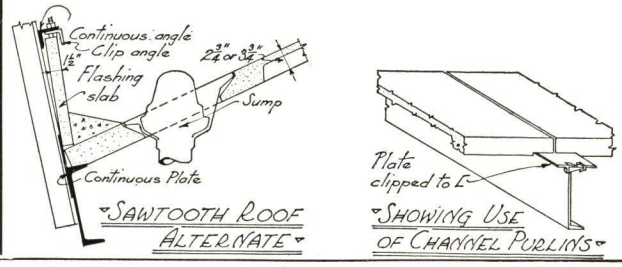
SAWTOOTH ROOF

TYPICAL LONGITUDINAL SECTION



MONITOR DETAIL, USING COLUMNS INSTEAD OF STRUTS

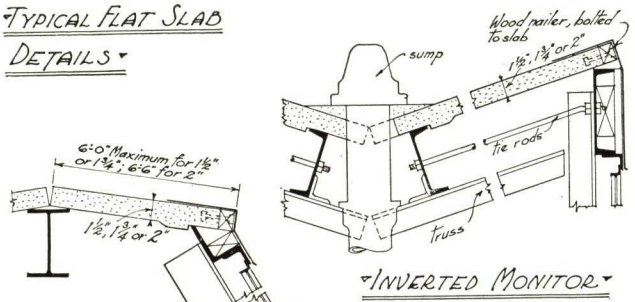
MONITOR END DETAIL



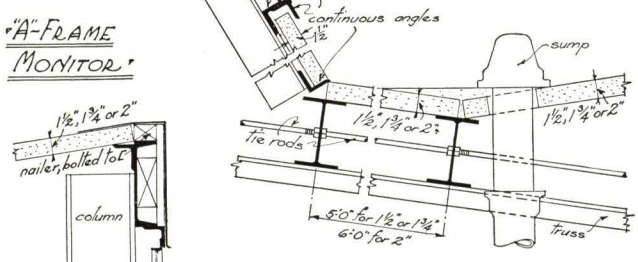
SAWTOOTH ROOF ALTERNATE

SHOWING USE OF CHANNEL PURLINS

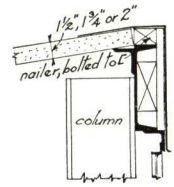
TYPICAL FLAT SLAB DETAILS



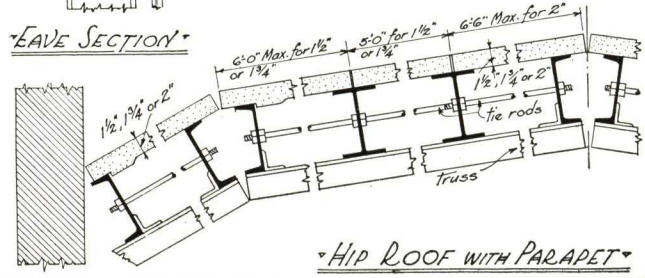
INVERTED MONITOR



"A"-FRAME MONITOR

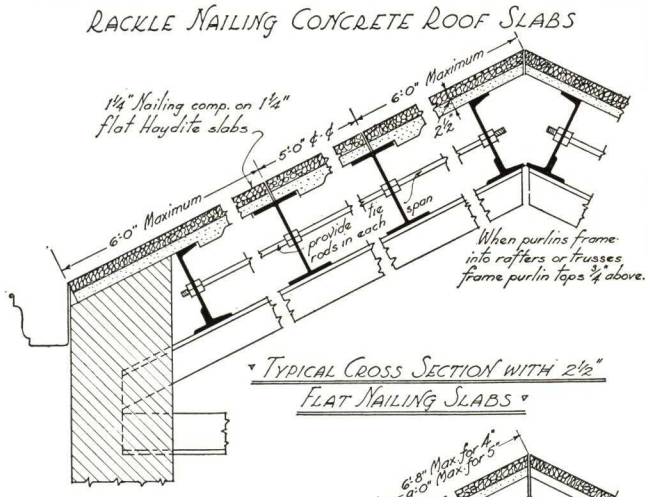


EAVE SECTION

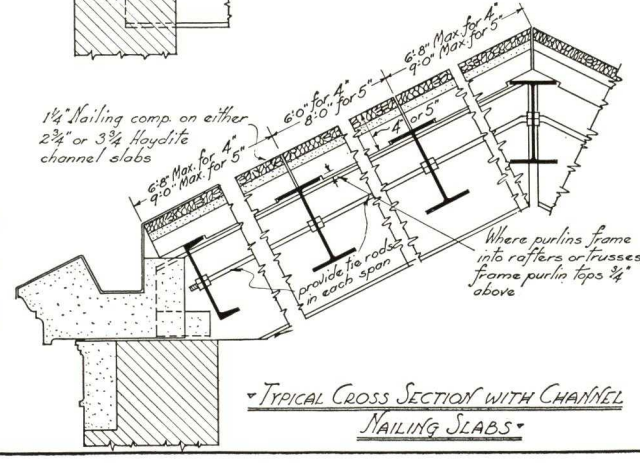


HIP ROOF WITH PARAPET

RACKLE NAILING CONCRETE ROOF SLABS



TYPICAL CROSS SECTION WITH 2½" FLAT NAILING SLABS



TYPICAL CROSS SECTION WITH CHANNEL NAILING SLABS

THE HAUSMAN STEEL CO.

Steel Forms for Concrete Construction

TOLEDO, OHIO

Products

REMOVABLE STEEL FORMS for concrete joists and adjustable round column forms.

REMOVABLE STEEL FORMS for any type of construction wherever there is sufficient duplication to make steel forms economical.

Experience

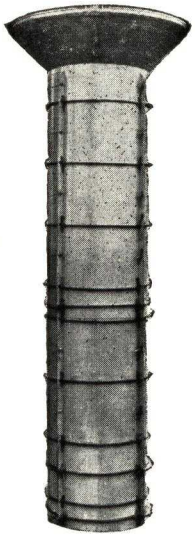
We have had twenty-three years' experience in design and construction of all types of wood and steel forms. Our forms have been used on hundreds of buildings throughout the country.

Service

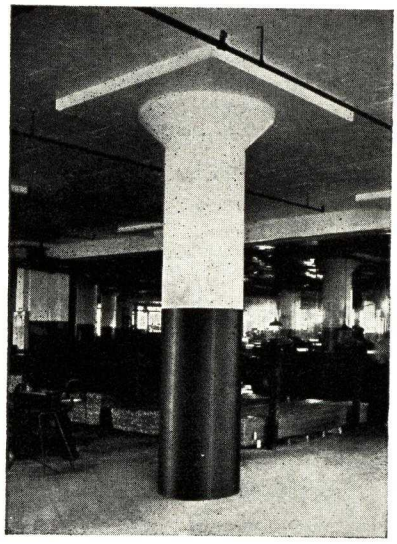
Forms are either leased outright or erected complete, including all centering underneath same. Our Engineering Department will prepare preliminary estimates and comparative cost data.

Cost

Estimates furnished promptly and costs vary with spans, loads, location and speed. Repeat orders confirm our claims for economy.



Hausman Adjustable Column Form Assembled



Finished Column, Champion Spark Plug Co., Toledo, Ohio
MILLS, RHINES, BELLMAN & NORDHOFF, Architects
THE HENRY J. SPIEKER CO., Contractors

ADJUSTABLE ROUND COLUMN FORMS

The Hausman Column Mold Form is an ingenious, adjustable device for forming perfect concrete columns of varying diameters and heights with speed and efficieny.

Built up out of panels of 20-gauge steel, the forms are easy to handle, though strong enough to carry the loads to which they are subjected. Construction is simple throughout. The panels are firmly held together to form a true circle by circular steel bands and steel wedges. By assembling the form with different sized panels, the diameter is changed. The diameter of the shaft must be in multiples of 2 in., the capitals in multiples of 6 in.

Capitals are adjustable to any column diameters specified. Forms may either be leased or erected complete. Consult us on your special problem.

TYPICAL INSTALLATIONS

Column Forms

NAME	LOCATION	CONTRACTOR	ARCHITECT
Ainsworth Mfg. Co.	Detroit, Mich.	Bryant & Detwiler	Albert Kahn
Chevrolet Fisher Plant	Flint, Mich.	J. A. Utley	Albert Kahn
Eastman Kodak Co.	Rochester, N. Y.	Ridge Construction Co.	Owner
Educational Press	Columbus, Ohio	E. Elford & Son	Richards, McCarty & Bulford
Brown-Forman Distilling Co.	Louisville, Ky.	Geo. H. Rommel Co.	Joseph & Joseph
Shillito Department Store	Cincinnati, Ohio	Frank Messer & Sons, Inc.	Potter, Tyler & Martin
Federal Warehouse	Washington, D. C.	B-W Construction Co.	Lockwood, Greene, Inc.
Burdine's Department Store	Miami, Fla.	Sandquist Construction Co.	Owner
Marshall Field & Co., Warehouse	Spray, N. C.	Southeastern Construction Co.	N. C. Robert & Co.
Kimberley-Clark Corp. Whse.	Neenah, Wis.	Koepke Construction Co.	Owner

Ribbed Slabs

State Hospital	Willard, N. Y.	A. E. Stephens Co.	W. E. Haugaard
U. S. Veterans Hospital	Bedford, Mass.	Thos. O'Connor & Co.	Veterans Bureau
Ohio State Office Building	Columbus, Ohio	Struck Construction Co.	Harry Hake
U. S. Veterans Hospital	Canandaigua, N. Y.	Irwin & Leighton	Veterans Bureau
U. S. Veterans Hospital	Bath, N. Y.	Irwin & Leighton	Veterans Bureau
15 Buildings, State Hospital	Gowanda, N. Y.	C. F. Haglin & Sons, Inc.	W. E. Haugaard
U. S. Veterans Hospital	Little Rock, Ark.	McGregor & Pickett	Veterans Bureau
Lord Baltimore Hotel	Baltimore, Md.	Consolidated Engineering Co	W. L. Stoddart
U. S. Veterans Hospital	Perry Point, Md.	North-Eastern Construction Co.	Veterans Bureau
Abraham Lincoln Hotel	Reading, Pa.	Hunkin-Conkey Construction Co.	W. L. Stoddart
U. S. Veterans Hospital	Kecoughtan, Va.	Virginia Engineering Co.	Veterans Bureau
U. S. Veterans Hospital	Lexington, Ky.	J. A. Jones Construction Co.	Veterans Bureau
Charity Hospital of Louisiana	New Orleans, La.	Geo. A. Fuller Co.	Weiss, Dreyfous & Seiferth
U. S. Veterans Hospital	Togus, Me.	Doyle & Russell	Veterans Bureau
U. S. Veterans Hospital	Dearborn, Mich.	Cooper-Little Co.	Veterans Bureau
U. S. Veterans Hospital	Camp Custer, Mich.	E. W. Sproul Construction Co.	Veterans Bureau

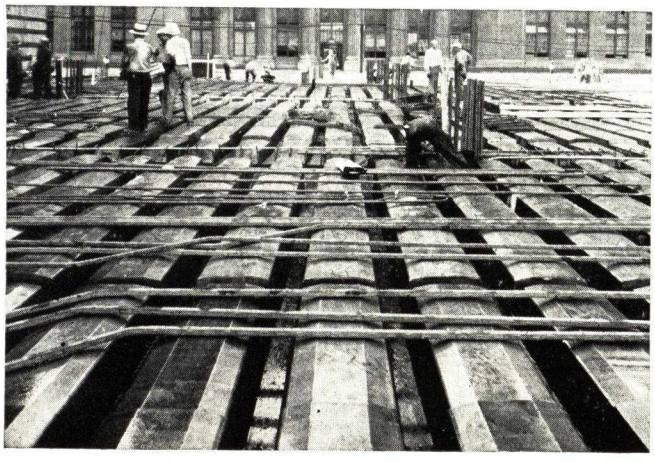
REMOVABLE STEEL FORMS FOR CONCRETE JOISTS

Description

Structural steel channel soffits combined with 14-gauge smooth type pans in long lengths and a system of shoring which permits pans to be removed while shores remain in place. Note illustration above showing double taper pans and channels, bridging joist and method of centering. Our quotations include not only lease and erection of pans, but all centering underneath same. Further details upon request.

Advantages

Forms are sufficiently heavy so that there are no deflections or indentations. Structural steel soffits insure straight, true lines and tight joints. No leakage of concrete. No re-shoring is required, and all shores are superimposed directly above each other, providing maximum safety. Shores are far enough apart to provide ample working space for other trades. Extremely rapid progress schedules can be maintained.



Hausman Steel Forms in Place, General Motors Research Building, Detroit, Mich.
ALBERT KAHN, Architect
O. W. BURKE CO., Contractors

Typical Hausman Steel Form Installation, Mt. Pleasant Senior High School, Providence, R. I.
PUBLIC WORKS DEPARTMENT, Architects
CHAS. T. WILLS, INC. and TUCKER CONST. CO., INC., Contractors

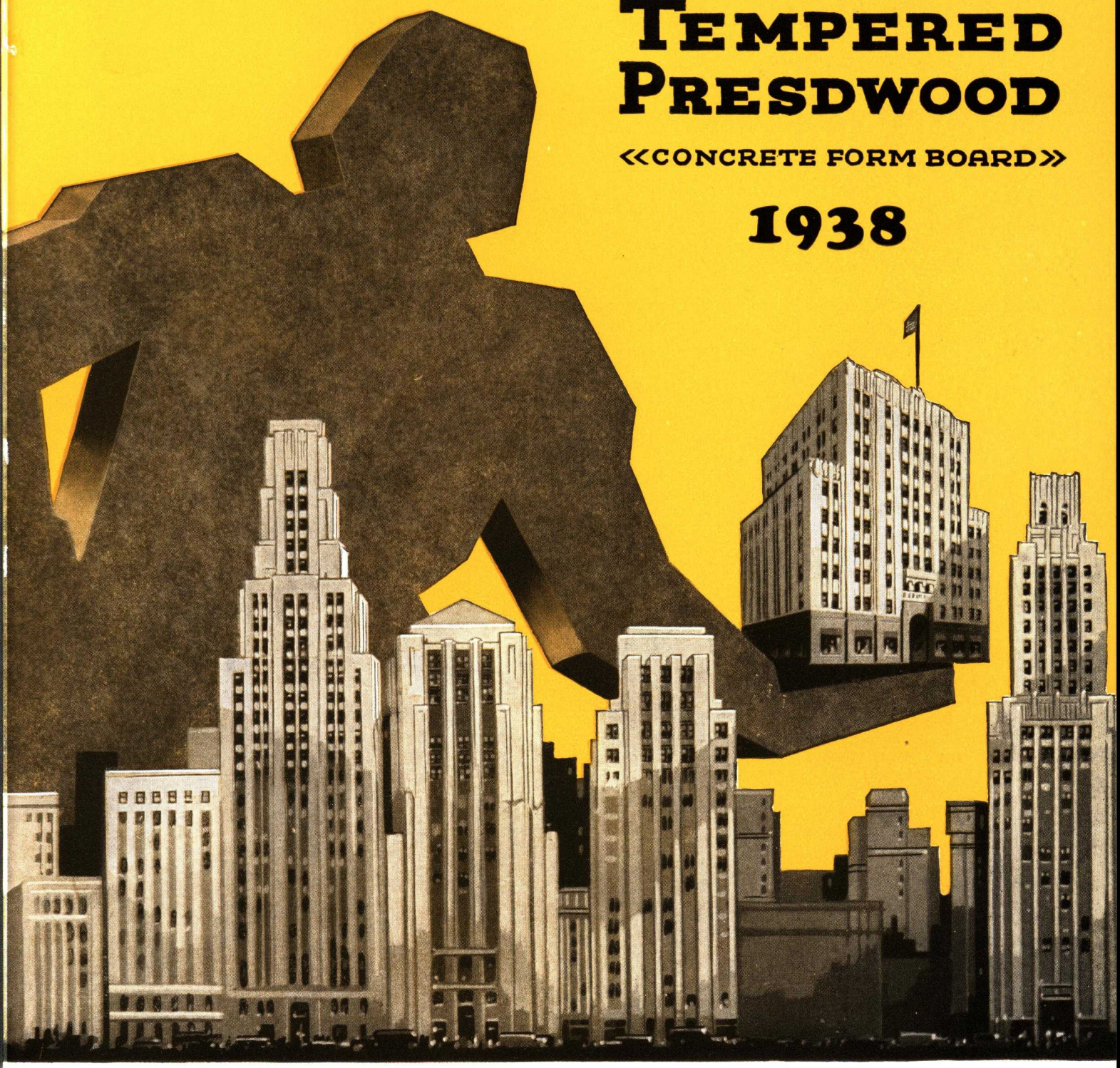
MEMORANDA

Genuine

MASONITE TEMPERED PRESDWOOD

«CONCRETE FORM BOARD»

1938



MASONITE *Corporation*
111 *W. Washington Street*, CHICAGO, ILLINOIS

MASONITE Corporation

111 W. Washington Street, CHICAGO—ILLINOIS.

FOR CATALOG ON **MASONITE STRUCTURAL INSULATION** See Sweet's File Index

MASONITE TEMPERED PRESDWOOD (CONCRETE FORM BOARD)

Why You Should Specify It

Two requisite characteristics of concrete are strength and durability. To secure these characteristics, it is necessary that the concrete be thoroughly and completely hydrated. Perfect hydration can be obtained only when forms that retain the mixing-water and maintain the established water cement ratio during the early stages of curing, are used. Properly constructed forms of Masonite Tempered Presdwood retain the mixing-water, thereby insuring the complete and uniform hydration of the concrete mass during the early stages of curing.

Tempered Presdwood forms not only insure better concrete, but also effect substantial economies, as there are numerous instances in which they have been reused upward of twenty times, and some cases in which they have been reused upward of thirty times.

An understanding of what Masonite Tempered Presdwood is, will immediately explain why it serves so well in concrete form work.

INTRODUCTION

A Tried and Proved Material

The increasing demand and successful use of Masonite Presdwood for the lining of concrete forms to economically produce smooth, finished, exposed concrete surfaces, led the Research and Development Department of the MASONITE CORPORATION to further develop and perfect this material to more particularly adapt it to this use.

This fine material, Tempered Presdwood, should in no way be contused with the previously made board, still admirably adapted to many uses in building and other industries.

Tempered Presdwood is much denser, less absorptive and of considerably greater structural strength than Standard Presdwood.

To the long and favorably known unique qualities of Presdwood have been added almost unbelievable new qualities of tough, wear-resisting ruggedness and strength.

Made of Exploded Wood

Masonite Tempered Presdwood is a manufactured board, made entirely of wood fibres by the Mason Process (Patented).

No binders are added and no chemicals are used in its manufacture.

Clean wood chips (yellow pine) are exploded under high steam pressure. This first stage in the manufacturing process produces long cellulose fibres with their original strength unimpaired and the lignin or natural cementing constitutent of the wood entirely retained. The exploding process is purely physical, not chemical, and there is no change in the wood except that it is torn apart into exceptionally long fibres.

These clean, long fibres are next thoroughly felted together and compressed into boards 4 feet by 12 feet in steam heated, flat-bed hydraulic presses where they are subjected to tremendous pressure and at the same time to a high temperature. In four ways the board thus produced is better than nature's own original material. It is both grainless and knotless, has greater moisture resistance and is much denser and tougher.

The compressed or finished boards (Masonite Presdwood) are now treated or tempered by a patented process which adds unbelievably to their density, non-absorption, structural strength and toughness. The result is a board of uniformity in thickness and physical properties. The face surface of the board is smooth and semi-polished. The reverse surface is screen-mesh-indented.

THE COMPANY Manufacturing Facilities

The MASONITE CORPORATION has been continuously in business since 1925. All of its products, "Masonite Insulation," "Quartrboard," "Presdwood," the new "Tempered Presdwood," and "Temprtile" are produced by the "Mason Process." They are made entirely of pure, clean wood fibre. All of the products are sold nationally through retail lumber merchants.

The Manufacturing Plant is located at Laurel, Miss., with an annual capacity of better than 200,000,000 square feet of its various insulation and hard board products. Reasonable stocks are always maintained at the factory to insure quick delivery for any size operation.

Form Designing Service

The MASONITE CORPORATION maintain a corps of competent engineers to assist in the design and erection supervision of economical concrete forming based on the use of Tempered Presdwood.

Physical Characteristics of TEMPERED PRESDWOOD

SIZE (AREA)

The boards are uniformly 4'x 12' cut accurately rectangular in shape with smooth, sharp arrises.

THICKNESS

Form Liner Boards—$\frac{3}{16}$ in. thick.
Structural Form Boards—$\frac{1}{4}$ in. and $\frac{5}{16}$ in. thick.

WEIGHT

$\frac{3}{16}$ in. thick—1100 lbs. per thousand square feet.
$\frac{1}{4}$ in. thick—1400 lbs. per thousand square feet.
$\frac{5}{16}$ in. thick—1700 lbs. per thousand square feet.

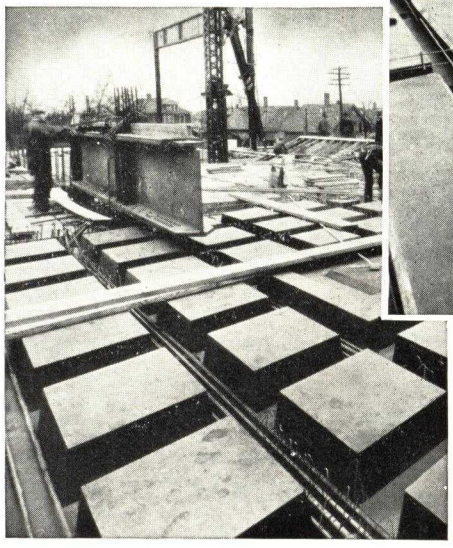
SPECIFIC GRAVITY

The specific gravity of Tempered Presdwood is 1.08, which is greater than Northern Hard Maple.

STRUCTURAL STRENGTH

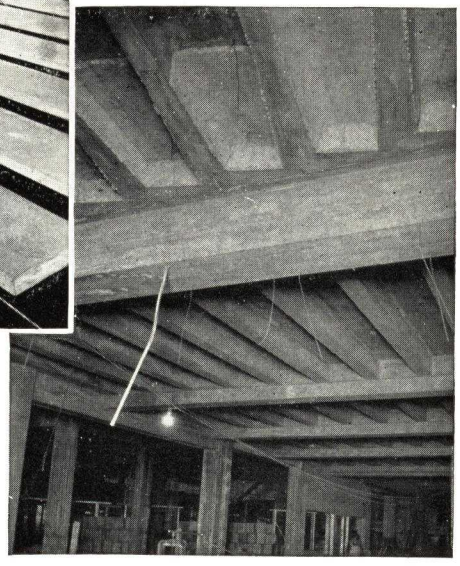
Tensile Strength per square inch....	5,000 lbs.
Modulus of Rupture per square inch.	10,000 lbs.
Working stress per square inch.....	1,250 lbs.
Modulus of Elasticity.....	850,000 lbs.

NORTH EAST Y. M. C. A. NOTE TWO WAY JOIST SYSTEM USED ON THIS PART OF THE BUILDING AND THE ADAPTABILITY OF TEMPERED PRESDWOOD TO THIS SYSTEM



NORTH EAST Y. M. C. A. BUILDING —DETROIT, MICH. ARCHITECTS: SMITH, HINCHMAN & GRYLLS—DETROIT. GEN. CONTRACTORS: A. A. ALBRECHT CO.—DETROIT. TEMPERED PRESDWOOD USED AS A FORM LINER ON ALL EXPOSED SLABS, JOISTS AND COLUMNS

NORTH EAST Y. M. C. A. NOTE STRAIGHT ALIGNMENT AND CLEAN EDGES OF THE CONCRETE JOIST. COMPARE THIS SURFACE WITH THE FOREGROUND METAL PAN SURFACE



Advantages and Economies of MASONITE TEMPERED PRESDWOOD

(Concrete Form Board)

FORM FINISHED CONCRETE— GENERAL ADAPTABILITY

Building Industry for years searched without success for a material wholly suitable for concrete form lining and structural forming which would leave the concrete surface in a smooth, finished condition without added labor and expense.

The development of Tempered Presdwood, a grainless, all-wood fibre board, has through actual use on practically every type of concrete structure, proven its entire practicability and adaptability for this purpose. Tempered Presdwood has all the advantages previously accredited to natural wood lumber with the elimination of all of its inherent disadvantages.

Smooth finished concrete surfaces, both for the interior and exterior, are obviously an economy and may be utilized in practically every type of construction where reinforced and mass concrete are adapted.

On the interior, Form Finished Concrete in columns, beams, girders and slabs forming ceilings requires no plastering or furred or suspended ceilings to cover up or make presentable the structural members. The finished concrete is practically ready for decorating when the forms are removed.

For subways, tunnels and similar construction, a dense, smooth concrete surface is provided.

For exterior exposed building foundations and walls, Form Finished Concrete devoid of the usual form lumber disfigurations, has infinite possibilities. This is particularly true in the case of bridge piers, bridges and viaducts. Tempered Presdwood has proven an ideal form surface for special-process exposed-aggregate concrete wall facings.

Tempered Presdwood boards may be formed to the average curves required for arches and vaults.

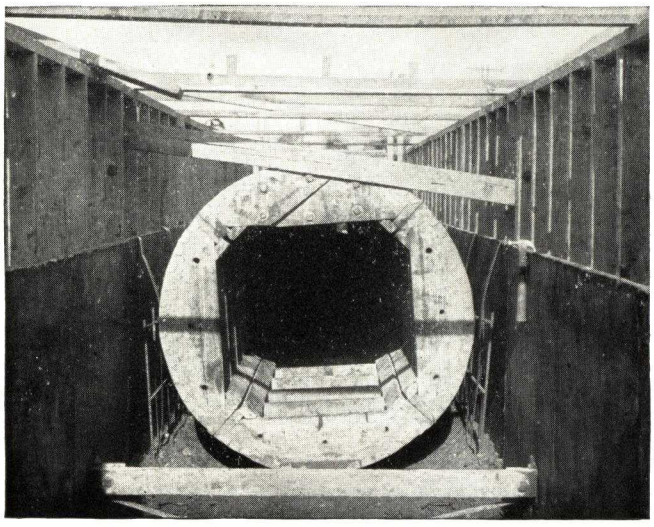
ELIMINATION OF FORM JOINTS, ETC.

Due to the large area of the Tempered Presdwood units (4 ft. x 12 ft.), form joints, which would appear as disfiguring marks and fins on the concrete surface, are entirely eliminated.

Where joints between boards are necessary, they can be practically obliterated if ordinary care is exercised in cutting the boards and matching and securing the edges at the butt. (The manufactured edges of Tempered Presdwood boards are straight and square with sharp, true arrises.) No joint filler is required.

Much of the disfiguring form marks on exposed concrete in the past has been due to moisture absorption which has caused swelling, cupping and bulging of the individual boards of even the most carefully built wood lumber forms.

KALAMAZOO OUTFALL SEWER 6000 LINEAL FT. OF MONOLITHIC CONCRETE SEWER. 4' 6" INSIDE DIAMETER. NO HORIZONTAL JOINTS
OWNER: CITY OF KALAMAZOO, MICHIGAN
ENGINEERS & BUILDERS: CITY ENGINEERING DEPT. OF KALAMAZOO
INTERIOR FORM IN PLACE. NOTE TEMPERED PRESDWOOD PARTIALLY LINING EXTERIOR SKELETON FRAME. IT HAD BEEN USED 21 TIMES WHEN PHOTOGRAPH WAS TAKEN



Since Tempered Presdwood is practically non-absorptive, it remains flat and smooth even after repeated uses.

UNIFORMITY

Tempered Presdwood boards are absolutely uniform in surface finish, density and strength and are accurately cut to dimension.

The material is grainless and therefore has no tendency to split.

The fibres are uniformly compacted throughout the entire thickness—it is not laminated or stratified, therefore it will not separate or flake transversely.

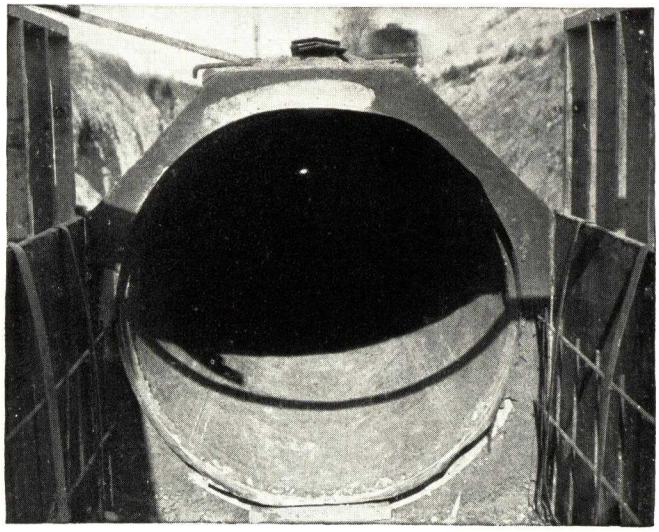
LIGHT WEIGHT—EASILY HANDLED

While of great structural strength, the boards are thin ($\frac{3}{16}$, $\frac{1}{4}$ and $\frac{5}{16}$ in.) and weigh only 67.2 lbs. for 48 sq. ft. of $\frac{1}{4}$ in. Whether used as lining for wood forms or structurally spanning between wood supports, they are easy to handle and weigh less than any other material possessing comparable characteristics.

A SMOOTH FORM SURFACE

The face of Tempered Presdwood is smooth and has a semi-polished appearance. This is due to the smooth chromium steel platens against which Presdwood is pressed when being made.

The tempering process fills the voids that may be in the surface of the board, increasing both its hardness and smoothness.



ANOTHER VIEW OF KALAMAZOO OUTFALL SEWER SHOWING SECTION OF SEWER HAVING JUST BEEN STRIPPED. NOTE COMPARATIVE SMOOTH SURFACE OF INTERIOR LINING OF SEWER. TEMPERED PRESDWOOD USED 21 TIMES WHEN THIS PHOTOGRAPH WAS TAKEN

RETAINS THE CORRECT WATER CEMENT RATIO

Forms lined with or built of Tempered Presdwood are tight and retain all of the pre-determined moisture within the forms assuring complete, uniform hydration of the cement and, therefore, better concrete.

The full strength of concrete pre-determined by the water cement ratio method is secured.

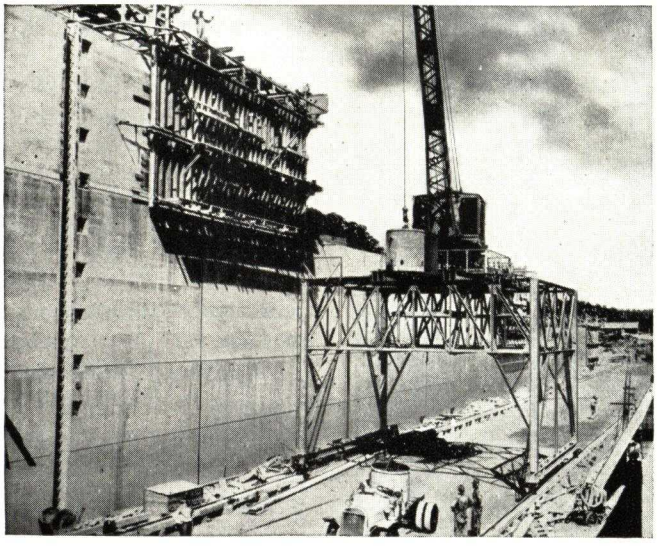
There are few, if any, cracks or joints for the moisture to seep through and practically no moisture is absorbed by the Tempered Presdwood.

TEMPERED PRESDWOOD ENDURES REPEATED USE

The greatest economy in forming may obviously be expected where the form units for floor arches or slabs, joists, beams, girders and columns are designed in sections for easy removal and repeated reuse on similar members. This is particularly so on floor constructions in multi-story buildings.

Column form size reductions on successive stories are easily accomplished with a minimum loss of material and labor.

Eight to twelve reuses of Tempered Presdwood in form units are frequently obtained when reasonable care is exercised in stripping, cleaning, storing, handling, and re-erecting. There have been jobs on which forms have been reused upward of thirty times.



SECTION SHOWING LOWER GUIDE WALL AT DAM No. 3

After the concrete has set sufficiently for form removal, Tempered Presdwood strips easily from the concrete surface.

Tempered Presdwood from large forms may be repeatedly cut down for use in smaller units.

On an average job, 5% is considered a generous allowance for wastage in cutting.

SAVES FORM LUMBER COSTS

Only sound square edged form lumber need be used in conjunction with Tempered Presdwood—dressed and matched material may be entirely eliminated.

Where Tempered Presdwood is used structurally the skeleton wood form bracing or backing may be so arranged as to require little, if any, cutting to length—the ends of alternate boards may be staggered and lapped.

Since the Tempered Presdwood largely prevents the seepage or loss of water from the concrete, the wood bracing or backing lumber remains in good condition (out of contact with moisture) and with ordinary care in stripping and handling, the salvage and reuse is very considerably increased.

Under average conditions 85% salvage of the supporting wood form lumber is not unusual.

WOOD ACCESSORIES FOR ARCHITECTURAL EFFECT

Where the design requires it, reverse wood moulding forms are easily and inexpensively added to Tempered Presdwood forms to provide ceiling panels, beam and girder crown moulds, beam soffit chamfers and panels and column chamfers.

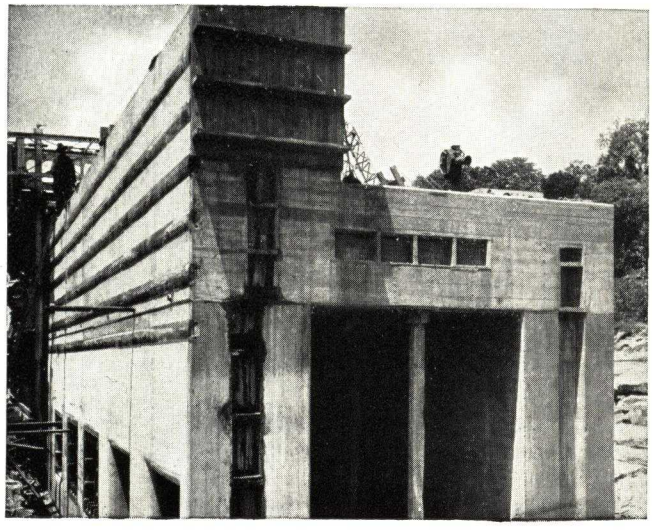
These accessories should be carefully fitted, particularly at miters and intersections and thoroughly oiled to reduce moisture absorption.

SAWING TEMPERED PRESDWOOD

Tempered Presdwood, due to its density and grainless composition, is best cut with a power saw. The saw blade should be an 88-tooth, 14 inch diameter, 10 gauge, for straight saws and 8-13-8 gauge for mitre ground saws and such equipment will give the greatest efficiency for the longest period of time.

For cutting Tempered Presdwood the saw blade should be raised from one-half (½) inch to three-quarters (¾) inch above the surface of the board. The pitch is considerably lengthened and is instrumental in speeding the cutting of Tempered Presdwood Board.

LOCK WALLS ON LOCK AT DAM NO. 3 TENNESSEE RIVER, CHATTANOOGA DISTRICT, WERE POURED IN FORMS LINED WITH GENUINE MASONITE TEMPERED PRESDWOOD.



TYPE OF CONCRETE REQUIRED

A uniform, extremely plastic concrete mix should always be used, well spaded to assure complete elimination of air and provide full contact with the form face. The whole mass should be puddled, agitated or vibrated by artificial means where concrete is closely confined in comparatively narrow members.

INSPECTION OF FORMS

The best of exposed concrete surfaces can be obtained by a minimum of added care and expense in form construction and proper care and treatment of the forms. Finished forms should always be inspected to insure tight butted joints of the Tempered Presdwood and any foreign substance clinging to the surface of the forms should be removed.

MASTER SPECIFICATIONS

TEMPERED PRESDWOOD FOR CONCRETE FORMS

Note: Notes are explanatory or advisory only and are not to be included in the specifications.

Note: Select and include only those clauses which apply to the particular work. Words or clauses within brackets in italics are selective.

GENERAL REQUIREMENTS

(1) WORK INCLUDED

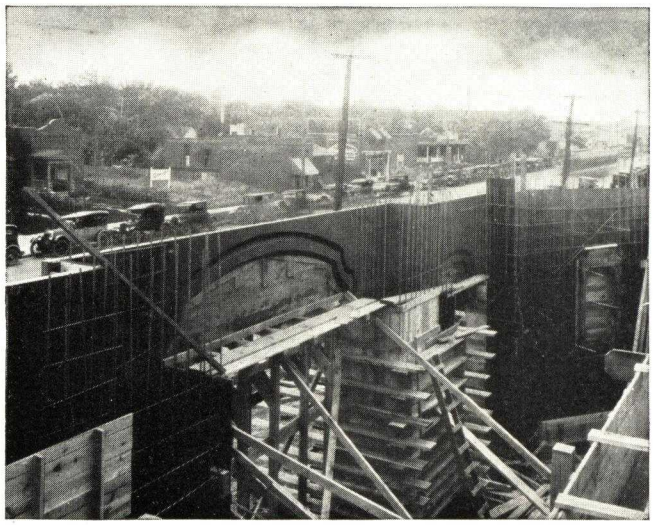
The following concrete surfaces shall be so executed that the exposed faces shall be "Form Finished," smooth and true, devoid of surface irregularities, disfigurement or markings without the necessity of rubbing, grinding, tooling or other mechanical finishing.

Note: Here list and locate all areas of "Form Finished Concrete." Contractor to take advantage of the structural strength of Tempered Presdwood.

(2) FORM FACING MATERIAL

(2a) Forms for "Form Finished Concrete" shall be faced with Tempered Presdwood as manufactured by the MASONITE CORPORATION, 111 W. Washington Street, Chicago, Illinois.

(2b) Boards shall be 4 ft. x 12 ft. in area with square-cut, straight edges and sharp arrises; $\frac{3}{16}$ in. for form lining and $\frac{1}{4}$ in. or $\frac{5}{16}$ in. thick for structural forms as best adapted to the particular type of concrete construction.



MONTGOMERY WARD BUILDING, DENVER, COLORADO. EXPOSED FACE OF EXTERIOR WALL FORMS WERE LINED WITH TEMPERED PRESDWOOD, TOUGH AND NON-WARPING, FOR "FORM FINISHED" CONCRETE REQUIRING NO TOOLING OR RUBBING AFTER FORM STRIPPING

(3) APPLICATION OF TEMPERED PRESDWOOD—GENERAL REQUIREMENTS

(3a) Tempered Presdwood forms shall be so constructed that the smooth face of the board shall always be in contact with the finished or exposed face of the concrete.

(3b) Approximately 24 hours before applying the Presdwood, thoroughly wet with water the screen side of the board. Stack the boards, screen side to screen side, in the pile before using.

(3c) Boards shall be so disposed and of such sizes as to eliminate all unnecessary joints between board areas.

(3d) All joints between boards shall be butted tight. Do not spring or force the boards in place.

(3e) The edges of Tempered Presdwood boards, cut on the job, shall be straight, true and clean to produce a smooth, even edge where butted at joints.

(3f) All butt joints shall be rigidly supported for their full length to prevent movement.

(3g) All curved surfaces shall be formed accurately.

(3h) Nail Tempered Presdwood using three-penny cement coated, casing head nails. Space nails through center of board on 6″ or 8″ centers, the nails to be staggered. Along all four edges space nails approximately 4″ on centers. Always nail from the center of the board out to the edges.

(3i) Tempered Presdwood may be reused as many times as will provide a continuous, smooth surface.

(4) FORM OILS AND GREASES

Before each use, Tempered Presdwood Forms shall be wiped with waste saturated with grease having a calcium soap or aluminum stearate base, or with waste dipped in paraffin base oil having a viscosity of 145 (Saybolt) or over, free from volatile constituents. These are obtainable under various trade names from Standard Oil Co., Shell Oil Co., Texas Oil Co., Gulf Refining Co., and other refiners. Do not use an excess of oil.

(5) WOOD ACCESSORIES

Wood accessories, such as reverse crown moulds, panel moulds, chamfers, etc. shall be accurately and smoothly milled to produce smooth finished concrete surfaces. They shall be so secured in conjunction with the Tempered Presdwood form facing as to form unbroken lines with all joints, miters, etc. accurately and closely fitted. Wood accessories shall be well oiled with a good grade of form oil before use and shall be maintained in a fairly waterproof condition throughout the work.

(6) FORM LUMBER

Form lumber used in conjunction with Tempered Presdwood form facing shall be sound material of sufficient size and so spaced as to adequately support the loads to be carried without deflection.

(7) STRIPPING

Care should be exercised in stripping the forms from the finished concrete that the Tempered Presdwood edges and face surfaces are not injured in any way to preclude their reuse.

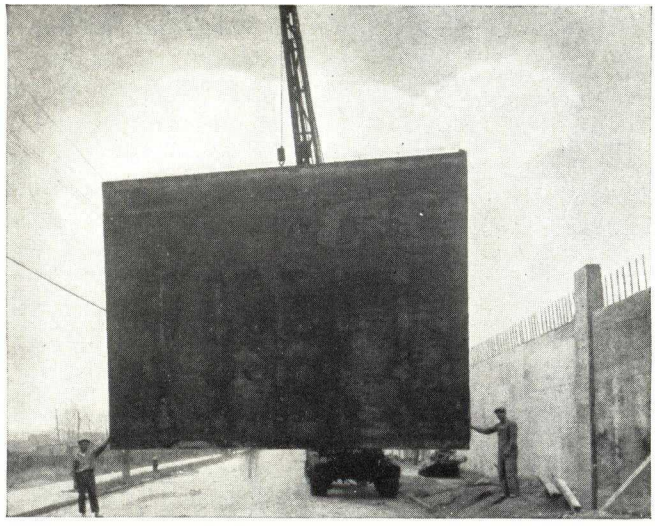
(8) CLEANING AND CARE OF TEMPERED PRESDWOOD

(8a) Tempered Presdwood forms when stripped from the concrete shall be set face down until dry.

(8b) Brush the face vigorously with a fibre scrubbing brush. Wipe the forms with oil or grease as specified in paragraph (4). Do not use an excess amount of oil.

(8c) Tempered Presdwood boards when finally removed from forms at completion shall be carefully stacked face down for subsequent reuse. When dry clean the faces. Adequately protect the edges from injury or abuse. All nails shall be carefully backed out and removed before stacking. Tie wire, tie bolt or other holes which will deleteriously affect reuse, shall be patched and filled level with Rutland patching plaster sanded smooth. When dry coat with grease.

LINDEN BLVD. UNDERCROSSING, LIVONIA AVE. YARD, NEW YORK CITY. 1400 LINEAL FT. OF 19 FT. HIGH WALL. 20 x 24 FT. PANEL, LINED WITH ONE-QUARTER INCH TEMPERED PRESDWOOD, LIGHTWEIGHT PERMITTED TRANSPORTATION AND EASY ERECTION. 25 REUSES OBTAINED



(9) INSPECTION OF FORMS

Immediately before placing concrete the forms shall be carefully inspected to make sure that they are properly braced, sufficiently rigid and thoroughly cleaned of any foreign matter in contact with or adhering to the Tempered Presdwood form face.

(10) CONCRETE CONSISTENCY

Wherever "Form Finished Concrete" is specified, provide an exceedingly plastic concrete to insure smooth finished surfaces free from honey-comb or similar defects.

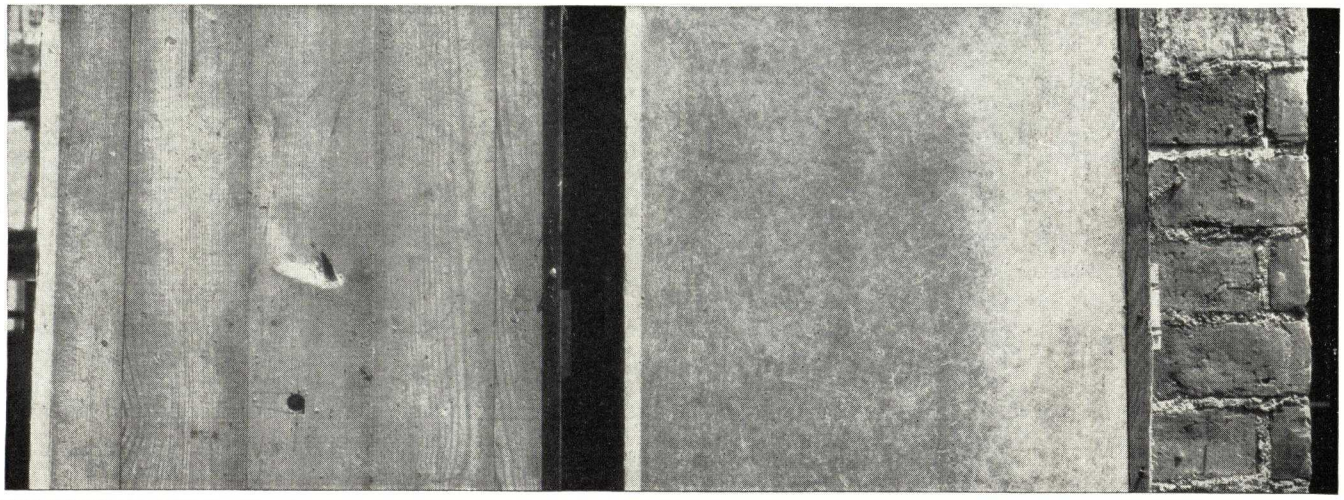
Note: Concrete should not be over sanded to produce plasticity.

(11) PLACING CONCRETE

(11a) All concrete placed in Tempered Presdwood forms should be well spaded at form sides to assure full and uniform contact with the form face. Use wood rod for spading.

(11b) Thoroughly rod, agitate or vibrate the concrete in closely confined form areas.

(11c) Mass concrete shall be thoroughly puddled.

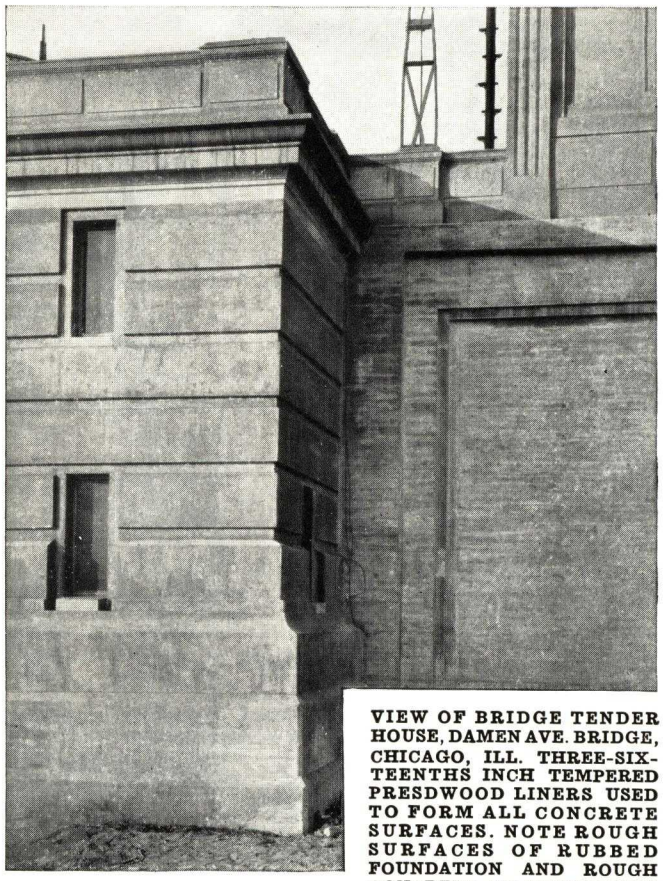


THE ILLUSTRATION ABOVE IS FROM AN UNRETOUCHED PHOTOGRAPH OF STRIPPED CONCRETE COLUMNS. THE COLUMN AT THE LEFT WAS FORMED WITH BETTER THAN AVERAGE STANDARD FORM LUMBER. THAT AT THE RIGHT WAS FORMED WITH MASONITE TEMPERED PRESDWOOD FORMS. NOTE THE SMOOTH FINISHED SURFACE OF THE "FORM FINISHED CONCRETE" JUST AS IT APPEARS WHEN THE FORMS ARE STRIPPED

SHORT FORM SPECIFICATION
For CONCRETE FORMING

FORMS FOR EXPOSED CONCRETE

Forms for all exposed interior and exterior concrete surfaces, including concrete surfaces that are to be painted, shall be lined with Masonite Tempered Presdwood or Masonite Concrete Form Board as manufactured by the Masonite Corporation, 111 W. Washington Street, Chicago, Illinois or equal, not less than $\frac{3}{16}$ in. thick with a hard, smooth surface on one side.



VIEW OF BRIDGE TENDER HOUSE, DAMEN AVE. BRIDGE, CHICAGO, ILL. THREE-SIXTEENTHS INCH TEMPERED PRESDWOOD LINERS USED TO FORM ALL CONCRETE SURFACES. NOTE ROUGH SURFACES OF RUBBED FOUNDATION AND ROUGH CONCRETE OF APPROACHES

The wood fibre board shall be specially processed to resist moisture.

Boards shall be of sizes as large as practical so as to obtain a minimum number of joints.

They shall be applied to the wood form construction with the smooth side against the concrete, and nailed so as to secure them properly.

All joints shall be butted tight and shall bear on solid construction.

The entire installation shall provide for exposed concrete surfaces which will be practically free from joinmarks, lumber grain marks, fins, depressions, or other defects which would not insure a continuous smooth surface.

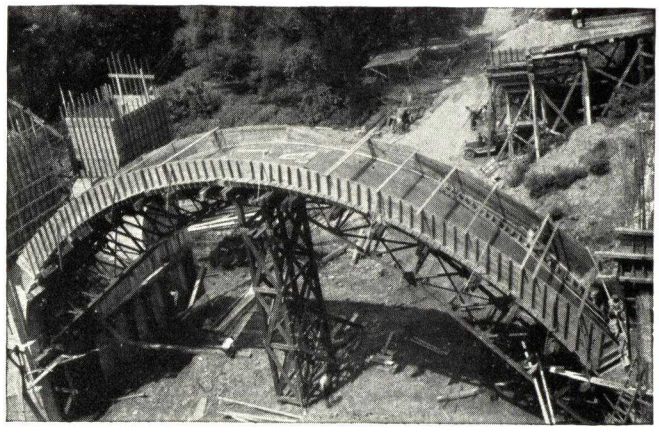
Bevels shall be formed of smooth straight grained wood and shall be nailed through the fibre board and into the backing.

Before using and between reuses, the forms shall be wiped with waste saturated with grease having a calcium soap or aluminum stearate base or with waste dipped in paraffin base oil having a viscosity of 145 (Saybolt) or over, free from volatile constituents. These are obtainable under various trade names from many large refiners.

The board shall only be reused as many times as will insure such continuous smooth concrete finish.

Special care shall be taken in pouring concrete against fibre board to insure the finished surface required.

The manufacturers' specification shall be considered a part of this specification and shall be consulted for further information or instructions.

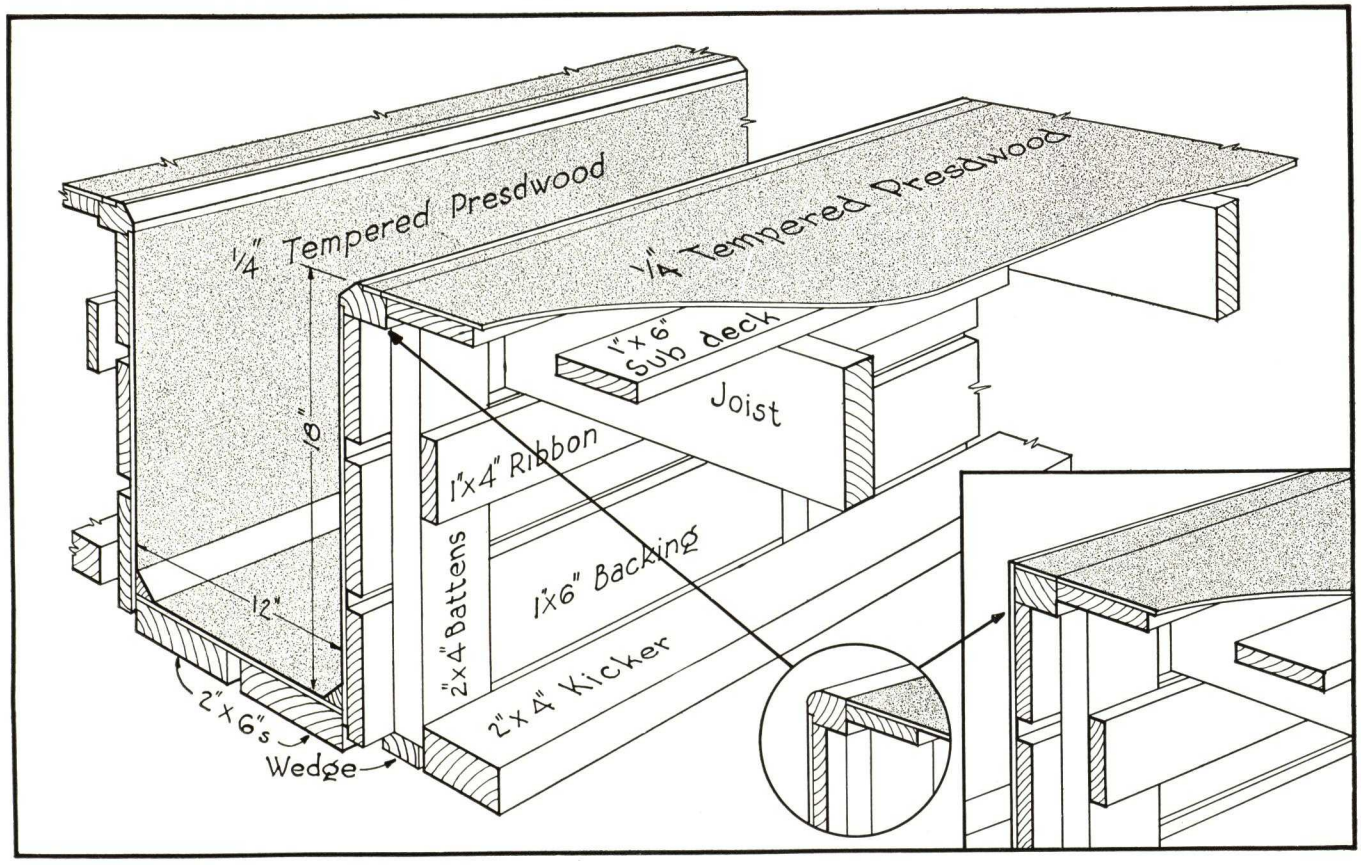


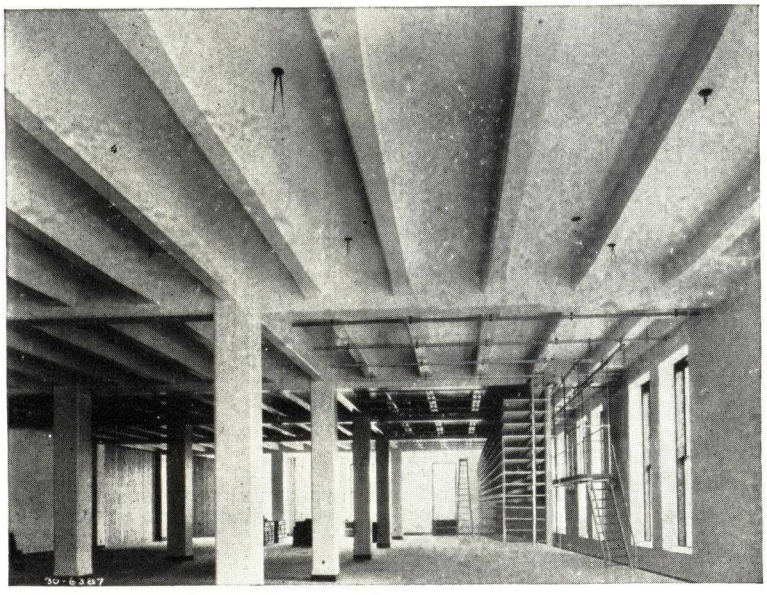
BALTIMORE ST. BRIDGE, BALTIMORE, MD. ENGINEER: H. L. LUCKE, CITY BRIDGE ENGINEER. CONTRACTORS: THE W. C. BRIDDEL CO., BALTIMORE

MASONITE TEMPERED PRESDWOOD ONE-QUARTER INCH THICK USED TO LINE ARCHES AND SLABS. NOTE SMOOTH PRESDWOOD LINER IN PLACE ON ARCH SOFFIT

CONCRETE BEAM AND SLAB FORM

USING 1/4" TEMPERED PRESDWOOD STRUCTURALLY

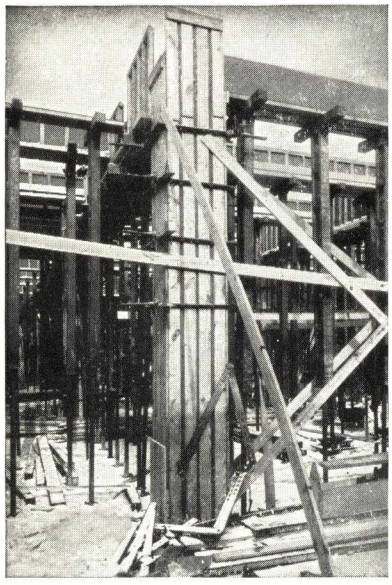


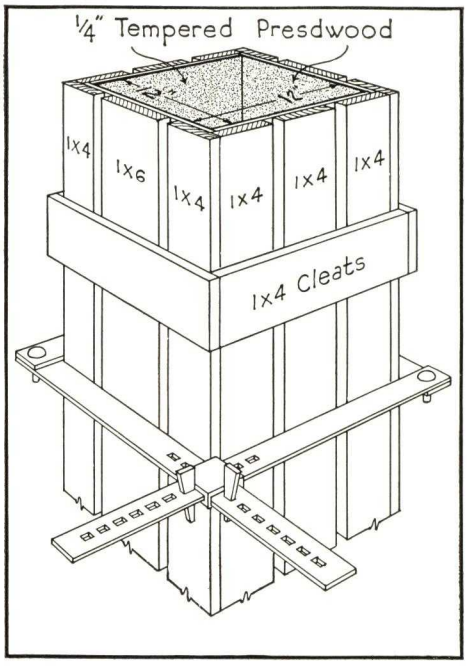


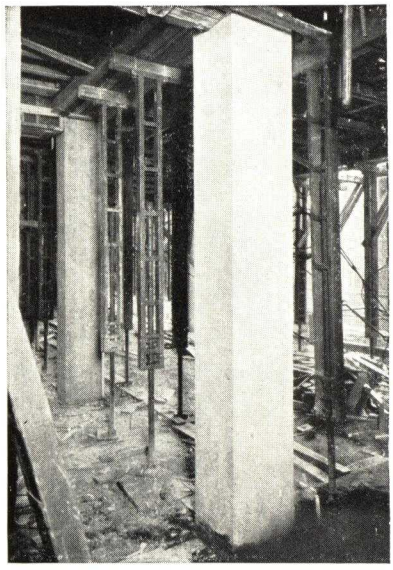
DAYTON BELL TELEPHONE BUILDING, DAYTON, OHIO. R. H. BLAGG, CONTRACTOR. SHENCH & WILLIAMS, ARCHITECTS. ALL COLUMNS, BEAMS, GIRDERS AND SLABS ARE EXPOSED CONCRETE. SURFACES PRODUCED WITH MASONITE TEMPERED PRESDWOOD AND PAINTED

CONCRETE COLUMN FORM

USING 1/4" TEMPERED PRESDWOOD STRUCTURALLY

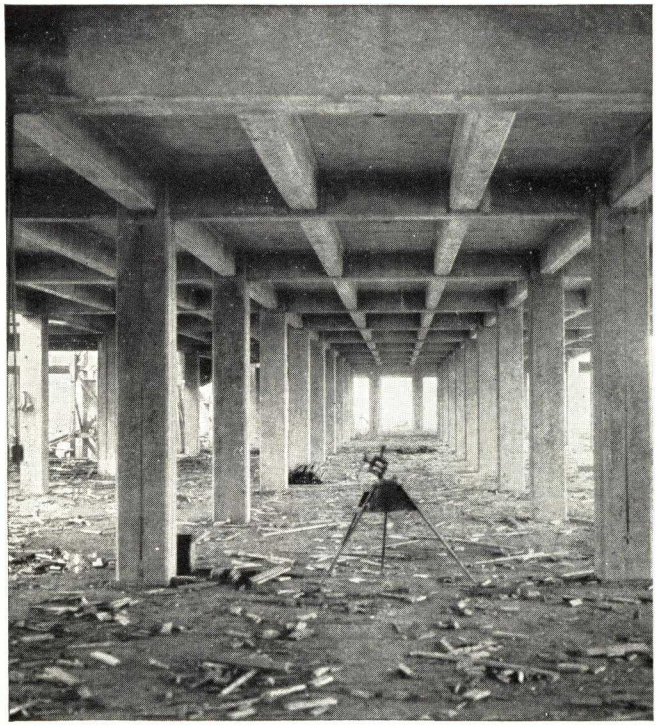


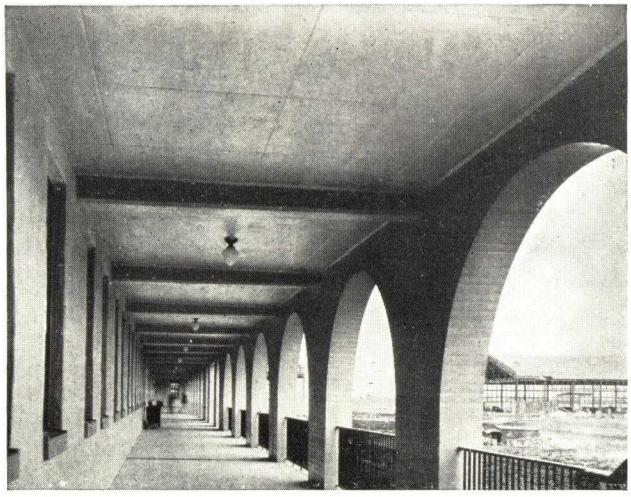




At left—A typical column form in place.

At right—Concrete column with forms stripped. Note the uniform surface and sharp corners.





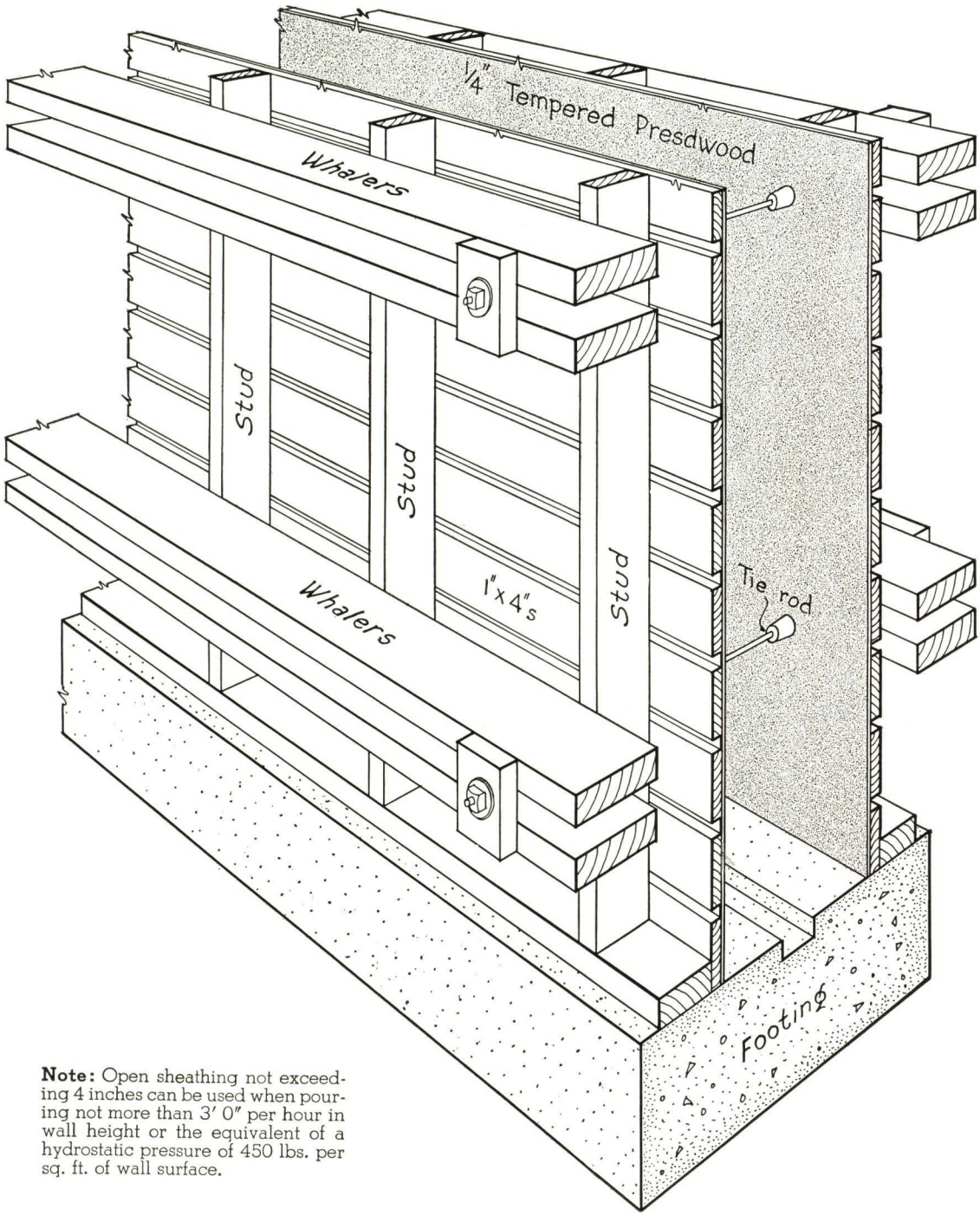
CADET BARRACKS, RANDOLPH FIELD, TEXAS

TEMPERED PRESDWOOD USED TO LINE ALL FORMS FOR THE PORCH SLABS AND BEAMS. SURFACE MARKED OFF IN 4 x 4 FEET TILES

MARINE BARRACKS, U. S GOVT. RESERVE, QUANTICO, VA. INTERIOR AND EXTERIOR EXPOSED CONCRETE SURFACE FORMED WITH MASONITE TEMPERED PRESDWOOD. NOTE THE PERFECT ALIGNMENT OF COLUMNS, BEAMS AND GIRDERS; ALSO THE UNIFORM SURFACES AND SHARP CORNERS

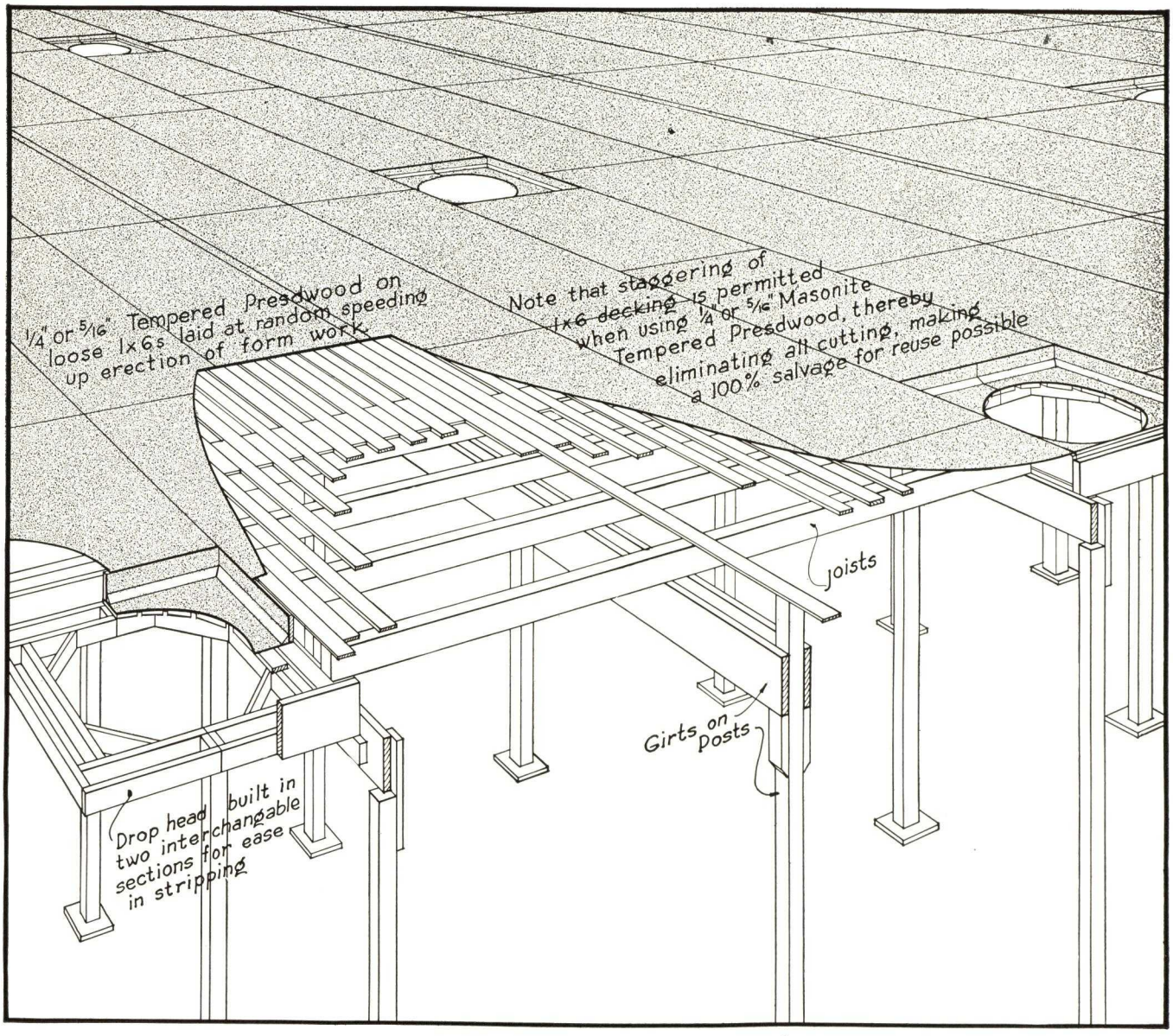
CONCRETE WALL FORM

USING 1/4" TEMPERED PRESDWOOD STRUCTURALLY



Note: Open sheathing not exceeding 4 inches can be used when pouring not more than 3' 0" per hour in wall height or the equivalent of a hydrostatic pressure of 450 lbs. per sq. ft. of wall surface.

FLAT SLAB CONSTRUCTION



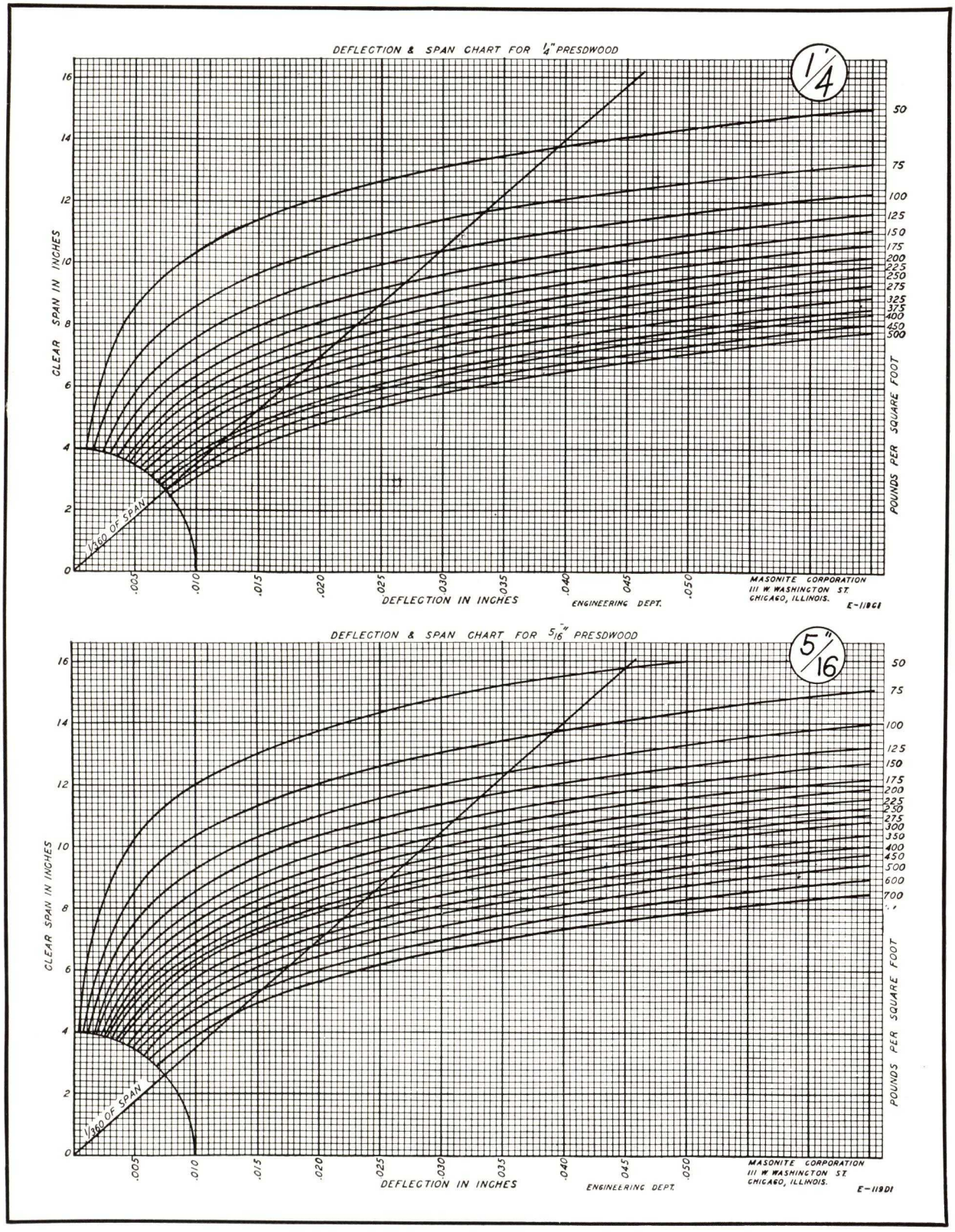
TYPICAL EXAMPLE FOR THE USE OF DEFLECTION CHARTS

(See Charts on Opposite Page 12*)*

The Contractor has a solid 8-in. concrete slab floor to form. He wishes to know how far apart he can space his 1 x 4's or 1 x 6's to get within the allowable limits of deflection. Usually the allowable deflection limit for floors is 1/360th of the span. An 8-in. concrete slab floor weighs 100 pounds per sq. ft. of floor. Add to this a working stress of 75 pounds per square foot, making a total of 175-pound load that the Presdwood board must support, within the deflection limits.

On the stress diagram for 1/4-in. Tempered Presdwood, intersect line marked 1/360 of span and curve marked 175 pounds. From this intersection follow the horizontal line to the left margin and it will be found that the support spacing may be as great as 8 in. Refer to the diagram for 5/16-in. Presdwood; repeat the above operation and it will be found that supports may be spaced 10 1/4 in. Then determine which thickness of Presdwood will serve more economically.

DEFLECTION CHARTS FOR TEMPERED PRESDWOOD



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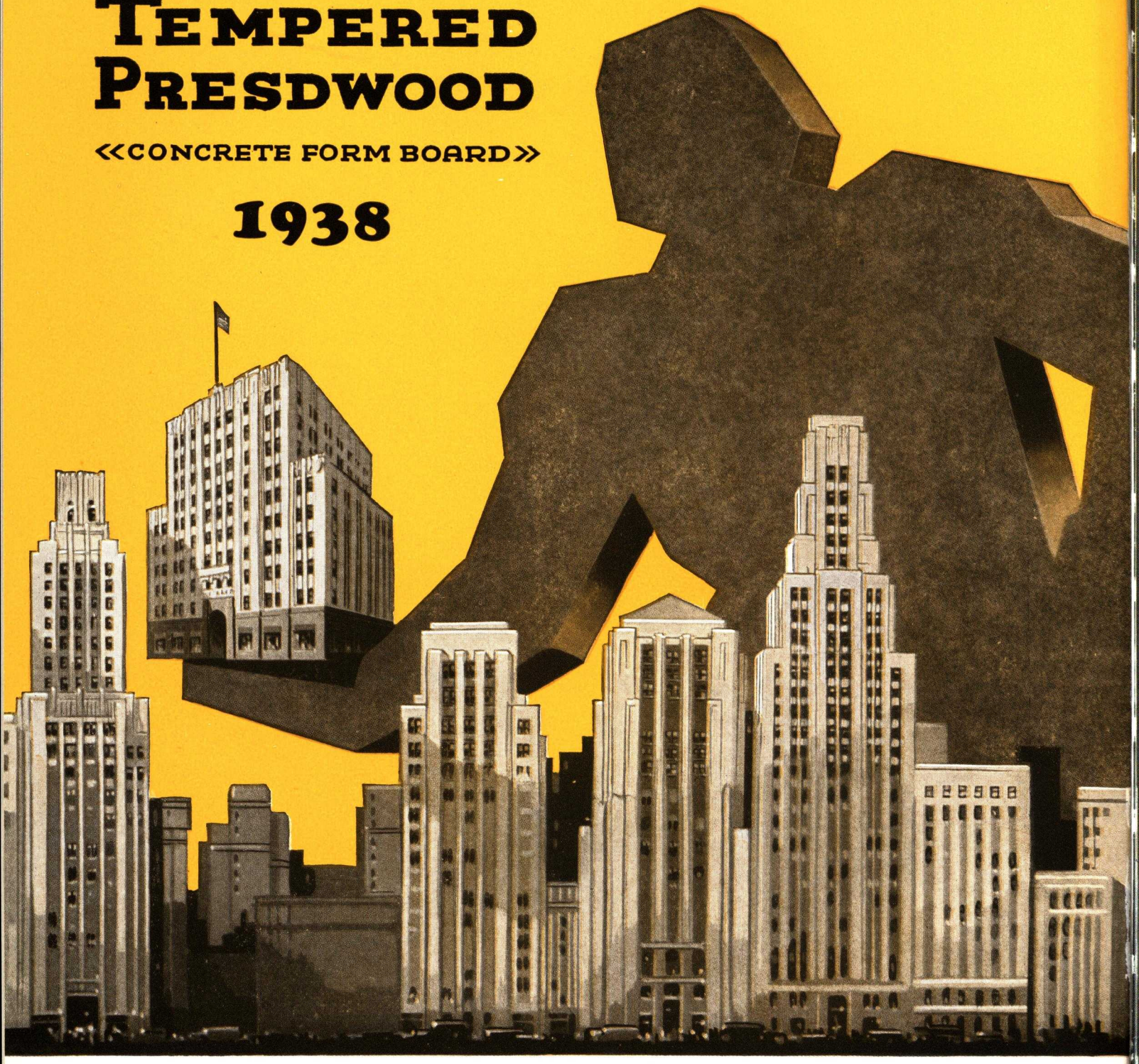
41

Genuine

MASONITE TEMPERED PRESDWOOD

«CONCRETE FORM BOARD»

1938



MASONITE *Corporation*

111 *W. Washington Street,* CHICAGO, ILLINOIS

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DOUGLAS FIR PLYWOOD ASSOCIATION

Tacoma Building, TACOMA, WASHINGTON

The Association

A non-profit organization of United States manufacturers of Douglas fir plywood, founded to sponsor a continuing program of technical research, to promote the use of this material in construction and industry, and to help users employ it to the best advantage.

Inquiries as to the characteristics or uses of Douglas fir plywood will receive prompt attention. Address DOUGLAS FIR PLYWOOD ASSOCIATION, Tacoma, Washington, or any of the following industry mills:

ABERDEEN PLYWOOD COMPANY
Aberdeen, Washington

AIRCRAFT PLYWOOD CORPORATION
Seattle, Washington

BUFFELEN LUMBER & MFG. CO.
Tacoma, Washington

CAPITOL PLYWOOD COMPANY
Olympia, Washington

ELLIOTT BAY MILL COMPANY
Seattle, Washington

HARBOR PLYWOOD CORPORATION
Hoquiam, Washington

M & M PLYWOOD CORPORATION
Portland, Oregon

NORTHWEST DOOR COMPANY
Tacoma, Washington

OLYMPIA VENEER COMPANY, INC.
Olympia, Washington

OREGON-WASHINGTON PLYWOOD CO.
Tacoma, Washington

PETERMAN MANUFACTURING CO.
Tacoma, Washington

THE PLYLOCK CORPORATION
Portland, Oregon

ROBINSON MANUFACTURING CO.
Everett, Washington

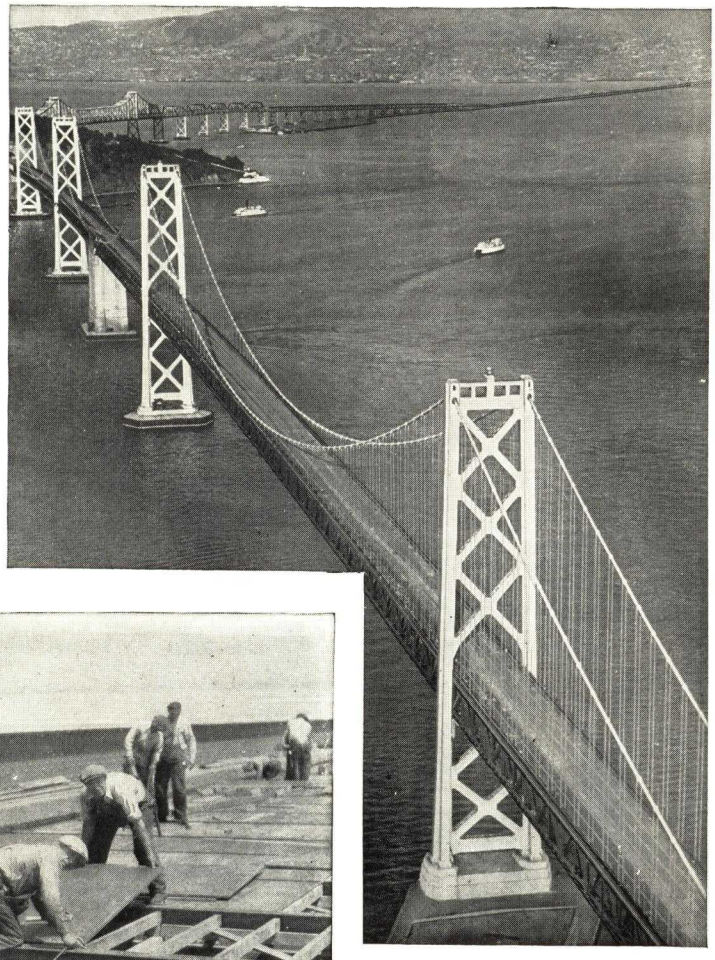
SMITH WOOD PRODUCTS, INC.
Portland, Oregon

VANCOUVER PLYWOOD & VENEER CO.
Vancouver, Washington

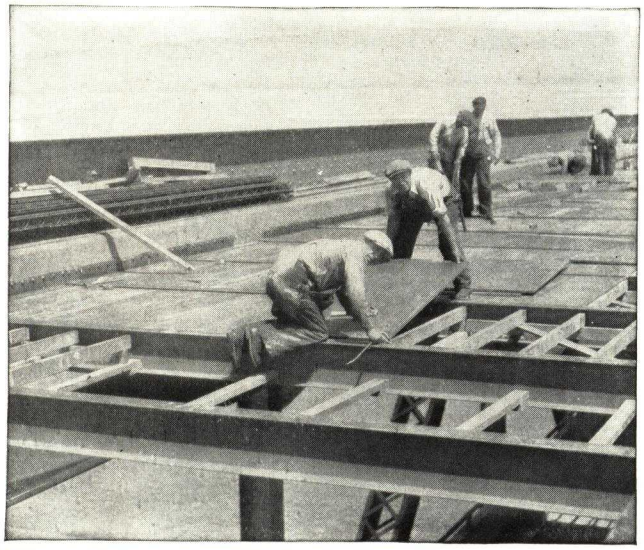
WASHINGTON VENEER COMPANY
Olympia, Washington

WEST COAST PLYWOOD COMPANY
Aberdeen, Washington

WHEELER OSGOOD SALES CORPORATION
Tacoma, Washington

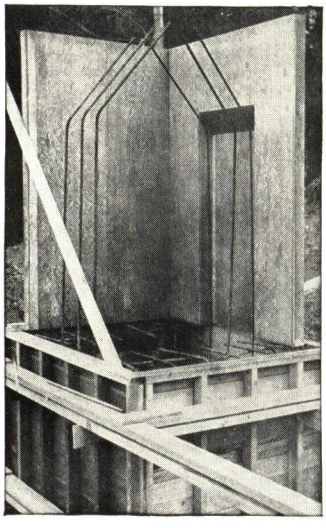


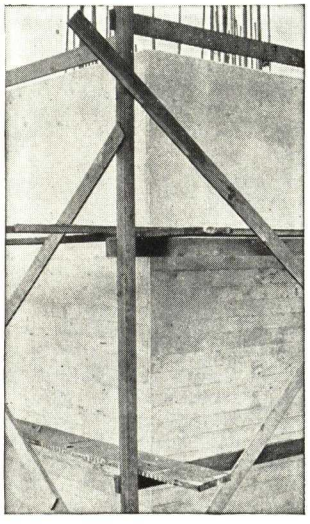
Above:
San Francisco-Oakland Bay Bridge—a large scale demonstration of economies of Douglas fir plywood Concrete Form Panels



Right:
Erectors laying ¾-in. Douglas fir plywood Concrete Form Panels on San Francisco-Oakland Bay Bridge

Below:
Left is column form for upper viaduct of Golden Gate Bridge approach. Right is concrete column formed in it. The upper part demonstrates the smooth surface cast by Douglas fir plywood Concrete Form Panels





FOR SMOOTH FINLESS CONCRETE

Specify Douglas Fir Plywood Concrete Form Panels

One of the most important developments of recent years in concrete form construction is the new specially-fabricated-and-treated Douglas fir plywood Concrete Form Panels. For catalog containing general information on the use of Douglas fir plywood for Concrete Forms, Wallboard, Subflooring, Sheathing, Cabinet Lumber and other purposes, as well as general information and test data, see Index of this edition of Sweet's Catalog File (Architectural). For handbook containing complete information and valuable tables write for copy of CONCRETE FORMS OF DOUGLAS FIR PLYWOOD.

UNIVERSAL FORM CLAMP COMPANY

Manufacturers of Accessories for All Types of Concrete Construction

GENERAL OFFICE AND FACTORY
972 Montana Street, CHICAGO, ILL.

BRANCHES
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UNIVERSAL'S FORM CLAMPING AND TYING DEVICES

FORM CLAMPING ASSEMBLIES

For watertight and stainproof walls and wherever ties must be back from the concrete face.

All the assemblies illustrated below, are drilled and tapped for an inside threaded rod. These assemblies have the following advantages:

The inside threaded rods are kept the required distance back from the concrete face.

The holes left by the rods are small and are easily grouted.

The assemblies are easily inserted through holes drilled in the sheathing of the wall forms.

Range of adjustment to accommodate any dimension of form lumber without removing the clamp.

Outer rods are removed without stripping the forms or removing the wales.

Universal's "Spi-ro-loc" Assembly

Patented

This assembly provides more speed than a wedge assembly with the fine adjustment of square cut threads and a clamp that will slide over the threaded rod into proper position against the wale and tighten with less than one complete turn.

Universal's "C-P" CLAMP ASSEMBLY

Patent Pending

This assembly enables the contractor to entirely remove the tie rods from the wall. Nailholes will be provided in this assembly to give spreader action when required.

Universal's "Bosco" Clamp Assembly

Patented

The outside rods of this assembly are high grade drop forgings, providing an assembly with outside rods that are self-cleaning and indestructible. They are especially useful for battered wall construction, as the rods can be bent to take the batter with no damage to the rod.

Twistyes

Patented

For ordinary, finished and watertight walls.

A strong spreader tie that can be twisted off an inch back from the wall face without removing the forms—combined with an improved clamp that has ample take-up and sufficient bearing surface.

THE FORM CLAMP

Patented

For all types of concrete construction

The features of the Form Clamp:

Rods can be entirely removed from the concrete.

Holes left by the rods are small and are easily grouted.

Two Form Clamps and a length of mild steel rod comprise a form tie.

A single unit, exceedingly simple in principle and application.

The useful life of the Form Clamp is unlimited.

The *sure grip principle* wherein the setscrew does not carry the load but merely holds the rod in the depression, throwing the load on the shoulder of the clamp. The depression of the rod between the shoulders insures the Clamp against slipping or moving on the rod.

Form Clamps with Spreader Cones

Patented

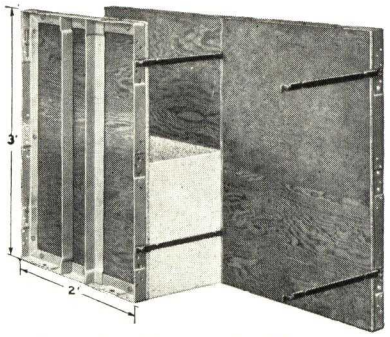
An inexpensive and efficient spreader for use with Form Clamps and plain round rods. The clamps, rods and cones are removed and re-used, the paper tubing being the only item lost.

Form Clamps with Cone Nuts

Cone Nuts with inside tie rods, stud rods and Form Clamps provide a combined tie and positive spreader. The clamps, stud rods and cones are removed and re-used, the tie rods being the only item lost.

Uni-Forms

Patented



For all types of concrete construction.

Uni-Forms are a complete forming unit comprised of a face that can be replaced at a small cost and a supporting frame that will last indefinitely.

Uni-Forms provide pre-determined definite wall thickness, due to absolute maintenance of tie length during pouring. Inspection is easily and quickly made. There are no blocks, wooden spreaders, shavings or sawdust to remove before pouring. Inserts, mouldings, anchor slots and dowels are readily attached to Uni-Forms.

Uni-Forms are so tightly locked that when the concrete is properly puddled, the assembly is without leakage and will retain the designed mix.

Uni-Forms are erected in such a manner that reinforcing steel is easy to inspect before and during pouring.

Tight forms and smooth faces assure concrete surfaces of even textures.

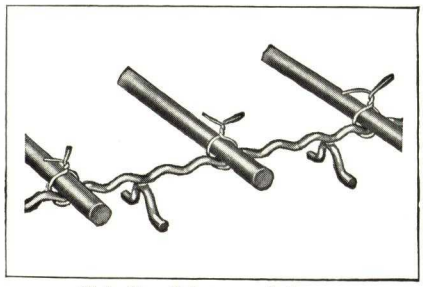
Uni-Form ties may be cut back from the wall face, leaving a very small hole to be filled with concrete grout.

Uni-Form surfaces are straight and true, without offsets, making it economical to provide perfect finished surfaces by rubbing or grinding.

UNIVERSAL'S BAR SPACERS AND CHAIRS

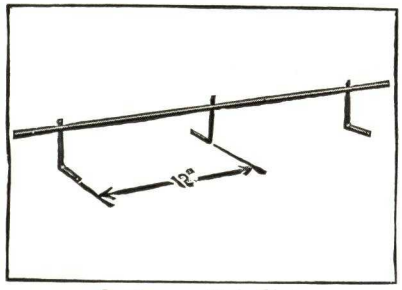
For Reinforced Concrete Construction

Universal's Bar Spacers and Chairs meet requirements where reinforcing steel must be accurately located in the forms and firmly held in place, before and during pouring. They insure against displacement during construction and keep the steel at a proper distance from the forms.



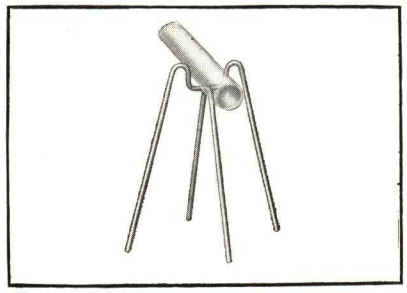
Slab Bar Bolster and Spacer

Bolster is fabricated with a top wire having corrugations 1 in. apart that act as a spacing guide when setting steel and prevent sliding of bars. Spacer is furnished with straight top wire and a leg under each bar



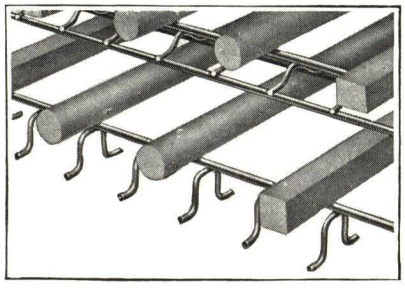
Continuous High Chair

Fabricated with a plain or corrugated top wire, is advantageously used for supporting and securely holding bent bars in position at the top of the slab



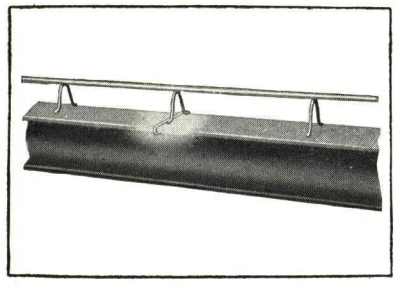
Individual High Chair

These chairs are used for supporting top layer of steel in combination with a support bar. They are firm non-collapsible chairs, providing bar seats with unusual strength



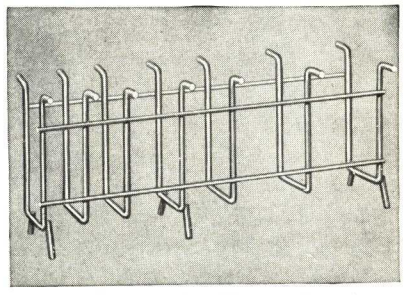
Beam Bar Bolster and Spacer

Bolster supports bars regardless of spacing and can be conveniently cut to beam widths on the job. Spacers provide deep seat for each bar with a leg under each bar



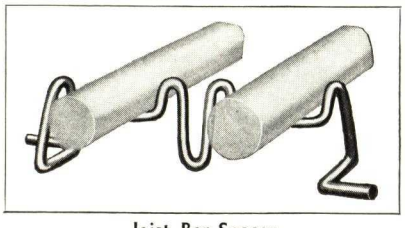
Continuous High Chair with Clip

Especially designed to support mesh or reinforcing over structural steel. Furnished with either straight or corrugated top wire



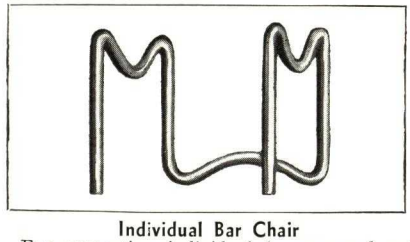
Continuous Stirrup Assembly

Assures correct position of stirrups in concrete structure. Economical for steel erection as 6 to 14 stirrups are placed in one operation



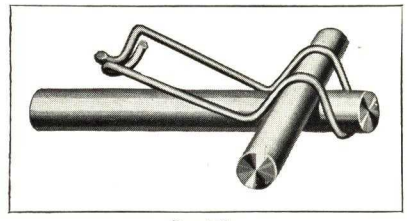
Joist Bar Spacer

For supporting joist reinforcing steel. Legs are so formed that they prevent spacers from slipping between pan and soffit



Individual Bar Chair

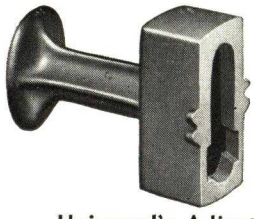
For supporting individual bars—spaced not more than 4 ft. on centers. Also used for supporting temperature steel over joist forms



Bar Tie

For tying bars in mats for concrete roads and tying horizontal and vertical reinforcing steel in all types of reinforced concrete construction

UNIVERSAL'S ADJUSTABLE INSERTS—MALLEABLE



For hanging shelf angles, shaft hangers, sprinkler systems, plumbing and heating systems, etc. This method saves considerable time and labor, as the slot into which the nut or bolt head is inserted allows adjustment the full length of the slot.

Universal's Adjustable Wall Furring Insert

For brick and concrete walls.

The Furring Insert for Brick Walls

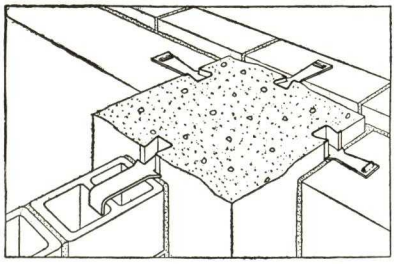
Provides the only system whereby a full height of wall can be straightened by a single operation. Space between masonry or concrete wall can be readily adjusted from ½ to 3 in. This is a clean space, not obstructed with nailing strips, so that conduits can readily be installed. System also eliminates waste of plaster as plastering surface is true to line

UNIVERSAL'S DOVETAIL ANCHOR SLOT AND ANCHORS

Universal's Anchor Slot with the Felt Filler prevents seepage of cement grout. Use of vibrators makes it virtually impossible to prevent this seepage.

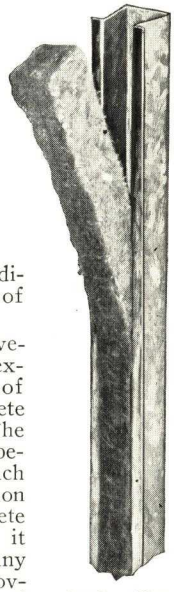
Slot and Filler are very easily installed and because seepage is prevented by use of the Filler, cutting, chipping, digging, cleaning and other difficulties are eliminated—leaving the slot entirely clean and immediately ready for installation of anchors at any desired spacing.

Dovetail Anchor Slot with Dovetail Anchors provide an unexcelled and economical method of anchoring masonry to concrete walls, beams and columns. The Slot is unique and superior because of its wide flange which adds so much strength in section that it is impossible for concrete to distort the slot, making it always easy to insert anchors. Any possibility of loosening or removing the anchor slot is eliminated by the greater dovetail or flare.



Anchors in Columns with Brick Facing and Tile Partition

Showing the versatility of Universal Dovetail Anchors and Slot



Anchor Slot with Filler

BETHLEHEM STEEL COMPANY

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For Other Bethlehem Pages, see File Index

CONCRETE REINFORCEMENT PRODUCTS

BETHLEHEM BARS for concrete reinforcement; WIRE FABRIC; COLUMN SPIRALS; REMOVABLE STEEL TILE; STEEL COLUMN FORMS; METAL LATH; Complete Line of ACCESSORY PRODUCTS—Bar Supports and Spacers, and Allied Products.

Bethlehem Bars

For concrete reinforcement. Deformed bars rolled to standard specifications of billet steel, as illustrated above, or rail steel to section areas conforming to Simplified Practice Recommendation R-26-30 of the U. S. Department of Commerce.

Bethlehem Bars are branded for ready identification of size.

STANDARD SIZES BETHLEHEM BARS

Size	⅜ in. round	½ in. round	½ in. square equiv.	⅝ in. round	¾ in. round	⅞ in. round	1 in. round	1 in. square equiv.	1⅛ in. square equiv.	1¼ in. square equiv.
Area (sq. in.) ..	.11	.20	.25	.31	.44	.60	.79	1.00	1.27	1.56

Column Forms

Bethlehem Circular Steel Column Forms are highly efficient and economical. They possess points of definite superiority over square column forms. They provide a smooth and perfectly uniform column, free from "knobs," "bulging" and "necking in."

Built of 20-gauge sheet steel, Bethlehem Column Forms are light, convenient to handle, and flexible. Yet they are amply strong to stand up under the most severe conditions.

These forms are built to produce accurate contours and are notable for their strength and simplicity of detail. They are furnished to contractors on a lease-and-erection basis.

Complete information on request.

Column Spirals

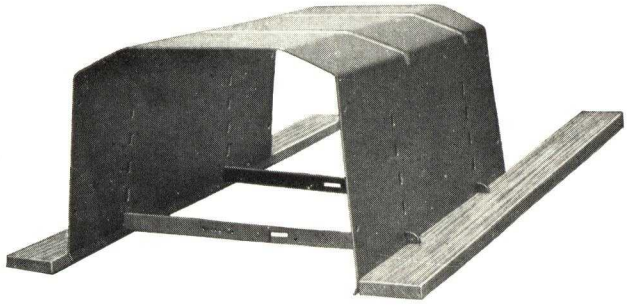
Spiral reinforcement for concrete columns furnished coiled to accurate diameter with spacers attached.

Collapsed for convenient handling.

Removable Steel Tile

For use as fillers or cores between the ribs of reinforced-concrete-joist floor and roof construction, Bethlehem offers steel tile of many advantages.

The tile is made of 16-gauge sheet steel with two ribs drawn in the top to provide stiffness. They are light and easy to handle. Two types are available:



(1) Spreader Tile, which make possible a decided saving in the erection of the wood centering; and (2) Nail-down Tile, which are preferred by some contractors.

Both types are furnished on a lease only or lease-and-erection basis.

Bar Supports and Spacers

Substantial devices for general use in accurate and economical setting of reinforcing steel. These products are standard in quality and performance for their purposes.

Accessory Products

Inserts and anchoring devices, usual in modern concrete construction, and an extensive line of products for use in erecting metal lath and related detail.

Engineering Service

Through all its offices, BETHLEHEM STEEL COMPANY offers expert assistance on matters of design and estimating of reinforced concrete structures, together with detailed advice concerning all Bethlehem products.

Folders and descriptive sheets are available on individual products, and will be supplied promptly on request.

ELECTRICALLY WELDED • AND TRIANGLE MESH

WIRE FABRIC REINFORCEMENT

AMERICAN STEEL & WIRE COMPANY

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AMERICAN STEEL & WIRE COMPANY

UNITED STATES STEEL

*Columbia Steel Company, *Pacific Coast Distributors*
United States Steel Products Company, 30 Church Street, New York, *Export Distributors*

USS TRIANGLE MESH & ELECTRICALLY WELDED WIRE FABRIC REINFORCEMENT

For many classes of work USS Wire Fabric Reinforcement manufactured by the AMERICAN STEEL & WIRE COMPANY is more efficient and more economical than other types of reinforcing steel.

Wire is a product resulting from drawing a hot rolled rod through a die which mechanically reduces the size and increases the length. The yield point and the ultimate strength is increased 50 to 100 per cent depending upon the amount of drawing or reduction. The finished wire is then partially annealed to reduce the stiffness, thereby making a fabric of high yield point and tensile strength that is still sufficiently flexible to insure ease in handling.

The yield point of the wire is at least 50 per cent greater than the yield point of the original hot rolled rod; therefore, based on strength of the steel alone, wire fabric is more efficient by 50 per cent than the hot rolled rod of equivalent area.

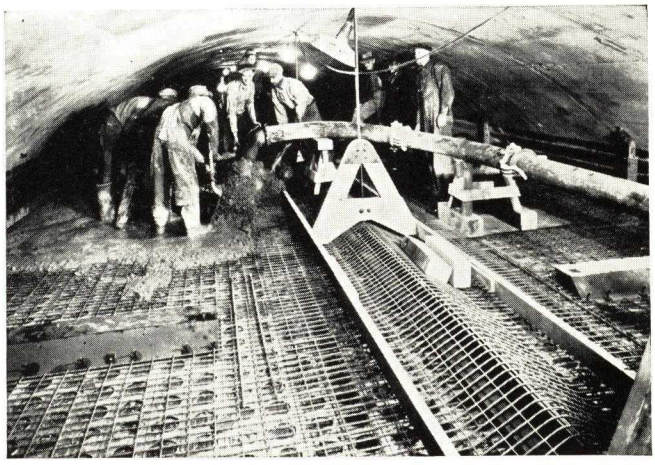
The bonding area of wire fabric because of its smaller members closely spaced is several times greater than that for a large steel member of an equal cross sectional area. This can be shown by the simple example of comparing the bond area or surface of four ½-inch square bars with that for one 1-inch square bar which has a sectional area equal to the four ½-inch bars. The four ½-inch bars have a total bonding surface of twice that for the 1-inch bar. Comparing sixteen ¼-inch square bars with one 1-inch bar shows the total bonding surface to be four times that for the 1-inch bar.

This explains in part why better results are obtained with a wire fabric having small members closely spaced than with reinforcement of equal area having larger members spaced further apart.

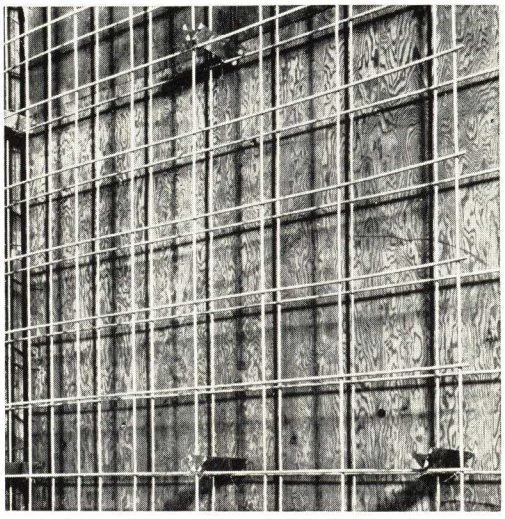
When comparing costs of wire fabric for any particular job, the comparison is not complete unless the costs to install are included. For the average floor job wire fabric can be installed in the forms at a cost of about 20 to 30 per cent less than other types of unfabricated reinforcing steel.

Uses

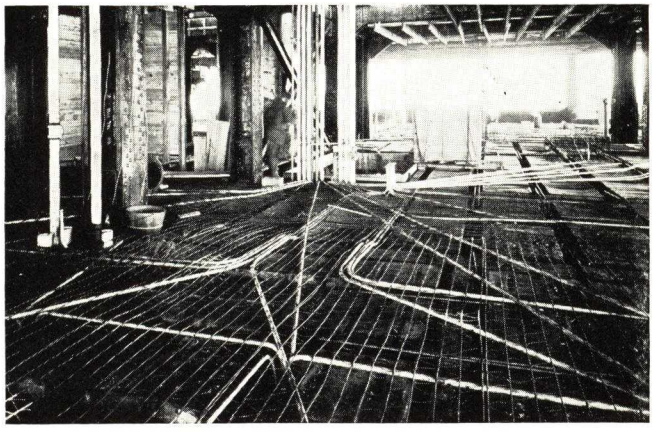
USS Triangle Mesh and Electrically Welded Wire Fabric are used for the reinforcing of concrete floor and roof slabs, concrete walls and chimneys, arch construction, beams, columns, dams and retaining walls, water, sewer and culvert pipe, pavements and roadways, river revetment, silos, fireproofing steel framing, bridge floors, reservoirs, monolithic concrete sewers and stucco work.



Welded Wire Fabric Used in Mid-Hudson Tunnel, New York, N. Y. Pouring the Ceiling Slab



Welded Wire Fabric Used in 8-inch Concrete Walls, Chicago Post Office, Chicago, Ill.



Triangle Mesh Reinforcement, Pan and Joist Construction, Tribune Tower, Chicago, Ill.

Advantages of Wire Fabric Reinforcement

(1) Provides even distribution of steel.

(2) Reinforces in every direction.

(3) Tension or carrying members accurately spaced.

(4) Low cost inspection.

(5) Properly distributes over a large area stresses due to concentrated load.

(6) Due to cold drawing, higher elastic limits with same quality of steel.

(7) Continuous action from one end of the structure to the other.

(8) Impossible to leave out or otherwise reduce the necessary steel if specific style number of fabric or area of steel is specified.

(9) Perfect mechanical bond.

(10) Easily handled and stored on the job.

(11) Minimum cost of installation.

(12) More bond area provided for equivalent steel area because of its small members closely spaced.

Grade of Steel

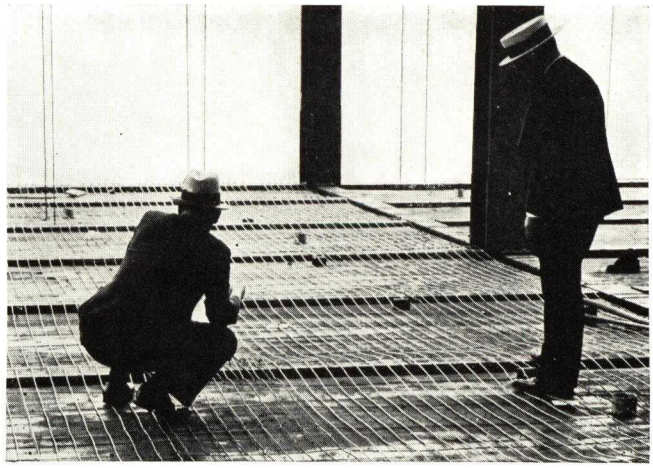
A reduction of the required sectional area of steel is safely accomplished, within limits, by the use of a higher yield point steel. This higher yield point may be secured by increasing the carbon content or by cold drawing of mild steel.

Cold drawing of mild steel produces a high ultimate strength and increases the yield point from 60% of the ultimate strength to approximately 90% of the ultimate strength. Since the strength of a reinforced concrete structure, in so far as the reinforcement is concerned, depends on the yield point and mechanical bond of the steel, the high yield point and increased bond area of cold drawn wire fabric is of great importance. A working stress of 30,000 lbs. per sq. in. is recommended where permitted by building codes.

Floor Construction Beam and Slab Type

Beam and Slab or short span type of floor construction with reinforced concrete slabs supported by reinforced concrete beams or steel beams is used extensively for office, hotel, apartment and factory building construction. The length of spans depends upon the column spacing. Usually three spans per column is most economical. The spans in this case usually would not exceed 8 ft. For spans up to 8 ft. in length the present New York City building code which has been in effect since 1916 states:

> Article 17, Section 354, paragraph 4-e: "Strength of concrete slabs. In determining the safe carrying capacity of concrete slab floor fillings the gross load in pounds per square foot of floor surface shall not exceed the product of the depth in inches of the reinforcement below the top of the slab, by the cross-sectional area in square inches per foot of width of the tensional steel, divided by the square of the span in feet, all multiplied by the following co-efficients when cinder concrete is used: 14,000 if the reinforcement is not continuous over the supports, 18,000 if the reinforcement consists of rods or shapes securely hooked over or attached to the supports, and 26,000 if the reinforcement consists of steel fabric continuous over the supports, and, when stone concrete is used, 16,000, 20,000 and 30,000, respectively."
>
> (Note:—This rule applies for spans 8 feet or less).



Short Span Cinder Concrete Floor Construction, Welded Wire Fabric as Used in Empire State Building, New York, N. Y.

The proposed Building Regulation for Reinforced Concrete, Report of American Concrete Institute Committee 501 Standard Building Code adopted as a tentative Standard February 27, 1936, recommends as a tensile working stress in wire mesh, Sec. 306 under allowable unit stresses in Reinforcement, "Wire Mesh . . . . fifty per cent of the minimum yield point as established by A.S.T.M. Standards . . . not to exceed 30,000 lbs. per square inch," and in Section 505—Placing Reinforcement.

> Paragraph (b) "When wire . . . . . is used as reinforcement for slabs not exceeding ten feet in span, the reinforcement may be carried from a point near the top of the slab over the support to a point near the bottom of the slab at mid span; providing such reinforcement is either continuous over or securely anchored to the support."

Supporting Wire Fabric Reinforcement Over Beams

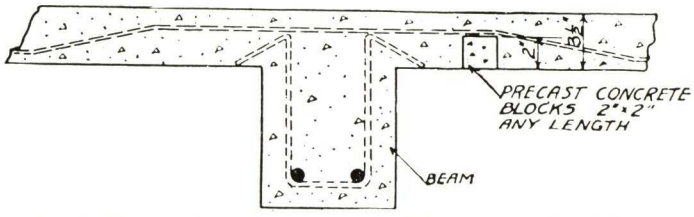


Fig. 1, Showing Inexpensive Method of Supporting Wire Fabric Reinforcement Over Concrete Beams

When structural steel beams are used with concrete slabs the top of the beam usually acts as a support for the fabric. However, when further support is required or when the beams are of concrete, precast concrete blocks as shown in figure 1 are often used.

These blocks should have a height about 1¼ or 1½ inches less than the full thickness of the slab. The length may be any convenient amount such as one or two feet or such lengths as readily formed by breaking long strips of the blocks. The wire fabric should be supported for at least one third of its width. These blocks will stay in approximately correct position without any means of attachment to the reinforcing fabric or to the forms.

For short spans (about 8 feet or less) these blocks will be required on only one side of the beams. For spans greater than 8 feet use blocks on both sides.

Comparative Cost of Wire Fabric and Bars

Usually wire fabric is the most economical reinforcement to use for areas of steel per foot of width of .50 sq. in. or less. Any design requiring a greater area of steel per foot of width is usually more economical for a bar design.

Detailing Widths of Wire Fabric

For estimating purposes where accuracy is unnecessary provided the estimate is on the safe side, it is permissible to assume that the wire fabric required will equal in square feet the actual area of the floor slab. A two-inch lap along the sides of the sheets of wire fabric is sufficient to develop the full strength of the reinforcement; more than that is a waste of material. This two-inch lap means a lap of the outside (or selvage) longitudinal wires as shown in Figures 3 and 4. The cross wires that extend beyond the longitudinals are not counted in as part of the lap.

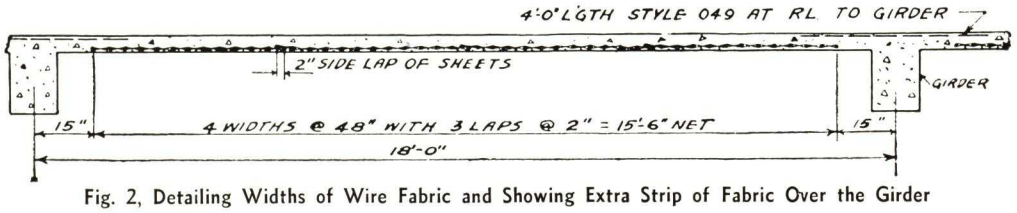


Fig. 2, Detailing Widths of Wire Fabric and Showing Extra Strip of Fabric Over the Girder

A suggested detail for the amount and location of wire fabric reinforcement is shown in Figure 2. Pro-

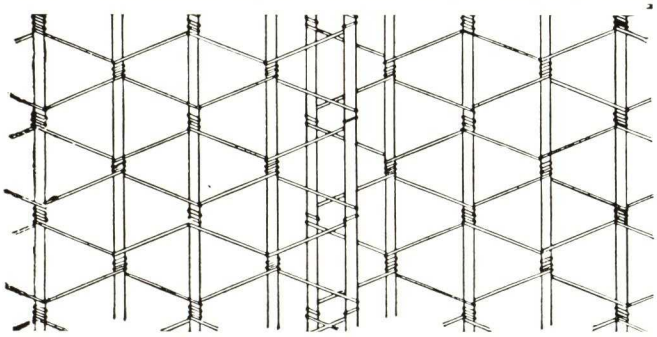


Fig. 3, Showing Triangle Mesh as it Actually Appears with a Side Lap of 2 Inches

viding a short strip of light weight fabric is placed near the top of the slab over the girders with the main longitudinal wires at right angles to the direction of the girders; it is not only unnecessary but a waste of material to require that the main reinforcement of the slabs entirely cover the space between and over the girders.

The distance between the center line of the girder and the edge of the reinforcing fabric can be any amount up to 20 inches without reducing the strength of the structure. In the case where the girder is a reinforced concrete beam the strip of fabric placed over the beam or girder is usually designed to carry the load on the portion of the slab assumed as the flange of the T-beam.

Concrete Joist Floors

For long spans and light loads a floor construction consisting of closely spaced concrete ribs and connecting concrete slabs will very often prove to be economical. Figure 5 shows a typical section of such a floor. Here is a 2 inch or 3 inch slab having a clear span between the supporting ribs of approximately 23 inches that must not only act as part of the compression portion of the beams and resist temperature stresses but in addition act as support to the loads that may come upon the floor. The most efficient type of reinforcement to take care of these various stresses is a wire fabric. At first these thin top slabs were built without any reinforcement. Such a construction invites disaster. The next step in the development of this type of floor consisted of adding small wire rods placed at right angles to the ribs and spaced from 12 to 24 inches apart. Such a method possibly takes care of the temperature stresses, but does not definitely insure the T-beam action assumed in the design and cannot possibly be considered as an efficient reinforcement to carry the live loads coming upon the floor. A thin slab approximately two feet square is left without any reinforcement. A wire fabric with comparatively close spacing of members is the only logical reinforcement to use.

The Proposed Building Regulation for Reinforced

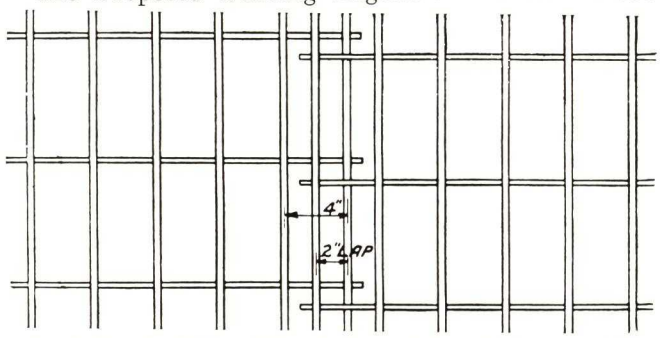


Fig. 4, Showing Welded Wire Fabric as it Actually Appears with a Side Lap of 2 Inches

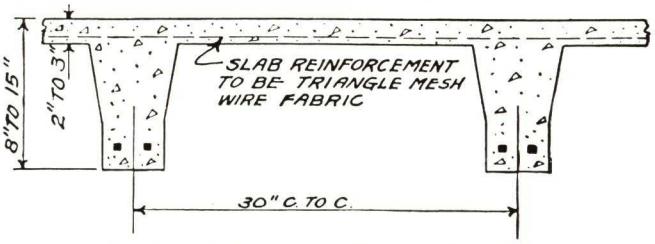
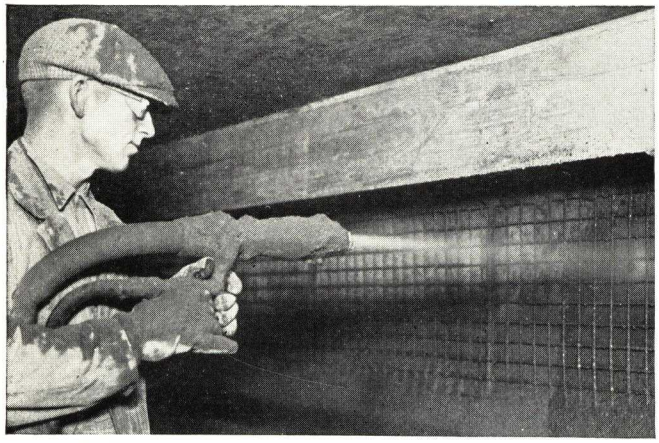


Fig. 5. Typical Section of Concrete Joist Floors

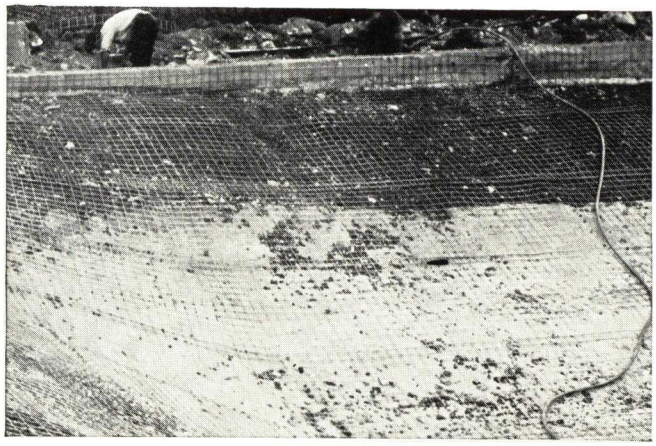
Concrete, Report of American Concrete Institute Committee 501 Standard Building Code adopted as a tentative Standard February 27, 1936, recommends Section 708 Shrinkage & Temperature Reinforcement (a) Reinforcement for shrinkage and temperature stresses normal to the principal reinforcement shall be provided in floor and roof slabs where the principal reinforcement extends in one direction only. Such reinforcement shall provide for the following minimum ratios of reinforcement area to concrete area but in no case shall such reinforcing bars be placed farther apart than five times the slab thickness nor more than 18 inches.

Floor slabs where Plain Bars are used	0.0025
Floor slabs where Deformed Bars are used	0.002
Floor slabs where Wire Fabric is used having welded intersections not farther apart in the direction of stress than 12 inches	0.0018
Roof slabs where Plain Bars are used	0.003
Roof slabs where Deformed Bars are used	0.0025
Roof slabs where Wire Fabric is used having welded intersections not farther apart in the direction of stress than 12 inches	0.0022

Wire Fabric Reinforcement for all classes of Cement Gun Work



Guniting Operation on Outer Drive Bridge, Chicago, Ill.



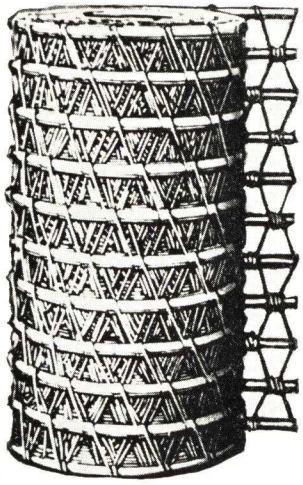
Guniting a Reservoir Using Welded Wire Fabric Reinforcement

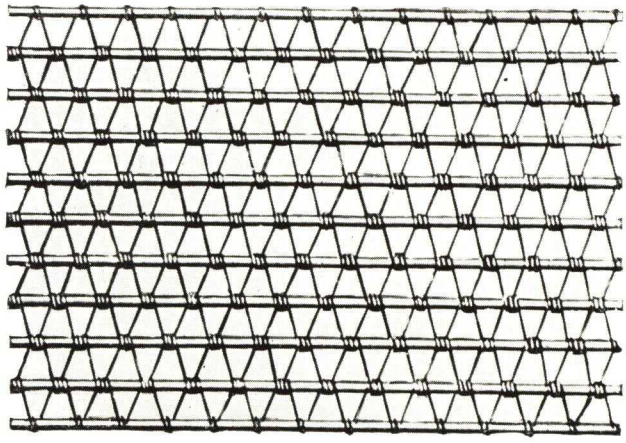
Gunite (trade name) is concrete applied by the Cement-gun process which produces a dense and waterproof concrete. Although Gunite has high tensile and compressive strengths, it still requires proper reinforcement to prevent cracks or in other words to produce a structurally strong finished product. Experience has taught the various Cement-gun companies that close-meshed wire fabric is the most efficient and economical form of reinforcement to use for this purpose.

Gunite reinforced with Triangle Mesh or Electric Welded Reinforcement has repaired successfully old crumbling bridge piers, tunnel linings and sea walls; old steel bridges, tanks and trusses; leaky reservoirs and irrigation ditches; even wooden structures that have been damaged by fire have been restored to usefulness by this method. And repair work is by no means the most important class of work produced. All kinds of new construction, especially those requiring waterproof qualities with light resulting weight can be successfully executed.

A 2-inch mesh (2-inch spacing cross wires known as "A" Styles) when Triangle Mesh is used or a 2x2-in. or a 3x3-in. welded wire fabric is made for use with the Cement-gun or similar work.

Description of Triangle Mesh Reinforcement





USS Triangle Mesh Woven Wire Reinforcement is made from cold drawn mild steel having a high breaking strength, the longitudinal or tension members are spaced 4 in. the diagonal cross wires either 2, 4 or 8 in.

For the light styles of fabric the longitudinals consist of one wire, for the medium styles two wires and for the heavy styles three wires stranded. The size of the wires is varied to obtain the desired cross sectional area of steel per foot of width. The reason for using stranded longitudinals for the heavy fabric is to reduce the stiffness of the finished product without affecting the tensile strength.

Triangle Mesh Reinforcement is regularly made in standard rolls but can be furnished straightened and cut to lengths when required. Generally, rolls can be more easily handled and installed.

Standard Styles USS Triangle Mesh Reinforcement

TABLE NO. 1
Longitudinals Spaced 4 Ins. Cross Wires Number 14 Gauge Spaced 4 Ins. Number and Gauge of Wires, Areas per Foot Width and Weights per 100 Sq. Ft.

Style Number	Number and gauge of Wires each longitudinal American Steel & Wire Company's steel wire gauge	Sectional area longitudinals square inches per foot width	Total Effective longitudinal sectional area square inches per foot width	Approximate weight lbs. per 100 square feet
032	1—No. 12 gauge	.026	.032	22
040	1—No. 11 gauge	.034	.040	25
049	1—No. 10 gauge	.043	.049	28
058	1—No. 9 gauge	.052	.058	32
068	1—No. 8 gauge	.062	.068	35
080	1—No. 7 gauge	.074	.080	40
093	1—No. 6 gauge	.087	.093	45
107	1—No. 5 gauge	.101	.107	50
126	1—No. 4 gauge	.120	.126	57
146	1—No. 3 gauge	.140	.146	65
153	1— ¼ inch	.147	.153	68
168	1—No. 2 gauge	.162	.168	74
180	2—No. 6 gauge	.174	.180	78
208	2—No. 5 gauge	.202	.208	89
245	2—No. 4 gauge	.239	.245	103
267	3—No. 6 gauge	.261	.267	111
287	3—No. 5½ gauge	.281	.287	119
309	3—No. 5 gauge	.303	.309	128
336	3—No. 4½ gauge	.330	.336	138
365	3—No. 4 gauge	.359	.365	149
395	3—No. 3½ gauge	.389	.395	160

TABLE NO. 2
Longitudinals Spaced 4 Ins. Cross Wires Number 14 Gauge Spaced 8 Ins.

036P	1—No. 12 gauge	.026	.036	17
044P	1—No. 11 gauge	.034	.044	20
053P	1—No. 10 gauge	.043	.053	24
062P	1—No. 9 gauge	.052	.062	27
072P	1—No. 8 gauge	.062	.072	31
084P	1—No. 7 gauge	.074	.084	35
097P	1—No. 6 gauge	.087	.097	40

Length of Rolls: 150, 200 and 300 ft.
Widths: Approximately 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 and 56 in.
Ultimate Tensile Strength 70,000 to 85,000 lbs. per sq. in.
Note: Materials may be furnished either plain or galvanized. Unless otherwise specified, shipments will be made of material not galvanized.

TABLE NO. 3
Longitudinals Spaced 4 Ins. Cross Wires Number 12½ Gauge Spaced 8 Ins. Number and Gauge of Wires, Areas per Foot Width and Weights per 100 Sq. Ft.

Style Number	Number and gauge of wires each longitudinal American Steel & Wire Company's steel wire gauge	Effective sectional area of cross reinforcement square ins. per foot width	Effective longitudinal sectional area square inches per foot width	Approximate weight lbs. per 100 square feet
041R	1—No. 12 gauge	.014	.041	21
049R	1—No. 11 gauge	.014	.049	24
058R	1—No. 10 gauge	.014	.058	28
067R	1—No. 9 gauge	.014	.067	31
077R	1—No. 8 gauge	.014	.077	35
089R	1—No. 7 gauge	.014	.089	40
102R	1—No. 6 gauge	.014	.102	44

TABLE NO. 4
This Material Is Used Principally for Cement Gun Work. Longitudinals Spaced 4 Ins. Cross Wires Spaced 2 Ins.

Style Number	Number of wires each long	Gauge of wire each long	Gauge of cross wires	Approximate weight per 100 square feet
7-A	1	12	14	31
6-A	1	10	14	37
5-A	1	8	14	44
4-A	1	6	14	53
29-A	1	12	12½	42
28-A	1	10	12½	48
27-A	1	8	12½	55
26-A	1	6	12½	64

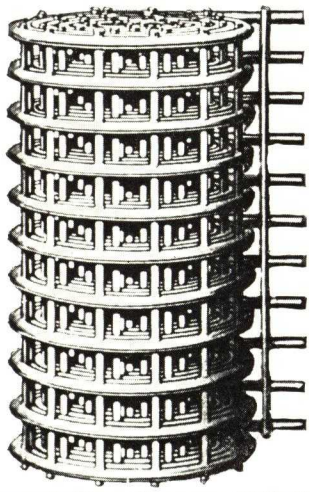
See footnotes under table No. 2.

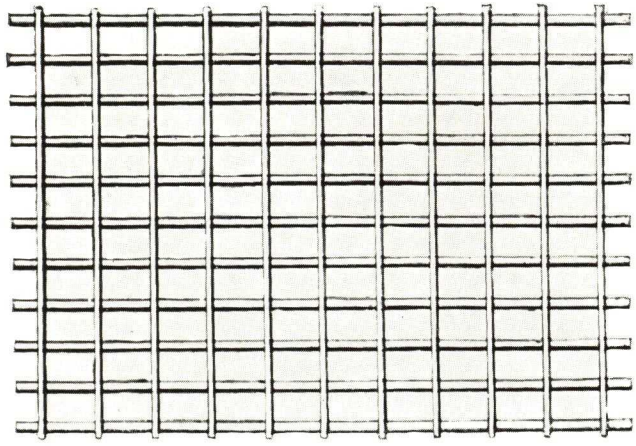
TABLE NO. 5
Areas in Sq. Ft. per Roll of Triangle Mesh Reinforcement

Width of roll inches	Square feet of reinforcement in roll		
	150-foot roll	200-foot roll	300-foot roll
16	200	267	400
20	250	333	500
24	300	400	600
28	350	467	700
32	400	533	800
36	450	600	900
40	500	667	1000
44	550	733	1100
48	600	800	1200
52	650	867	1300
56	700	933	1400

For the Lighter Styles we recommend the use of 200 or 300-ft. rolls. The Heavy Styles are easier to handle in 150-ft. rolls.

Description of Welded Wire Fabric Reinforcement





American Steel & Wire Company USS Welded Wire Fabric is a square or rectangular fabric made from cold drawn steel wire electrically welded at the intersections of the transverse and longitudinal wires. Various combinations of spacings of wires can be furnished but the standard spacings for the longitudinals are 2, 3, 4 or 6 inches and for the transverse wires 6, 8, 12 or 16 inches. See tables for Styles of Welded Wire Fabric usually carried in stock.

The cross or transverse wires extend out one inch beyond the outside or selvage longitudinal wires.

The weights given on the following page are based on a width of fabric measured center to center of the outside longitudinals. Square footage is also based on a width exclusive of the overhang of the cross wires outside of the longitudinals.

It is regularly made in rolls but can be furnished in flat sheets when required. As a general rule wire fabric in rolls can be more easily handled and installed.

All widths are based on the distance center to center of the outside or selvage longitudinal wires. The maximum width of fabric depends on the spacing and size of the longitudinal wires and range from 72 inches to 126 inches.

Welded Wire Fabric combines the same high quality of material and service that has given Triangle Mesh Reinforcement its enviable reputation. When imbedded in concrete this fabric yields the maximum of its steel strength.

Standard Styles USS Electrically Welded Wire Fabric Reinforcement†

TABLE NO. 6

Showing Styles, Sizes and Spacing of Wires, Sectional Areas and Weights of the More Common Styles of Fabric Specified.

Style Number	Spacing of wires inches		Gauge number		Sect. areas Sq. in. per ft.		Weight per 100 square feet
	Longit.	Trans.	Longit.	Trans.	Longit.	Trans.	
22–1616*	2	2	16	16	.018	.018	13
22–1414*	2	2	14	14	.030	.030	21
22–1313*	2	2	13	13	.039	.039	28
22–1212*	2	2	12	12	.052	.052	37
22–1111*	2	2	11	11	.068	.068	48
22–1010	2	2	10	10	.086	.086	60
24–1414*	2	4	14	14	.030	.015	16
24–1314*	2	4	13	14	.039	.015	19
24–1212*	2	4	12	12	.052	.026	28
212–38	2	12	3	8	.280	.021	105
212–06	2	12	0	6	.443	.029	166
216–812	2	16	8	12	.124	.007	46
216–711	2	16	7	11	.148	.008	55
216–610	2	16	6	10	.174	.011	65
216–510	2	16	5	10	.202	.011	75
216–49	2	16	4	9	.239	.013	89
216–38	2	16	3	8	.280	.015	104
216–28	2	16	2	8	.325	.015	119
216–17	2	16	1	7	.377	.018	139
33–1212*	3	3	12	12	.035	.035	25
33–1111*	3	3	11	11	.046	.046	32
33–1010	3	3	10	10	.057	.057	41
33–99	3	3	9	9	.069	.069	49
33–88	3	3	8	8	.082	.082	58
316–812	3	16	8	12	.082	.007	32
316–711	3	16	7	11	.098	.009	38
316–610	3	16	6	10	.116	.011	45
316–510	3	16	5	10	.135	.011	52
316–49	3	16	4	9	.159	.013	61
316–38	3	16	3	8	.187	.015	72
316–28	3	16	2	8	.216	.015	83
316–17	3	16	1	7	.252	.018	96
316–06	3	16	0	6	.295	.022	113
44–1414*	4	4	14	14	.015	.015	11
44–1313*	4	4	13	13	.020	.020	14
44–1212*	4	4	12	12	.026	.026	19
44–1010	4	4	10	10	.043	.043	31
44–88	4	4	8	8	.062	.062	44
44–77	4	4	7	7	.074	.074	53
44–66	4	4	6	6	.087	.087	62
44–44	4	4	4	4	.120	.120	85
48–1313*	4	8	13	13	.020	.010	11
48–1212*	4	8	12	12	.026	.013	14
48–1112*	4	8	11	12	.034	.013	17
48–1012	4	8	10	12	.043	.013	20
48–912	4	8	9	12	.052	.013	23
48–812	4	8	8	12	.062	.013	27
48–711	4	8	7	11	.074	.017	33
412–1212*	4	12	12	12	.026	.009	13
412–1112*	4	12	11	12	.034	.009	16
412–1012	4	12	10	12	.043	.009	19
412–912	4	12	9	12	.052	.009	22
412–812	4	12	8	12	.062	.009	26
412–711	4	12	7	11	.074	.011	31
412–610	4	12	6	10	.087	.014	37
412–67	4	12	6	7	.087	.025	40
412–510	4	12	5	10	.101	.014	42
412–57	4	12	5	7	.101	.025	45
412–49	4	12	4	9	.120	.017	49
416–711	4	16	7	11	.074	.009	30
416–610	4	16	6	10	.087	.011	35
416–510	4	16	5	10	.101	.011	40
416–49	4	16	4	9	.120	.013	48
416–38	4	16	3	8	.140	.015	56
416–28	4	16	2	8	.162	.015	64
66–1212*	6	6	12	12	.017	.017	13
66–1010	6	6	10	10	.029	.029	21
66–99	6	6	9	9	.035	.035	25
66–88	6	6	8	8	.041	.041	30
66–77	6	6	7	7	.049	.049	36
66–66	6	6	6	6	.058	.058	42
66–55	6	6	5	5	.067	.067	49
66–46	6	6	4	6	.080	.058	50
66–44	6	6	4	4	.080	.080	58
66–33	6	6	3	3	.093	.093	68
66–22	6	6	2	2	.108	.108	78
66–11	6	6	1	1	.126	.126	91
66–00	6	6	0	0	.148	.148	107

† Other styles can be furnished on application. See table No. 8 for various sizes and spacings of wire that can be provided for specific jobs.

Rolls: Standard lengths 150, 200 and 300 ft.

Widths: Multiples of the spacing of longitudinal wires up to a maximum width which varies with the size and spacing of the longitudinals. Approximate maximums 56 to 72 in. for 2-in. spacing, 84 to 96 in. for 3 or 4-in. spacing, and 96 to 120 in. for 6-in. spacing.

Finish: Plain or galvanized.

Tensile Strength: 70,000 to 80,000 lbs. per sq. in.

Weights: All above weights are based on a width of 60 in. measured from center to center of the outside or selvage longitudinal wires.

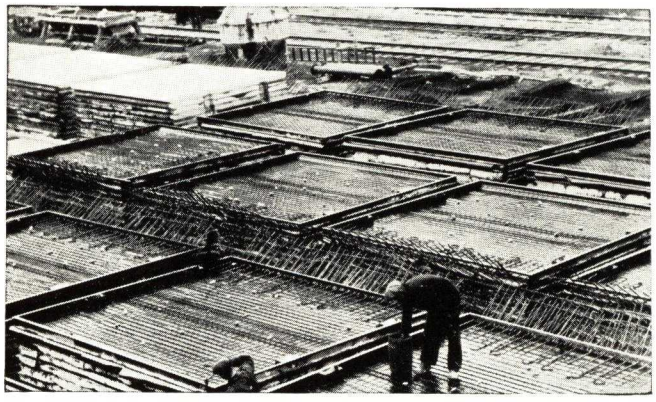
Note: Styles marked (*) can be furnished galvanized only.

How to Order USS Welded Wire Fabric

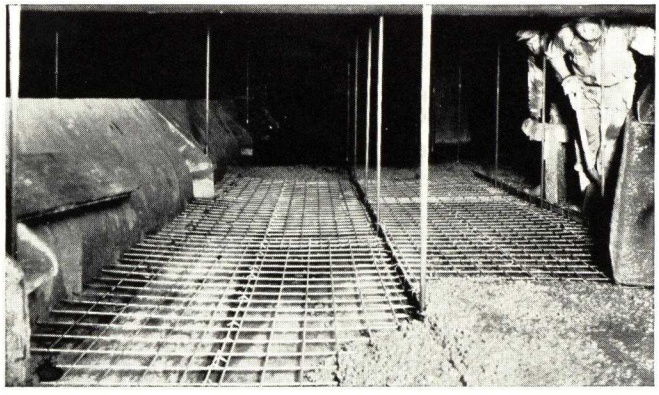
Specify the spacings of wires first, then the size or gauge. In each case mention first the longitudinals which are the wires running lengthwise of the roll or sheet.

EXAMPLE:—Assuming No. 6 gauge longitudinal wires spaced 4 inches and No. 10 gauge cross wires spaced 12 inches, the specifications should read: "USS Welded Wire Fabric 4x12 inch mesh, No. 6 x No. 10 wires."

The lengths and widths of rolls or sheets should be shown. If rolls are ordered and there is no preference as to widths or lengths, specify the total number of square feet and state any standard length and width of rolls will be satisfactory.



Welded Wire Fabric Precast Slabs, Chicago Sanitary District Sewage Disposal Plant, Stickney, Ill.



Welded Wire Fabric Reinforcing Smoke Chamber Slabs, Chicago Post Office, Chicago, Ill.

Tables for Estimating Weight of USS Electrically Welded Wire Fabric

Weights per 100 Sq. Ft. Assuming Net Width of 60 Ins. Center to Center of Outside Wires

TABLE NO. 7

American Steel & Wire Company's Steel Wire Gauge No.	Spacing of Longitudinals, in inches						Spacing of Cross Wires, in Inches						
	2	3	4	6	8	12	2	3	4	6	8	12	16
0000	256.43	173.71	132.35	90.99	69.80	49.63	256.43	170.95	128.22	85.48	64.11	42.74	32.05
000	217.31	147.21	112.16	77.11	59.14	42.06	217.31	144.87	108.66	72.44	54.33	36.22	27.16
00	181.16	122.72	93.54	64.28	49.31	35.06	181.16	120.78	90.58	60.39	45.29	30.19	22.65
0	155.37	105.25	80.19	55.13	42.29	30.07	155.37	103.58	77.69	51.79	38.84	25.90	19.42
1	132.43	89.71	68.35	46.99	36.05	25.63	132.43	88.29	66.22	44.14	33.11	22.07	16.55
2	113.96	77.20	58.82	40.44	31.02	22.06	113.96	75.97	56.99	37.99	28.49	18.99	14.24
3	98.21	66.53	50.69	34.85	26.73	19.01	98.21	65.47	49.10	32.74	24.55	16.37	12.28
4	83.95	56.87	43.33	29.79	22.85	16.25	83.95	55.97	41.97	27.98	20.99	13.99	10.49
5	70.87	48.01	36.58	25.15	19.29	13.72	70.87	47.24	35.43	23.62	17.72	11.81	8.86
6	60.96	41.29	31.46	21.63	16.59	11.80	60.96	40.64	30.48	20.32	15.24	10.16	7.62
7	51.81	35.10	26.74	18.38	14.10	10.03	51.81	34.54	25.90	17.27	12.95	8.63	6.48
8	43.40	29.40	22.40	15.40	11.81	8.40	43.40	28.93	21.70	14.47	10.85	7.23	5.43
9	36.37	24.64	18.77	12.91	9.90	7.04	36.37	24.25	18.18	12.12	9.09	6.06	4.55
10	30.14	20.42	15.56	10.69	8.20	5.83	30.14	20.09	15.07	10.05	7.53	5.02	3.77
11	24.01	16.27	12.39	8.52	6.54	4.65	24.01	16.01	12.01	8.00	6.00	4.00	3.00
12	18.41	12.47	9.50	6.53	5.01	3.56	18.41	12.27	9.20	6.14	4.60	3.07	2.30
13	13.84	9.38	7.15	4.91	3.77	2.68	13.84	9.23	6.92	4.61	3.46	2.31	1.73
14	10.58	7.17	5.46	3.76	2.88	2.05	10.58	7.06	5.29	3.53	2.65	1.76	1.32
16	6.46	4.38	3.33	2.29	1.77	1.25	6.45	4.31	3.23	2.15	1.62	1.08	0.81

The above weights are based on width of 60 inches measured from center to center of the outside or selvage longitudinal wires.
The weight of the cross or transverse wires includes the 1-in. projection or overhang beyond the outside longitudinal wires.

Note: To determine the weight of any type add the weights of the longitudinal and transverse members, adjust the total to the nearest lb., considering 0.5 lb. or over to be 1 lb., and less than 0.5 lb. to be zero.

Sectional Areas of USS Electrically Welded Wire Fabric . . . Area in Square Inches per Foot of Width for various Spacing of Wires

TABLE NO. 8

American Steel & Wire Company's Steel Wire Gauge No.	Wire		Center to center spacing, in inches											
	Diam. Inches	Area Sq. Ins.	2	3	4	5	6	7	8	9	10	12	14	16
0000	.3938	.12180	.731	.487	.365	....	.244	....	.183	....	....	.122	....	....
000	.3625	.10321	.619	.413	.310	....	.206	....	.155	....	....	.103	....	....
00	.3310	.086049	.516	.344	.258	....	.172	....	.129	....	....	.086	....	....
0	.3065	.073782	.443	.295	.221	.177	.148	.126	.111	.098	.089	.074	.063	.055
1	.2830	.062902	.377	.252	.189	.151	.126	.108	.094	.084	.075	.063	.054	.047
2	.2625	.054119	.325	.216	.162	.130	.108	.093	.081	.072	.065	.054	.046	.041
3	.2437	.046645	.280	.187	.140	.112	.093	.080	.070	.062	.056	.047	.040	.035
4	.2253	.039867	.239	.159	.120	.096	.080	.068	.060	.053	.048	.040	.034	.030
5	.2070	.033654	.202	.135	.101	.081	.067	.058	.050	.045	.040	.034	.029	.025
6	.1920	.028953	.174	.116	.087	.069	.058	.050	.043	.039	.035	.029	.025	.022
7	.1770	.024606	.148	.098	.074	.059	.049	.042	.037	.033	.030	.025	.021	.018
8	.1620	.020612	.124	.082	.062	.049	.041	.035	.031	.027	.025	.021	.018	.015
9	.1483	.017273	.104	.069	.052	.041	.035	.030	.026	.023	.021	.017	.015	.013
10	.1350	.014314	.086	.057	.043	.034	.029	.025	.021	.019	.017	.014	.012	.011
11	.1205	.011404	.068	.046	.034	.027	.023	.020	.017	.015	.014	.011	.010	.009
12	.1055	.0087417	.052	.035	.026	.021	.017	.015	.013	.012	.010	.009	.007	.007
13	.0915	.0065755	.039	.026	.020	.016	.013	.011	.010	.009	.008	.007	.006	.005
14	.0800	.0050266	.030	.020	.015	.012	.010	.009	.008	.007	.006	.005	.004	.004
16	.0625	.0030680	.018	.012	.009	....	.006	.005	....	.004	....	.003	....	.002

SUGGESTIONS FOR USE OF WIRE FABRIC REINFORCEMENT IN BUILDINGS

Basement Floor Slabs

All basement floor slabs should be reinforced with wire fabric reinforcement. The style of wire fabric depends upon the thickness of slab used and condition of the supporting soil. For small residences and apartment buildings Style 032 Triangle Mesh or a 6x6-in. mesh No. 10 and No. 10-gauge welded fabric is commonly used. For slabs laid over filled land Style 080 Triangle Mesh or a 6x6-in. mesh No. 6 and No. 6-gauge welded fabric is often used. The U. S. Government Engineers specify 6x6-in. mesh No. 6 and No. 6-gauge welded fabric to reinforce basement floor slabs on slum clearance projects.

Sidewalks, Garage Driveways and Alleys

Almost all buildings constructed in the city or suburban areas have cement sidewalks on the property, and many will require cement driveways and alleys. In practically all cases the concrete slabs should be reinforced with wire fabric. Wire fabric will hold together all cracks that may form, thereby increasing the life of the concrete slab. The usual style of fabric specified for sidewalks is Style 032 Triangle Mesh or a 6x6-in. mesh all No. 10-gauge welded wire fabric. For driveways and alleys Style 080 Triangle Mesh or 6x6-in. mesh No. 6 and No. 6-gauge welded wire fabric should be used.

Concrete Floor Filling

When concrete is used as a floor filling over concrete slabs, tile arches, metal deck floors, etc., a wire fabric is usually used as shrinkage fabric. The U. S. Government engineers specify a 4x4-in. mesh all No. 13-gauge wire fabric for shrinkage fabric in concrete floor fill.

SUGGESTIONS FOR USE OF WIRE FABRIC REINFORCEMENT IN BUILDINGS—Cont'd

Pan Joist, Tile Joist Construction

Wire fabric is commonly specified as shrinkage fabric with this type of construction. The usual fabric specified as a minimum shrinkage requirement is a 4x12-in. mesh No. 10 and No. 12-gauge wires.

Beam Slab Construction

Wire fabric, when used in this type of construction, can be designed in accordance with usual design formulas for reinforced concrete construction. A working stress of 30,000 lbs. per square inch (which is at least one-half the yield point of the material) is recommended. This is in accordance with the latest tests made on this material at the University of Delaware.

It is also the stress recommended for one way slabs by Committee 501 of the American Concrete Institute in their Report on a Standard Building Code adopted as a Tentative Standard in February, 1936.

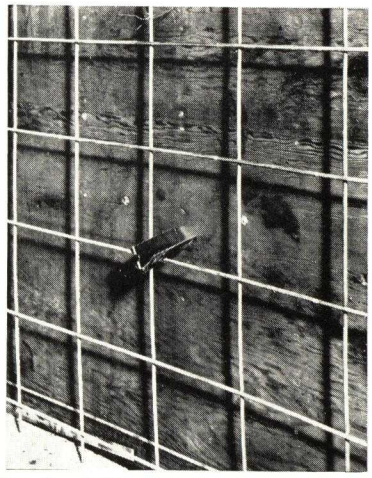
Previous tests and data indicate that a much higher stress than this may be safely employed with the usual design formulas for spans up to 8 ft., having a minimum slab thickness of 4 inches.

Fireproof Columns, Beams Encased in Concrete

Cold drawn steel wire fabric is used to wrap columns and beams encased in concrete. A 4x4-in. mesh all No. 13-gauge welded fabric or style 032 Triangle Mesh is the usual style of fabric employed.

Concrete Walls

Welded Wire Fabric can be economically used as reinforcement in concrete walls. The area of steel required will, of course, depend upon the stress produced in the wall due to design conditions. The proposed Building Regulations for Reinforced Concrete of the American Concrete Institute, adopted as a tentative Standard February, 1936, Sec. 122 (i) requires — "Monolithic Walls shall be reinforced with an area of steel in each direction both vertical and horizontal, at least equal to 0.0025 times the cross-sectional area of the wall if of bar and 0.0018 times the area if of Electrically Welded Wire Fabric. The wire of the welded fabric shall be of not less than No. 10-gauge. Walls more than eight inches in thickness shall have the reinforcement for each direction placed in two layers parallel with the faces of the wall . . . ."



Details of Wire Fabric in 6-in. Concrete Wall Construction. Used in Chicago Post Office, Chicago, Ill.

SLAB REINFORCEMENT

Showing style of wire fabric for different floor loadings for spans up to 8 ft. in accordance with the empirical formula adopted in the New York City Building Code

STANDARD STYLES USS WIRE FABRIC REQUIRED FOR VARIOUS LOADS

Total Load per Sq. Ft. Including Weight of Slab		Span 4′ 0″	4′ 3″	4′ 6″	4′ 9″	5′ 0″	5′ 3″	5′ 6″	5′ 9″	6′ 0″	6′ 3″	6′ 6″	6′ 9″	7′ 0″	7′ 3″	7′ 6″	7′ 9″	8′ 0″
USS Electric Welded Reinforcement—4-in. Cinder Concrete Slabs, 1-2-5 Mixture																		
100 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	3 x 12
	Gauge wire....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	8 & 12
125 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	3 x 12	4 x 16	3 x 16
	Gauge wire....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	8 & 12	6 & 10	7 & 11	5 & 10
150 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16
	Gauge wire....	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	4 & 9
175 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	4 x 16
	Gauge wire....	10 & 12	10 & 12	10 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	5 & 10	5 & 10	3 & 8
200 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	2 x 16	3 x 16	3 x 16
	Gauge wire....	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	5 & 10	5 & 10	7 & 11	4 & 9	4 & 9
225 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	2 x 16	3 x 16
	Gauge wire....	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	4 & 9	6 & 10	3 & 8
250 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	3 x 16	2 x 16
	Gauge wire....	9 & 12	8 & 12	8 & 12	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	5 & 10	5 & 10	4 & 9	3 & 8	3 & 8	3 & 8	5 & 10	3 & 8
275 lb..	Wire spacing in..	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	8 & 12	8 & 12	7 & 11	6 & 10	6 & 10	7 & 11	6 & 10	6 & 10	5 & 10	5 & 10	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	4 & 9
300 lb..	Wire spacing in..	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	4 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	8 & 12	7 & 11	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	4 & 9
325 lb..	Wire spacing in..	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	4 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	7 & 11	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8
350 lb..	Wire spacing in..	4 x 16	3 x 12	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	7 & 11	8 & 12	6 & 10	5 & 10	6 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8
375 lb..	Wire spacing in..	4 x 16	4 x 16	3 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	7 & 11	6 & 10	7 & 11	6 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	2 & 8	3 & 8
400 lb..	Wire spacing in..	3 x 12	3 x 16	4 x 16	3 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	8 & 12	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8	2 & 8	2 & 8
425 lb..	Wire spacing in..	4 x 16	3 x 16	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	6 & 10	7 & 11	4 & 9	4 & 9	5 & 10	4 & 9	4 & 9	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8	2 & 8	2 & 8	1 & 7
450 lb..	Wire spacing in..	3 x 16	4 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
	Gauge wire....	7 & 11	5 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	4 & 9	4 & 9	4 & 9	3 & 8	3 & 8	2 & 8	2 & 8	1 & 7	1 & 7

USS Triangle Mesh Reinforcement—4-in. Cinder Concrete Slabs, 1-2-5 Mixture																		
100 lb.	053P	053P	053P	053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	084P	097P
125 lb.	053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	097P	107	107
150 lb.	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	107	107	126	126	126
175 lb.	053P	053P	053P	062P	072P	072P	084P	084P	097P	097P	107	107	126	126	146	146	146
200 lb.	053P	062P	062P	072P	072P	084P	084P	097P	107	107	126	126	146	146	153	168	168
225 lb.	062P	062P	072P	072P	084P	097P	097P	107	107	126	126	146	146	153	168	180	208
250 lb.	062P	072P	072P	084P	097P	097P	107	126	126	146	146	153	168	180	180	208	208
275 lb.	072P	072P	084P	097P	097P	107	126	126	146	146	153	168	180	208	208	245	245
300 lb.	072P	084P	084P	097P	107	126	126	146	146	153	168	180	208	208	245	245	267
325 lb.	084P	084P	097P	107	107	126	146	146	153	168	180	208	208	245	245	267	287
350 lb.	084P	097P	097P	107	126	126	146	153	168	180	208	208	245	245	267	287	287
375 lb.	084P	097P	107	126	126	146	153	168	180	208	208	245	245	267	287	309	309
400 lb.	097P	107	107	126	146	146	168	180	208	208	245	245	267	287	287	309	336
425 lb.	097P	107	126	126	146	153	168	208	208	245	245	267	267	287	309	336	365
450 lb.	107	107	126	146	153	168	180	208	245	245	245	267	287	309	336	365	395

ELECTRIC WELD GALVANIZED WIRE FABRIC FOR PLASTER AND STUCCO REINFORCEMENT

Description and Uses

Perfected Plaster-Stucco Reinforcement, Styles PS—14 and PS-16—A combined wire lath and reinforcement for interior and exterior work. Wire lath and paper back are one unit. Shipped in crates of perfectly flat sheets (one man size), 34x52 in.

51 sheets of fabric are packed in a crate approximately 70 sq. yds. Sufficient galvanized or blued hook head nails for proper application of the fabric are supplied with each crate.

Fabric extends beyond paper to allow proper lapping of adjacent sheets. Stiffener wires are welded through holes in the paper to face fabric. These holes also provide enough ventilation to properly cure the new plaster. No. 14 gauge is used for outside stucco reinforcement and No. 16 gauge for inside plaster reinforcement.

Uses—The PS-14 fabric is used extensively for reinforcing cement or gypsum stucco on new buildings, or for overcoating old wood, brick or stone structures.

Style PS-16 is used for inside plaster work.

Paper Back—Heavy kraft paper for inside use. 2-ply waterproofed paper for exteriors or for use with termite treated lumber.

Advantages

PS-14 and PS-16 provide a positive reinforcement of the stucco or plaster. The 2x2-in. square mesh openings are of sufficient size to allow the stucco or plaster to be pushed through and to completely embed the galvanized wire. Galvanized steel prevents rusting thereby providing a lasting construction of low first and installation costs. Paper backing, in addition to preventing loss of the expensive plaster material by acting as a form for the plastic stucco or plaster, also prevents joist and lath marks on the finished plaster wall.

The economy of paper back galvanized wire fabric lies in its efficiency, low first cost, low installation cost and long life.

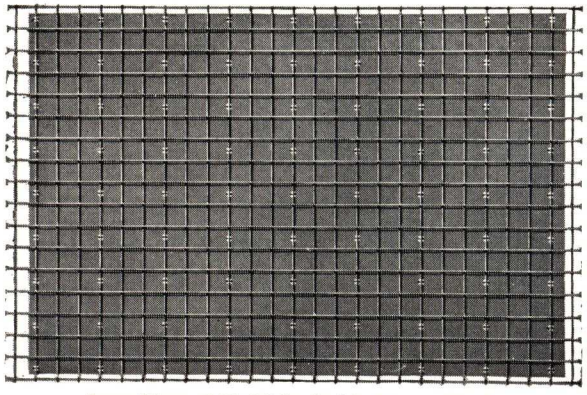
Application

Styles PS-14 and PS-16 (Paper Back) can be applied directly to the studs or to the sheathing or other backing. Use hook head nails supplied with each crate of fabric. The paper back fabric should extend around the corners and the back stiffener wires should span the studding. Self-furring stucco nails may also be used with this fabric if desired.

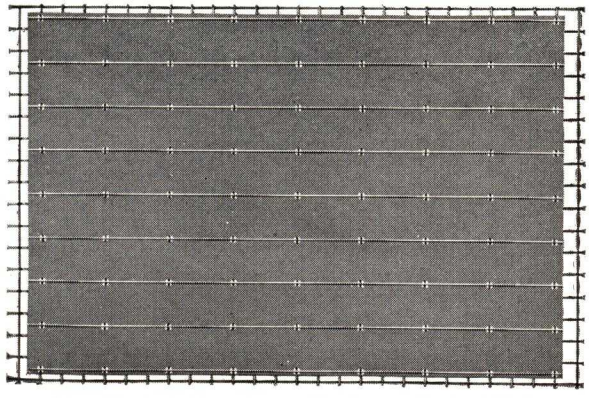
PERFECTED PLASTER-STUCCO REINFORCEMENT (PAPER BACK)

Style No.	Wires, face fabric		Back wires		Net weight, lb. per sq. yd.	Gross wt., lb. per sq. yd.
	Gauge No.	Spacing, in.	Gauge No.	Spacing, in.		
PS-14	14	2 x 2	13	4	3.0	3.5
PS-16	16	2 x 2	13	4	2.3	2.8

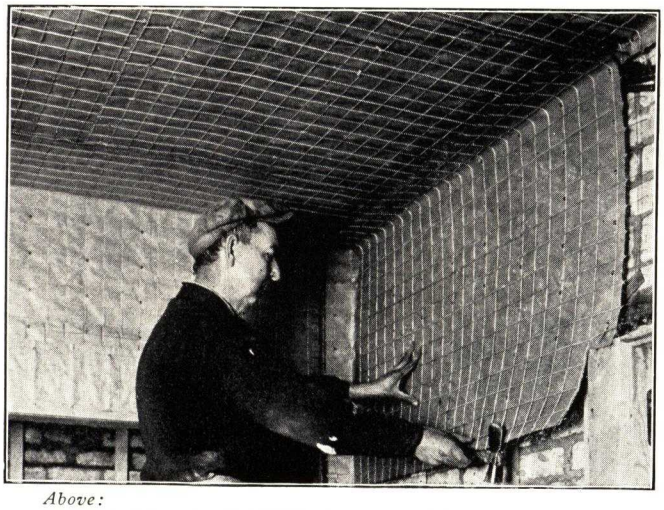
Note: Gross weight per sq. yd. includes weight of crate and nails.



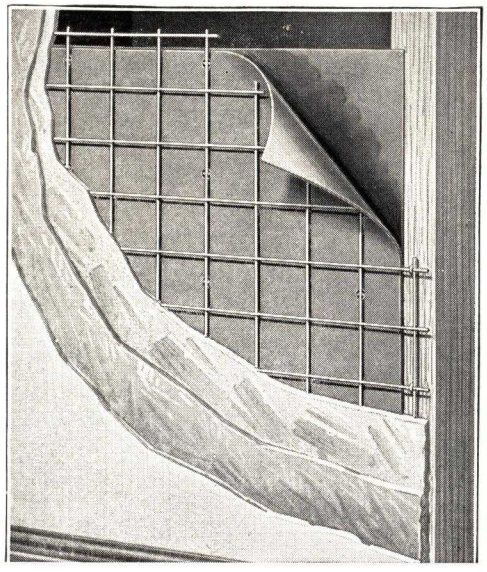
Front View of PS-16 for Inside Plaster Work
Note holes in paper necessary to provide ventilation to properly cure the new plaster



Back View of PS-16 for Inside Plaster Work Showing Stiffener Wires
Note overhang of fabric beyond paper for proper lapping at sides and ends of sheets



Above:
PS-16 Fits Easily Around Window and Door Openings



At right:
Style PS-14 Self Furring Paper Back Fabric with 2-ply Waterproof Paper Backing for Stucco

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UNITED STATES STEEL

CONCRETE STEEL COMPANY

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Products

CONCRETE REINFORCEMENT BARS; COLLAPSIBLE SPIRALS for column reinforcement; REMOVABLE METAL FORMS; CONCRETE INSERTS; CURB BARS; CONCRETE REINFORCEMENT ACCESSORIES, including SUPPORTING, SPACING and TYING DEVICES for holding bars in place in forms; WIRE DEVICES; WIRE SOFFIT CLIPS; WALL ANCHORS and TIES; EXPANDED METAL LATH (Plain and Self-furring); EXPANDED METAL REINFORCEMENT; HOT ROLLED and COLD FORMED CHANNELS; CORNER BEADS; RIB LATH; WIRE MESH; BAR MAT ROAD REINFORCEMENT; SANITREAD; "CONSTEEL" JOISTS.

Concrete Reinforcement Bars

The Havemeyer deformed bar (Figs. 1 and 2) is rolled in square and round sections, with the deformations running longitudinally and entering directly into the tensile strength of the bar, no metal being used for the mechanical bond only. At all points it has a constant uniform area of cross section exactly

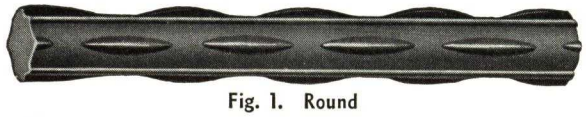


Fig. 1. Round

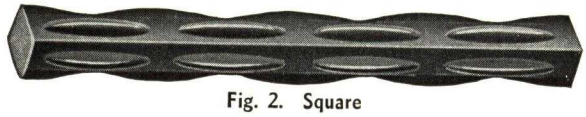


Fig. 2. Square

equal to the cross-sectional area of a plain bar of same size. As the projections and depressions are rolled longitudinally, there are no sharp angles to start a fracture when bar is bent.

Havemeyer bars are rolled to any desired standard specification from new billet steel. Complete stocks of Havemeyer bars, rolled to A.S.T.M. standard specifications A-15-35, are carried in all our warehouses.

We are also prepared to furnish rail steel deformed bars complying with A.S.T.M. specifications, Serial A-16-35, and maintain stocks of rail steel in some of our warehouses.

Shop Bending and Fabricating—Our warehouses are equipped for bending and fabricating bars. This service not only insures greater accuracy but is more economical for the contractor than if he did the work himself.

Collapsible Spirals

Accurately coiled, rigidly spaced and shipped collapsed, ready to be opened up and placed in the forms.

Removable Metal Forms

Removable metal forms, in a wide range of dimensions, adapted to all types of buildings designed for concrete joists, are available to contractors on a rental basis.

Concrete Inserts

Dayton Adjustable-Inserts, with keyhole slot for adjustment; "Y" Socket-Inserts; Slotted-Inserts, unlimited adjustment obtainable.

Accessories for Supporting, Spacing and Tying Bars

Consist of Bar-Tys, Hy-Chairs, Ty-Chairs, Easel-Chairs, Sheet Metal and Welded Wire Bar-Spacers, Beam-Saddles and Separators.

These devices offer many decided advantages. Supporting devices keep bars at proper distance above the forms.

Wire Devices

Soffit clips; hanger wire, straight, cut and bent, toggle hangers, etc.

Our wire shops are prepared to manufacture, on short notice, any type of wire device required for the installation of suspended ceilings or for securing lath. Tie wire, staples, etc., carried in stock.

Fireproofing Products

Metal Lath—Flat expanded, flat rib, ⅜-in. rib, ¾-in. rib and perforated sheet.

Furring—Hot rolled channels, angles and flats.

Cold rolled channels, ¾, 1, 1½ and 2 ins.

Corner Beads—Expanded wing, scalloped edge, rail and bullnose types.

Lengths, 6, 7, 8, 9, 10 and 12 ft.

Base Beads—Expansion, plain and curved point.

Wire Mesh—Both triangle and electric weld, plain and galvanized, all standard weights and areas.

Expanded Metal—Complete information furnished on request.

Road Reinforcement, Curb Bars, Etc.

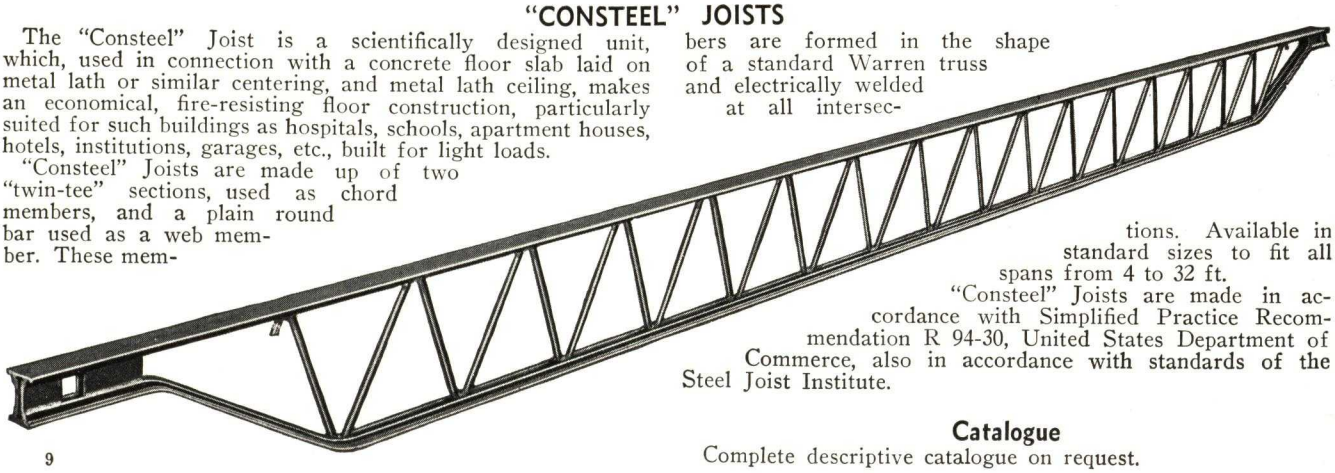
We furnish wire mesh, welded or clipped bar mat road reinforcing, together with all accessories for placing mats, joint construction, etc.; also cork, asphalt and other types of road joint.

Also round nose and angle nose curb bars for curb edge protection, stair nosings and platform edges; and Sanitread for safe, non-slip step surfaces.

"CONSTEEL" JOISTS

The "Consteel" Joist is a scientifically designed unit, which, used in connection with a concrete floor slab laid on metal lath or similar centering, and metal lath ceiling, makes an economical, fire-resisting floor construction, particularly suited for such buildings as hospitals, schools, apartment houses, hotels, institutions, garages, etc., built for light loads.

"Consteel" Joists are made up of two "twin-tee" sections, used as chord members, and a plain round bar used as a web member. These members are formed in the shape of a standard Warren truss and electrically welded at all intersections. Available in standard sizes to fit all spans from 4 to 32 ft.



"Consteel" Joists are made in accordance with Simplified Practice Recommendation R 94-30, United States Department of Commerce, also in accordance with standards of the Steel Joist Institute.

Catalogue

Complete descriptive catalogue on request.

THE CONSOLIDATED EXPANDED METAL COMPANIES

Steelcrete Concrete Reinforcing Mesh and Steelcrete Welded Wire Fabric

WHEELING, W. VA.

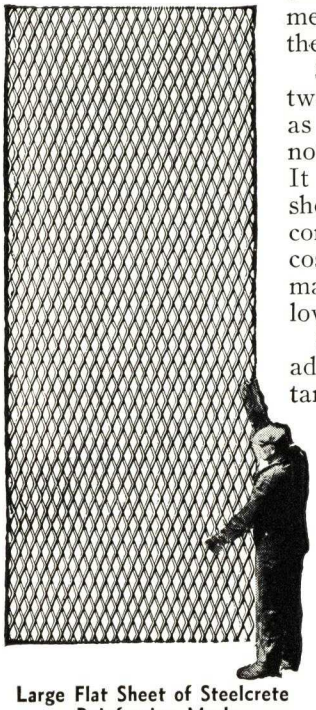
SALES OFFICES AND WAREHOUSES

ATLANTA, GA. BUFFALO, N. Y. CINCINNATI, OHIO HOUSTON, TEX. PHILADELPHIA, PA.
BOSTON, MASS. CHICAGO, ILL. CLEVELAND, OHIO NEW YORK, N. Y. PITTSBURGH, PA.

For Other Steelcrete Pages, see File Index

STEELCRETE REINFORCING MESH

Steelcrete Reinforcing Mesh is a diamond mesh fabric, cold drawn from a solid steel plate and has an elastic limit 60% higher than commercial medium steel. In the process of manufacture every strand is tested against flaws and other weaknesses, assuring a uniform mesh of high elastic limit. Steelcrete Mesh is free from mechanical and welded joints, the fabric being one solid sheet.



Large Flat Sheet of Steelcrete Reinforcing Mesh

Steelcrete Mesh provides two-way reinforcement, as well as the diagonal reinforcement, not ordinarily taken care of. It is furnished in large, flat sheets, suitable to all types of construction, easy to handle and costs less "in place" than many materials having considerably lower reinforcing values.

Steelcrete Mesh is especially adapted for use in tunnels, tanks, sewers, culverts, retaining walls, foundations and floor slats.

Reduces Shrinkage Cracks

One of the principal uses of steel reinforcement is to prevent or minimize shrinkage cracks. Such reinforcing resists stresses that otherwise would be borne by the concrete alone—stresses that fracture plain concrete. Steelcrete—a diamond mesh—extending in each diagonal direction—distributes stresses throughout the slab thus reducing tendency of the concrete to fracture, and effectually serving the purpose.

STANDARDS FOR "STEELCRETE" EXPANDED METAL

Designation of mesh	Effective sectional area sq. in. per ft. width	Approx. weight per sq. ft., lb.	Standard width of sheets,	Standard length of sheets, ft.
3–13–075	.075	.25	6′–4″	8, 10, 12, 16
3–13– 10	.10	.34	7′–0″	8, 10, 12, 16
3–13–125	.125	.42	5′–8″	8, 10, 12, 16
3– 9– 15	.15	.51	7′–0″	8, 10, 12, 16
3– 9–175	.175	.60	6′–0″	8, 10, 12, 16
3– 9– 20	.20	.68	5′–3″	8, 10, 12, 16
3– 9– 25	.25	.85	4′–2½″	8, 10, 12, 16
3– 9– 30	.30	1.02	7′–0″	8, 10, 12, 16
3– 9– 35	.35	1.19	6′–0″	8, 10, 12, 16
3– 4– 40	.40	1.36	4′–7″	8, 12
3– 4– 45	.45	1.53	4′–1″	8, 12
3– 4– 50	.50	1.70	7′–4″	8, 12
3– 4– 55	.55	1.87	6′–8″	8, 12
3– 4– 60	.60	2.04	6′–1½″	8, 12

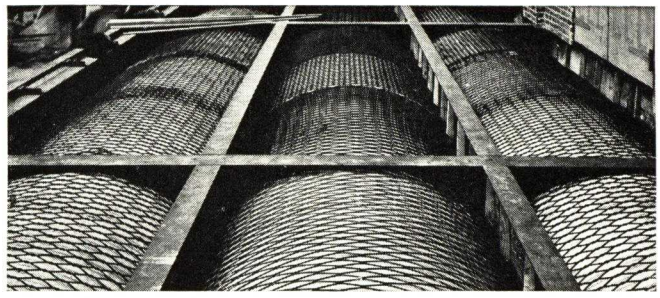
Note: Sheets of special size furnished from the factory only. All the above sizes are furnished in a standard diamond 8 in. long and approximately 3 in. wide.

Provides Better Bond

The very nature of the strands, rectangular in shape, coupled with the solid, rectangular joint or bridge, lends assurance to the engineer or architect that the bond is efficient. The diamond shaped mesh carrying the stresses in diagonal directions, makes Steelcrete ideal to resist "fatigue" of reinforced concrete. *Steelcrete cannot slip in the slab.*

Specifications

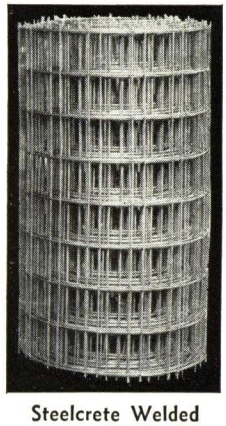
The Steelcrete Mesh shall be laid on the forms with long way of the diamond meshes extending in the direction indicated on the drawings. The separate sheets shall be lapped one mesh on the side and one mesh on the end, and wired together at a sufficient number of points to hold sheets in position while depositing the concrete.



Floor Slab Using Heavy Reinforcing Mesh. Sheets Curved to Suit Beams at Mill

STEELCRETE WELDED WIRE FABRIC

This is an electrically welded wire fabric furnished in rolls or flat sheets in various gauges and spacing of wires. The wire is manufactured to American Society of Testing Material Specifications. One of the chief advantages of Steelcrete Welded Wire Fabric is that practically any desired size of mesh and wire can be obtained and this affords the designer a great latitude in the selection of a suitable reenforcement.



Steelcrete Welded Wire Fabric

STEELCRETE SERVICE

Immediate shipments can be made from our plant at Beech Bottom, W. Va., or branch warehouses listed above.

JOHNS-MANVILLE

EXECUTIVE OFFICES

22 East 40th Street, NEW YORK, N. Y.

Products

J-M Steeltex Floor Lath and Welded Wire Reinforcement for concrete building construction. *(Other Steeltex products will be found in our catalog in the Metal Lath section of this edition.)*

For the following Johns-Manville products, see File Index: Acoustical Treatment and Sound Isolation; Asbestos and Asphalt Shingles; Built-up and Insulated Roofs; Home Insulation; Insulating Board; Pipe Coverings and Insulations; Tile Flooring; Transite; Flat and Corrugated; Asbestos Wainscoting and Flexboard; Transite Walls.

J-M STEELTEX FLOOR LATH

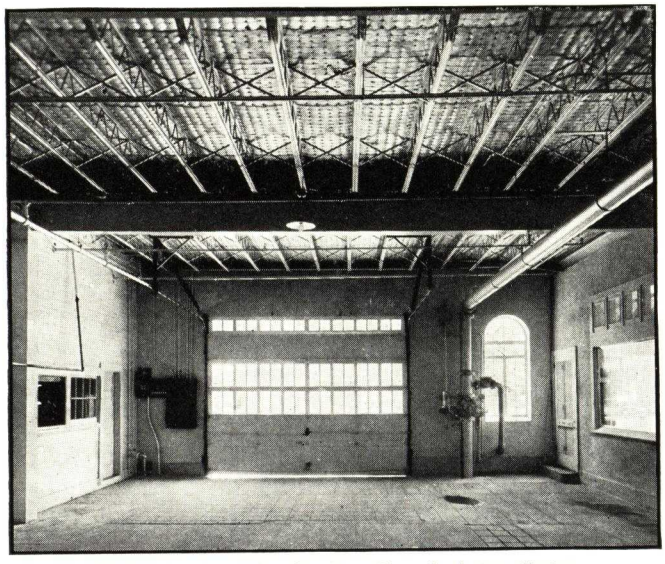
J-M Steeltex Floor Lath is a combined form and reinforcing which offers important structural advantages and economies in light-slab concrete floor and roof construction. It will give maximum reinforcing value and facilitate proper curing of the concrete through the maintenance of the original water-cement ratio, at the same time effecting important savings in application costs and in the reduction of waste material.

The reinforcing element of Steeltex Floor Lath is composed of 12-gauge cold-drawn electrically-welded galvanized steel wire reinforcing mesh. This mesh is attached to a tough corded backing—the form element—by means of crimp wires which also space the reinforcing mesh at the proper distance from the backing to permit the concrete completely to surround and embed the reinforcement. The weight of the poured concrete insures complete and uniform embedment without the labor of blocking up or of pouring the slab in two operations.

The Steeltex corded backing is of ample strength not only to support the concrete while it is being poured, but also to afford a safe walking surface, once the fabric has been attached to the joists. Being water-resistant, the backing minimizes loss of water and fine aggregate through leakage, with a further advantage in the protection it affords to the floors below. Droppings are minimized, clean-up expense is eliminated, and work can proceed in safety even while the concrete is being placed on the floor above.

Form and Reinforcing combined

Steeltex Floor Lath has the dual feature of making forms unnecessary and providing proper reinforcing for light cement floor or roof slabs



Underside view of a Steeltex Floor Lath installation after the concrete has been poured

Note absence of concrete drippings and of sag between joists—two advantages that mean a worthwhile saving in concrete

Advantages of Steeltex Method of Application

The laying of Steeltex Floor Lath is accomplished with a minimum of time and labor. Furnished in conveniently handled rolls 4 ft. wide by 125 ft. in length, the material is simply unrolled over the joists and cut to length. It is then attached to an end or anchored joist, drawn taut by means of the special Steeltex stretcher furnished for this purpose and fastened by clips to the intermediate joists.

The speed of work is also facilitated by the ability to cut necessary openings for pipes, etc., with snips or knife instead of saw, chisel and auger. Naturally, rolls can be more quickly laid per unit of area than can sheets, and with less wastage, since overlapping is minimized.

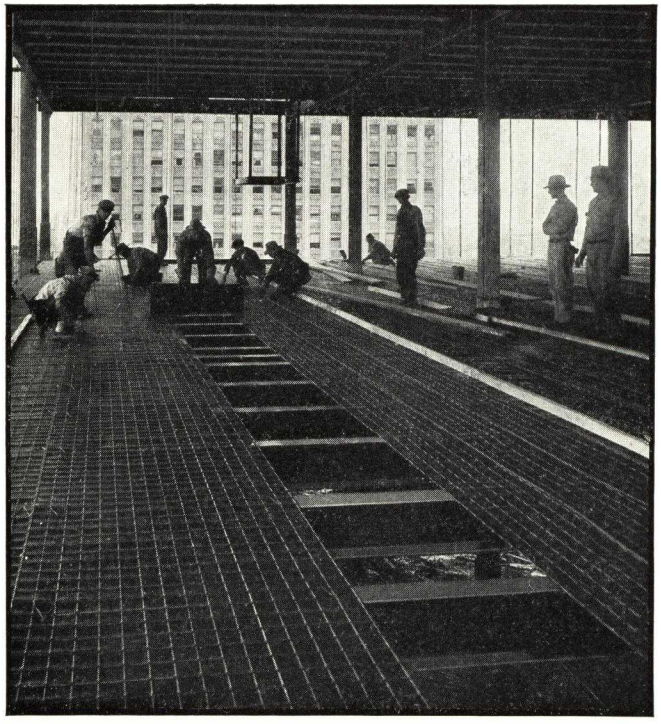
Properly installed, there is no excessive sag when concrete is being poured, which effects considerable saving. Also, because Steeltex Floor Lath extends in one piece across the entire panel or bay, it gives lateral stiffness, continuity of reinforcing and distribution of loads over a number of joists or beams. The automatic embedding of the steel wire fabric in

the concrete, coupled with its scientific design and spacing, provides maximum reinforcing value and promotes development of the full strength of the slab.

Equally Adaptable to Floors and Roofs

Steeltex Clips furnish a secure hold

The advantages of Steeltex Floor Lath as a reinforcement and form for light-slab floor construction apply equally in the construction of concrete and gypsum roofs. The material is easily laid on sloping or curved roof surfaces and the fibrous backing is particularly adapted to roof construction since it helps check condensation on the underside of the slab, thus protecting the steel joists and beams and the plaster ceiling beneath.



Steeltex Floor Lath is applied by unrolling the material across joists
The roll form assures continuity of reinforcement across the entire panel, and provides, in one operation, both form and reinforcement

Floor slab being poured over Steeltex Floor Lath

TABLE OF SAFE LOADS FOR CONCRETE FLOOR SLABS USING STEELTEX FLOOR LATH

Values in table are Total Safe Loads in pounds per sq. ft. uniformly distributed, including Slab

Span of slab, inches	Size of Slab and Weight per square foot			
	2 in. (*25 lbs.*)	2½ in. (*31 lbs.*)	3 in. (*38 lbs.*)	3½ in. (*44 lbs.*)
18	436	586	736	886
20	353	475	597	718
22	292	392	494	594
24	245	330	415	499
26	209	281	353	426
28	180	242	305	366
30	157	211	266	319
32	139	186	234	281
34	123	165	207	248
36	109	146	184	222

Note: For partial continuity, i. e. $M = \frac{W1^2}{10}$ take 5/6 of loads in table.

For simply supported, i. e. $M = \frac{W1^2}{8}$ take 2/3 of loads in table.

For stress in steel other than 20,000, loads are directly proportiona to stress, thus for 16,000, take 16/20 of load in table, for 18,000 take 18/20 of load in table, etc.

Specifications for J-M Steeltex Floor Lath

(Specifications for reinforcing concrete and gypsum floors and roofs over steel joists)

Before installing Steeltex Floor Lath, joists shall be rigidly bridged in accordance with Steel Joist Institute specifications.

Steeltex Floor Lath (a 3x4-in., 12-gauge, cold-drawn, electrically-welded, galvanized wire fabric, attached to a water-resistant backing, furnished in rolls 4 ft. x 125 ft.) shall be unrolled across the joists to the desired length from the outer or bearing walls of the building. Steeltex Floor Lath shall be fastened every 12 in. along the end joist with special clips.

Steeltex Floor Lath shall be stretched taut longitudinally across the joists by a special stretcher, and clipped securely every 12 in. along the bearing to which the stretcher is attached. Steeltex Floor Lath shall then be clipped to each joist every 24 in. on joists spaced 16 in. and over, and one clip per width of roll for joists spacing under 16 in. Each clip shall face in the opposite direction from the clip adjacent to it.

Where end laps are necessary, Steeltex Floor Lath shall be lapped at least 1 ft. directly over a joist. Side laps shall be not less than 2 in.

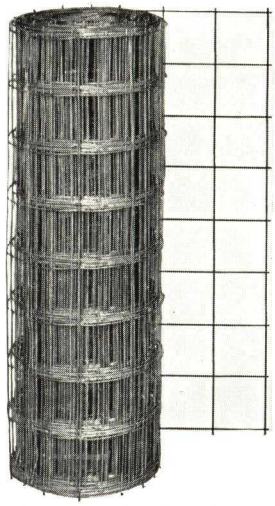
Note: Installation instructions and test information are available upon request at the nearest Johns-Manville office.

See following page for Welded Wire Reinforcement

JOHNS-MANVILLE WELDED WIRE REINFORCEMENT

For general concrete building construction, Johns-Manville supplies J-M Welded Wire Reinforcement. This is more than ordinary "steel reinforcement." It is an electrically-welded wire fabric of square or rectangular mesh, manufactured from a special high grade cold-drawn steel wire of high tensile strength and proper ductile qualities.

This welding produces an absolutely rigid connection at every joint. Distortion of the fabric is thereby prevented and, since there are no wraps, ties or clips where the members are joined, the concrete is allowed to flow freely around and completely cover every wire. The result is a perfect bond between concrete and reinforcement. Rolls are of such length as to provide an unbroken continuity of reinforcement extending across the entire width of most buildings. Full effectiveness of reinforcement is thus obtained at every section of the slab, while the almost complete absence of laps and splices reduces the required quantity of steel to the minimum.

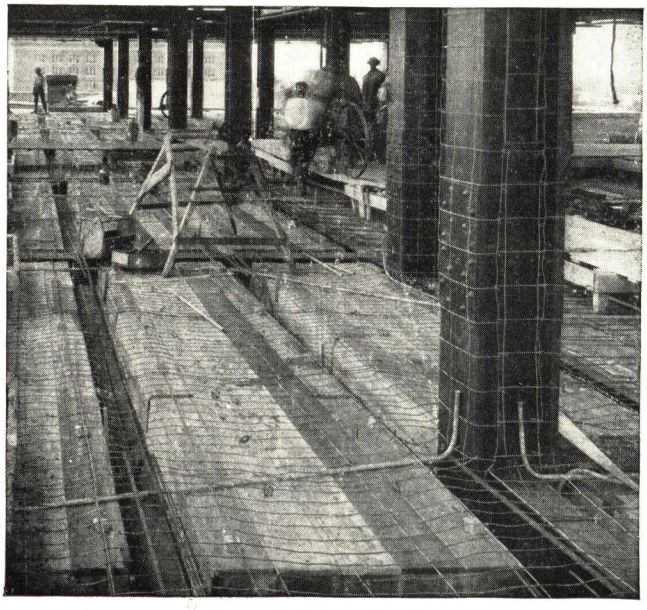


A roll of J-M Welded Wire Reinforcement

A Type for Every Reinforcing Need

Practically any desired size of mesh and gauge of wire may be obtained. *(See table of standard styles opposite.)* This wide range of selection adapts the material to a multitude of uses, including reinforcement of all types of concrete floor slab construction, concrete driveways, sidewalks, retaining walls, etc.; beam and column wrapping; fireproofing of steel framework; temperature reinforcement in top or finish layer of cement or composition floors, etc.

Finish—Plain or Galvanized as specified. *(Plain* fabric will be shipped on all unspecified orders.)



Floor and Column Reinforcing

Tensile Strength—Wire used in all types of J-M Welded Wire Reinforcement will develop 70,000 lbs. per sq. in.

Widths—*Rolls* or *Sheets:* For 4-in. spacing of longitudinal wires, maximum width is 112 in. and is measured from center-to-center of outside longitudinal wires. For 3-in. and 6-in. spacing of longitudinal wires, maximum width is 60 in., with 139 in. possible in some styles, and is measured from center-to-center of outside longitudinal wires. All tranverse wires will have close overhang (½ in. or less) unless otherwise specified.

Lengths—*Rolls:* Stock lengths 100 ft. to 300 ft. depending on style. Customer may specify length of rolls on orders not shipped from stock.

Sheets: No extra charge for sheets 6 ft. or over. Sheet length as specified by customer.

DIMENSIONS, AREAS AND WEIGHTS

SUITABLE USES	Style	Spacing, inches		Gauge of wire		Sec. Area, sq. in. per lin. ft.		Weight per 100 sq. ft. lbs.
		Long.	Tran.	Long.	Tran.	Long.	Tran.	
Gunite, Composition Flooring, Fireproofing, Etc.	AA 1414	2	2	14	14	.030	.030	21
	AA 1212	2	2	12	12	.052	.052	37
	TT 1414	3	3	14	14	.020	.020	14
	TT 1212	3	3	12	12	.035	.035	25
	TT 1010	3	3	10	10	.057	.057	41
	BB 1414	4	4	14	14	.015	.015	11
	BB 1313	4	4	13	13	.020	.020	14
	BB 1212	4	4	12	12	.026	.026	19
	BB 1010	4	4	10	10	.043	.043	31
Gunite, Waterproof Concrete Linings, Etc.	BB 88	4	4	8	8	.062	.062	44
	BB 66	4	4	6	6	.087	.087	62
	BB 44	4	4	4	4	.120	.120	85
Temperature Reinforcing, Ground Floors, Etc.	CC 1212	6	6	12	12	.017	.017	13
	CC 1010	6	6	10	10	.029	.029	21
	CC 99	6	6	9	9	.035	.035	25
	CC 88	6	6	8	8	.041	.041	30
	CC 77	6	6	7	7	.049	.049	36
	CC 66	6	6	6	6	.058	.058	42
Slab Reinforcing, Etc. (One direction only)	AH 711	2	16	7	11	.148	.008	55
	AH 610	2	16	6	10	.174	.011	65
	AH 510	2	16	5	10	.202	.011	75
	AH 49	2	16	4	9	.239	.013	89
	AH 38	2	16	3	8	.280	.015	104
	TH 711	3	16	7	11	.098	.009	38
	TH 610	3	16	6	10	.116	.011	45
	TH 510	3	16	5	10	.135	.011	52
	TH 49	3	16	4	9	.160	.013	61
	TH 38	3	16	3	8	.187	.015	72
	TH 28	3	16	2	8	.217	.015	83
	TH 17	3	16	1	7	.252	.018	96
	TH 06	3	16	0	6	.295	.022	113
	BH 711	4	16	7	11	.074	.008	30
	BH 610	4	16	6	10	.087	.011	35
	BH 510	4	16	5	10	.101	.011	40
	BH 49	4	16	4	9	.120	.013	48
	BH 38	4	16	3	8	.140	.015	56
	BH 28	4	16	2	8	.162	.015	64
Beam Wrapping, Fireproofing, Etc.	BD 1313	4	8	13	13	.020	.010	11
	BD 1214	4	8	12	14	.026	.008	12
	BD 1212	4	8	12	12	.026	.013	14
	BD 1112	4	8	11	12	.034	.013	17
	BD 1012	4	8	10	12	.043	.013	20
Concrete Shapes, Etc.	BD 912	4	8	9	12	.052	.013	23
	BD 812	4	8	8	12	.062	.013	27
	BD 711	4	8	7	11	.074	.017	33
Slab Reinforcing, Driveways, Ramps, Etc.	BF 1012	4	12	10	12	.043	.009	19
	BF 912	4	12	9	12	.052	.009	22
	BF 812	4	12	8	12	.062	.009	26
	BF 711	4	12	7	11	.074	.011	31
	BF 610	4	12	6	10	.087	.014	37
	BF 510	4	12	5	10	.101	.014	42
	BF 49	4	12	4	9	.120	.017	50

Note: The "Style" letter and numerals refer respectively to the spacing of wires and to the gauge of wires; for instance, "BD" means 4-in. spacing of longitudinal wires and 8-in. spacing of transverse wires, and "1112" means No. 11 gauge longitudinal wires and No. 12 gauge transverse wire.

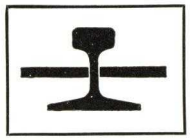
RAIL STEEL BAR ASSOCIATION

CHICAGO, ILLINOIS

ESTABLISHED 1911

ASSOCIATED PRODUCERS OF RAIL STEEL CONCRETE REINFORCEMENT BARS

ALABAMA: BIRMINGHAM—Connors Steel Company
CANADA: HAMILTON, ONT.—Burlington Steel Company, Limited
CANADA: MONTREAL, QUE.—Canadian Tube & Steel Products Limited
ILLINOIS: CHICAGO—Calumet Steel Company
ILLINOIS: CHICAGO—Inland Steel Company
MISSOURI: ST. LOUIS—Laclede Steel Company
MISSOURI: ST. LOUIS—Missouri Rolling Mill Corporation
NEW YORK: SYRACUSE—Eckels-Nye Steel Company
NEW YORK: TONAWANDA—Buffalo Steel Company
OHIO: CINCINNATI—The Pollak Steel Company
PENNSYLVANIA: FRANKLIN—Franklin Steel Works
TENNESSEE: KNOXVILLE—Knoxville Iron Company
TEXAS: FORT WORTH—Texas Steel Company
WEST VIRGINIA: HUNTINGTON—The West Virginia Rail Company



Standard Specification for Reinforcement Bars

Quoted verbatim from the American Concrete Institute Building Code, 1936 edition, the following specification is considered universal standard practice:

> *Metal reinforcement shall conform to the requirements of the Standard Specifications for Billet-Steel Concrete Reinforcement Bars (A.S.T.M. Serial Designation A15-35), or for Rail-Steel Concrete Reinforcement Bars (A.S.T.M. Serial Designation A16-35).*

This brief standard form provides complete requirements for source, quality and testing, and is in agreement with recommendations by the Joint Committee on Concrete and Reinforced Concrete, National Board of Fire Underwriters, and similar national authority. By adopting this universal standard as office practice architects and engineers are assured a complete up-to-date specification for reinforcement bars.

Rail Steel in Canada and for Federal Work

In Canada, Rail Steel bars are specified to be in accordance with CESA Specification G-31-1930. For Federal work the standard is Federal Specification QQ-B-71. Each is equivalent to A.S.T.M. Specification A16-35.

Source and Manufacture of Rail Steel

First produced over 40 years ago, Rail Steel bars today are rolled under standard processes by associated producers of the United States and Canada. Selected rails, the only raw material, are inspected, graded, rolled into billets and reduced to bars. Research and production service are provided by the Association laboratory and consultant metallurgist.

Association Quality Mark on Rail Steel

Positive identity of grade, source, quality and strength is provided by an Association quality mark (the rail symbol) on all deformed Rail Steel bars produced by associated mills in the United States. Rail Steel must not be confused with re-rolled steel.

Maximum Working Stresses with Rail Steel

Modern codes and design recommendations acknowledge the high tensile values of Rail Steel bars and permit their use at maximum working stresses with resulting economy and increased safety factor. Minimum and average tensile properties of Rail Steel (lb. per sq. in.) are:

Elastic limit .....50,000 min. 65,000 average.
Tensile strength ....80,000 min. 100,000 average

Modulus of elasticity (30,000,000) is identical with milder grades and permits Rail Steel to be used interchangeably or in combination with these grades.

Overload and Impact Resistance of Rail Steel

High tensile strength and toughness, basic Rail Steel properties, contribute to its proved overload resistance. Termed a favorable design consideration (U. S. Bureau of Standards, Bulletin BH-9) this high strength of Rail Steel resists crack formation due to overload. Studies of actual explosions, hurricanes and other disaster loadings demonstrate maximum resistance of Rail Steel to failure and collapse—an added safety factor.

Uniformity and Dependability of Rail Steel

Tests sponsored by the National Research Council (Proceedings 1931) showed a variation coefficient of 3.8 per cent for a full day's production of Rail Steel, this being reported a "very high degree of uniformity". Similar surveys of large commercial quantities shipped over long periods show equivalent uniformity and dependability. These tests included tensile, bending and hardness determinations.

Send for Detailed Information

For many years the Rail Steel Bar Association has aided engineering development, actively participating in the work and studies of eminent technical societies and research agencies. For detailed information and published engineering reports on any question relating to Rail Steel, inquiries are invited by the Association.

UNITED STATES GYPSUM COMPANY

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see File Index for USG Catalog on Roof, Floor and Partition Products

RED TOP EXPANDED METAL

(ECONO MESH)

Introductory

Red Top Expanded Metal (Econo Mesh) is a fabricated diamond mesh steel material of high elasticity manufactured by The UNITED STATES GYPSUM COMPANY at its Warren, Ohio, Steel Products Plant. Its diamond shaped meshes range from 3x8 in. down to ½x1 3/16 in. Engineer and contractor alike find definite advantages in using expanded metal as a reinforcement for the many forms of concrete slab work of moderate span and load, since the correct amount of reinforcing can be predetermined.

The smaller meshes present an ideal open mesh material for the construction of open partitions, window and door guards, elevator enclosures, machine guards, etc., and similar items that require a rigid open mesh material.

For Concrete Work

Red Top Expanded Metal offers marked advantages over reinforcing systems composed of tied or interlaced units. Some of its many advantages are: (1) Ease and rapidity with which it can be properly placed by unskilled workmen and with less supervision. (2) Lightens the designer's responsibility, because the correct amount of steel is determined at the time of manufacture, and cannot be altered by careless or ignorant workmen. (3) Provides a perfect bond, minimizing shocks, concentrated loading, etc., as stresses are evenly distributed over entire area. (4) Large, convenient size sheets, which lie flat without stretching.

The more popular reinforcing uses are for floor and roof slabs of moderate span and load, retaining walls, loading platforms, porch floors, culverts, sea walls, reservoirs, small bridges, tanks, foundations, columns, vaults, fireproofing, beam wrapping, etc.

For Open Partitions, Industrial Uses, etc.

Because it permits good visibility and has great rigidity, Red Top Expanded Metal is used extensively in many industries. It is particularly adaptable for the making of Open Partitions, Window and Door Guards, Machine Guards, etc. Its moderate cost, efficiency, durability and the ease with which it can be formed and framed commend it for this wide range of service. Red Top Expanded Metal can be framed with angle iron, U-edging, Red Top Frame Bar, or Red Top Partition Bar. These and other accessories are also furnished.

Some of its present uses in various industries are: Skylight guards, conveyor enclosures, elevator shaft and cage enclosures, fire door guards, mill trucks, trays and baskets, open shelving, ventilating fan enclosures, refuse burners, live stock pens, filter screens, truck body enclosures, stairway enclosures, brake shoe binder.

The UNITED STATES GYPSUM COMPANY does not manufacture partitions, guards, etc. Its interest is confined to the distribution of the necessary materials for their construction, together with any advisory service that can be rendered. Names of reliable fabricators will also be furnished to those who prefer to have their safety and industrial devices built for them. Interesting descriptive literature on the many industrial uses for Red Top Expanded Metal is also available.

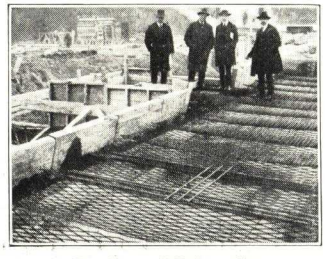
Shelf-X, Flattened Expanded Metal

Except for the fact that it has the advantage of a flat surface, Shelf-X has the strength, rigidity, workability, and economy features of Red Top Expanded Metal. It is widely used for shelving purposes and many other uses requiring a rigid open mesh material. Some Shelf-X uses are: refrigerator shelves, cabinet shelves, stove grilles, ventilating grilles, drying trays, display panels. Can be had in ½, ¾, and 1½ inch meshes cut from 13, 16, and 18 gauge steel.

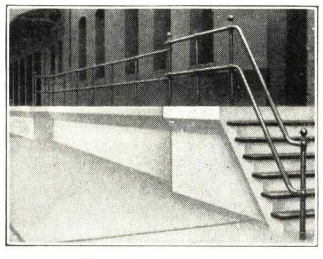
STOCK SIZES AND WEIGHTS OF EXPANDED METAL

Style Numbers	Size of mesh, in.	U. S. std. gauge number	Sq. inch sect. area per foot of width	Weight lbs. per sq. ft.	Width short way of mesh	Length long way of mesh feet
Meshes for Reinforcing Concrete						
3-13-075	3 x8	13	.075	.25	6′ 4″	8, 10, 12
3-13- 10	3 x8	13	.10	.34	7′ 0″	8, 10, 12
3-13-125	3 x8	13	.125	.42	5′ 8″	8, 10, 12
3- 9- 15	3 x8	9	.15	.51	7′ 0″	8, 10, 12
3- 9-175	3 x8	9	.175	.60	6′ 0″	8, 10, 12
3- 9- 20	3 x8	9	.20	.68	5′ 3″	8, 10, 12
3- 9- 25	3 x8	9	.25	.85	4′ 2½″	8, 10, 12
3- 9- 30	3 x8	9	.30	1.02	7′ 0″	8, 10, 12
3- 9- 35	3 x8	9	.35	1.19	6′ 0″	8, 10, 12
3- 4- 40	3 x8	4	.40	1.36	4′ 7″	8, 12
3- 4- 45	3 x8	4	.45	1.53	4′ 1″	8, 12
3- 4- 50	3 x8	4	.50	1.70	7′ 4″	8, 12
3- 4- 55	3 x8	4	.55	1.87	6′ 8″	8, 12
3- 4- 60	3 x8	4	.60	2.04	6′ 1½″	8, 12
2¼-13-10	2¼x6	13	.10	.34	7′ 0″	8, 10, 12
2¼-13-15	2¼x6	13	.15	.51	4′ 8″	8
Special Meshes for Open Partitions, Industrial Uses, etc.						
1½″ No. 18	1⅜x3⅛	18	.06	.25	4′ 0″	8′ 0″
1½″ No. 16	1⅜x3⅛	16	.12	.41	4′ 0″	8′ 0″
1½″ No. 13	1⅜x3⅛	13	.18	.65		8′ 0″
1½″–.68 lb.	1⅜x3⅛	13	.20	.68	4′0″ and 6′0″	8′ 0″
1½″ No. 10	1⅜x3⅛	13	.24	.79	4′0″ and 6′0″	8′ 0″
1½″ No. 9	1⅜x3⅛	9	.375	1.19	6′0″	8′ 0″
¾″ No. 16	¾x2⅛	16	.15	.57	6′6″	8′ 0″
¾″ No. 13	¾x2⅛	13	.24	.87	4′0″ and 6′0″	8′ 0″
¾″ No. 10	¾x2⅛	13	.35	1.19	4′0″	8′ 0″
¾″ No. 9	¾x2⅛	9	.53	1.80	4′0″	8′ 0″
½″ No. 18	½x1 3/16	18	.21	.70	4′0″ and 6′0″	8′ 0″
½″ No. 16	½x1 3/16	16	.29	.87	4′0″ and 6′0″	8′ 0″

CONCRETE REINFORCING USES

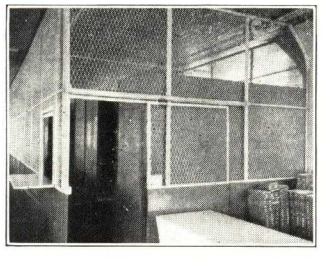


Roads and Sidewalks

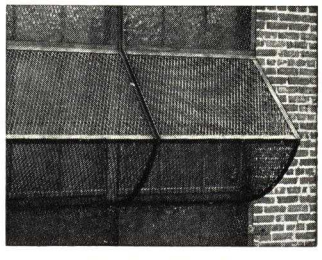


Loading Platforms

INDUSTRIAL USES



Open Partitions



Window Guards

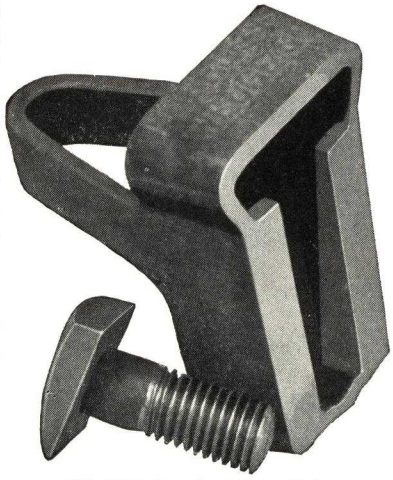
UNION STEEL PRODUCTS CO.

"Union" Reinforced Concrete Specialties

408 Pine Street
ALBION, MICHIGAN

Peerless Wedge Adjustable Shelf Angle Support

The Peerless Wedge is a powerful insert designed to securely hold, in properly adjusted position, the shelf angles commonly used to carry veneer or exterior facing of building walls.

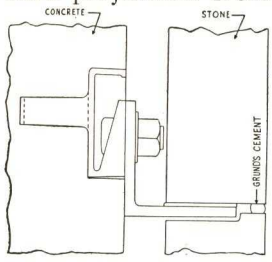


US 425—for the 5/8-in. Bolt
US 436—for the 3/4-in. Bolt
(Patented)

The vertical adjustment is provided for by the slotted opening in the face of the insert. The method of locking the shelf angle in its properly adjusted position is provided by the inside sloping faces that make up the slides of the slot mentioned above and a special askew head bolt on which the angle of offset of both is exactly the same, insuring the greatest possible amount of bearing of head against the shoulders of the Peerless Wedge which in turn insure slip-proof locking of the shelf angle in position without depending upon friction. Notice the lower picture which gives a sectional view.

The Peerless Wedge is very easily applied to the inside of the form at the exact position where it is designed to be by the architect or engineer and held in place by three common nails, holes for which are provided in the Wedge casting. No drilling of the forms is necessary because bolts are not inserted until the actual operation of placing the shelf angles is taking place.

The Peerless Wedge is particularly advantageous to install in hard-to-get-at places because it eliminates awkward projections from the wall which complicates the setting of the exterior facing. This also reduces to a very minimum the amount of chipping of this material and generally speeds up the entire operation of stone setting. The angles are placed only when the exterior facing comes up to the level at which these angles are to be placed.



The Very Nature of a Shelf Angle Makes It Impossible to Place a Load on Any Except an Eccentric Basis
(Patented)

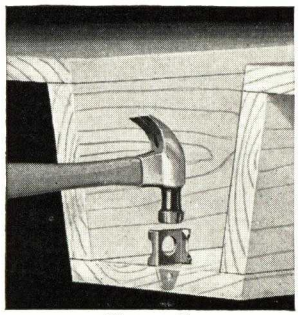
Special length bolts can be supplied up to 3 in. Can be furnished with *Rust-proof Plating*

The Peerless Wedge is designed to take care of all eccentricity of the load and also to hold this with a very fine margin of safety.

The 5/8-in. size has been tested for loads almost up to 5 tons and the 3/4-in. size has held 5 tons per Wedge, both of which are considerably in excess of the safe loading of the shelf angles themselves and in excess of recommended loading on the wedges. Although under ordinary circumstances it will never be necessary, under extremely peculiar circumstances it might be desirable, to put a reinforcing bar through the loop of the insert for additional bond.

The Peerless Wedge is made of high grade malleable iron and it is so cast that under all working loads there shall be no spring nor distortion of the metal. Rigidity which is essential in a wall support is an inherent quality of the Peerless Wedge.

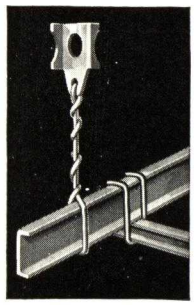
Nailer Ceiling Insert



(Patented)

The Nailer Ceiling Insert is, we claim, the most practical and economical of ceiling supports on the market.

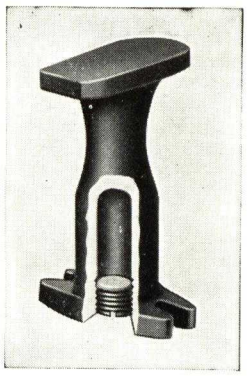
It is made of 14-gauge hard steel in such a manner that it can be driven into the forms wherever a hanger is desired and upon removal of the forms the blade with a hole for a pencil rod or wire or strip metal hanger is exposed beneath the concrete. Each insert will hold approximately 1000 lbs. in good rock concrete.



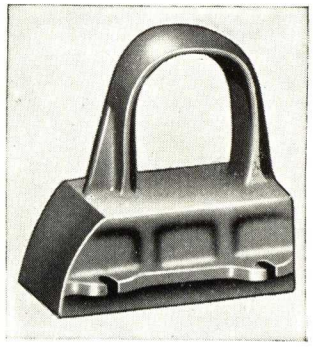
(Patented)

Use of the Nailer Ceiling Insert permits the installation of either ordinary metal lath or hi-rib. Another important feature is that the form lumber is not destroyed or damaged but can be used just the same as if no Nailer Ceiling Insert had ever been driven into it and all of these features make this a very economical installation.

Inserts



Tapped
(Patented)



Malleable
(Patented)

Besides Nailer Ceiling Inserts, Union also manufactures two other general types, the Tapped Insert made of cast iron with a screw thread, illustrated at the left, and the Malleable Adjustable Insert illustrated at the right. These are ceiling hangers and are not recommended for shelf angle support.

The Tapped Insert is for lighter loads and pipe hangers, and the Malleable Adjustable Insert is used to support heavier piping and machinery hangers.

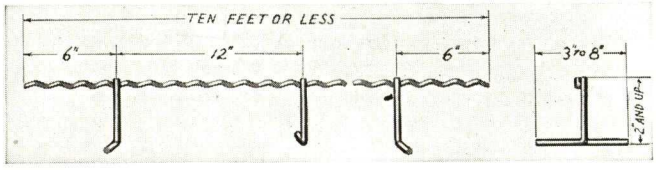
The Tapped Inserts are made for 1/4, 5/16 and 3/8-in. threads, and the Malleable Adjustable Inserts are made for 5/8 and 3/4-in. bolts.

Continuous Hi Chairs

Continuous Hi Chairs are used to support the top bars in slabs or the bent-up bars at columns, beams or girders. This Continuous Hi Chair is more rigid and the height is more uniform and exact than when individual high chairs and rods are wired together.

No assembling or nailing to forms necessary. The supporting bar has L-shaped legs rigidly welded every 12-in. along its lengths. Place the Continuous Hi Chair strip in the proper place on the forms and they are ready to support the steel. Ideal for metal deck forms.

Continuous Hi Chairs are *rigid* and *strong*. They are made of $\frac{5}{16}$-in. hard steel wire. The vertical L-shaped support every 12-in. prevents sagging and will easily hold up bars under the severest treatment. The corrugations in the top bar prevent the reinforcing bars from sliding together or apart.



(Patented)

Cost is 10% to 25% less than header bars and individual Hi Chairs.

Continuous Slab Bar Spacers and Beam Bar Spacers

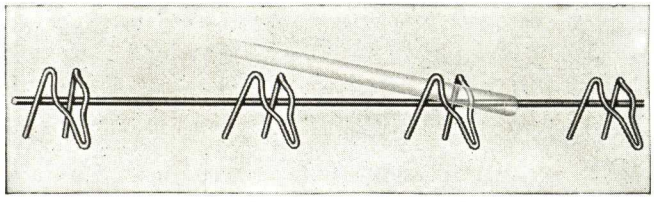
Continuous Slab Bar Spacers and Beam Bar Spacers are similar in construction to the Continuous Hi Chair, except that the legs are spaced 5-in. centers and 2-in. centers, respectively, and made of wire sizes that meet the requirements of the Concrete Reinforcing Steel Institute specifications.

Snap-In Slab Spacers

Support, space and tie the bars.

The supporting clips are welded along the longitudinal rod any desired spacing. The steel setter merely places the continuous strips on the forms and snaps the bars in place. Each bar is rigidly held in place and supported by three legs directly under the bar.

Snap-In Slab Bar Spacers are made to order in lengths not to exceed 10 ft., and the clips are spaced at any desired spacing. They are made in ½, ¾, 1, 1½ and 2-in. heights. The Snap-In clips will hold ⅜, ½ and ⅝-in. bars.



Snap-In Slab Spacers US 117
(Patented)

Snap-In Beam Bar Spacers that lock in place regular beam reinforcing bars are supplied similar in construction to Snap-In Slab Bar Spacers but of wire heavy enough to take care of the heavier loads which they support.

Expansible Reed Clips

Reed Expansible Clips have been acknowledged by leading architects and contractors as the most effective means of reinforcing the fireproofing on structural beams and columns.

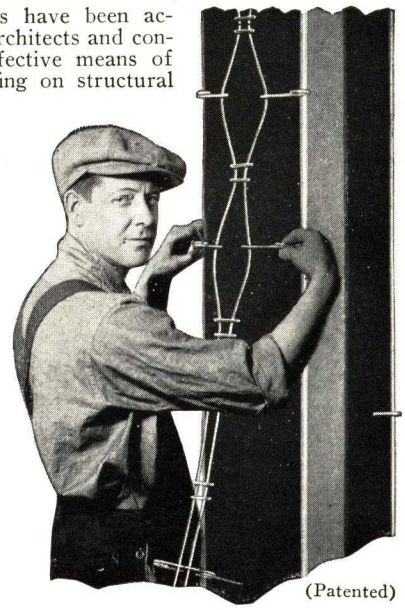
The clip is made in convenient 4 and 4½-ft. lengths.

Two widths of clip wrap all flanges from 3 to 16-in. wide.

On the average job the cost of Expansible Clips will be less than any other form of wrapping.

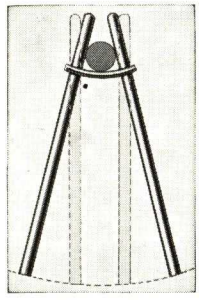
Reed clips do not obstruct the flow of concrete; cannot be dislodged from the flanges during the pouring operation; and being so open, do not cause voids in the concrete.

They are made of No. 12-gauge galvanized wire, electric welded at every joint. They are also made of No. 10-gauge wire to comply with requirements of Federal specifications.



(Patented)

U-Lock Hi Chair



(Patented)

The U-Lock Hi Chair is the only Hi Chair on the market that locks the supporting bar in place.

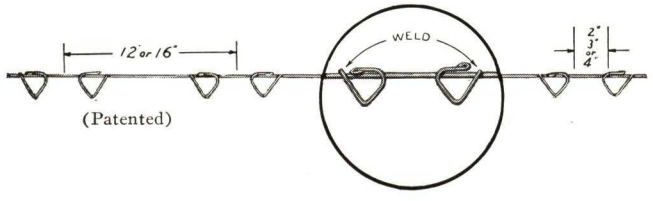
These chairs are shipped to the job with the top open and by placing the support bar in its seat and spreading the legs the bar is locked and the chair is part of the complete supporting unit, which can be moved around at will as the job requires.

The U-Lock Hi Chair provides four supporting legs with the ends of each support in contact with the form and with sufficient spread to prevent tipping.

It is made in any height from 2-in. up and of heavy hard steel wire which varies in size according to the height.

Sleeper Anchors

The Union Continuous Sleeper Anchor provides the most economical and satisfactory way of anchoring wood sleepers or screeds on any construction where wood floors are to be placed on top of concrete slabs.



(Patented)

Each pair of clips welded to the spacing bar forms a perfect and complete anchor for each wood sleeper which will provide solid floors and eliminate squeaks.

The anchors themselves are easily placed and depending on center to center spacing they are placed either four or five at a time without the necessity of measuring or using templets. Merely start at one side of the building and work across and you know the results will be satisfactory.

UNITED STATES STEEL CORPORATION SUBSIDIARIES

CARNEGIE-ILLINOIS STEEL CORPORATION
PITTSBURGH and CHICAGO

COLUMBIA STEEL COMPANY
SAN FRANCISCO, CALIF.

TENNESSEE COAL, IRON & RAILROAD COMPANY
BIRMINGHAM, ALA.

UNITED STATES STEEL PRODUCTS COMPANY, New York, N. Y., Export Distributors

A DEPENDABLE SERVICE GOES WITH THIS DEPENDABLE PRODUCT
U·S·S CONCRETE REINFORCING BARS

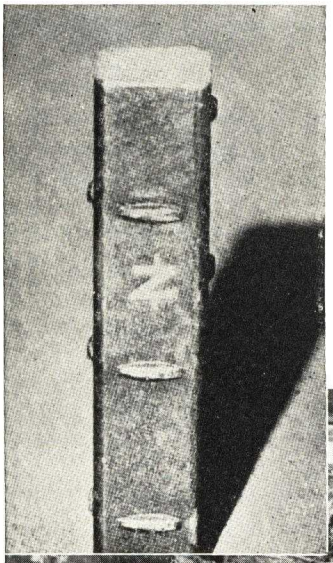
When you specify U·S·S Concrete Reinforcing Bars, you benefit in four ways.

Prompt delivery is part of our reputation. Eliminate delays, losses in time and money. Specify U·S·S.

Efficient distribution is accomplished by a widespread network of distributors. There is a warehouse near you in miles and hours.

U·S·S Concrete Reinforcing Bars are rolled in *eleven standard sizes* from new billet steel. All bars carry the Quality Mark of the Concrete Reinforcing Steel Institute as illustrated here. A permanent record of heat numbers and mill tests kept by us is your assurance that U·S·S Concrete Reinforcing Bars will meet your requirements.

A *complete service* is yours for the asking. We are equipped to cut and bend U·S·S Concrete Reinforcing Bars to your specifications. Call our nearest district sales office or your distributor.

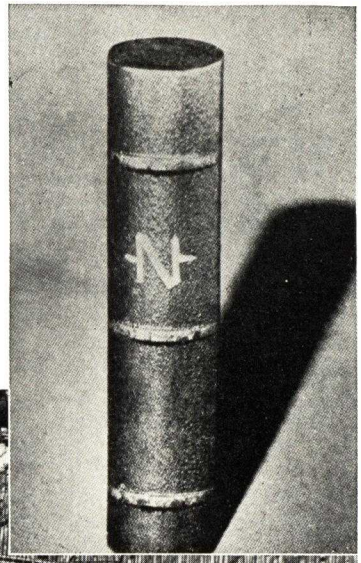


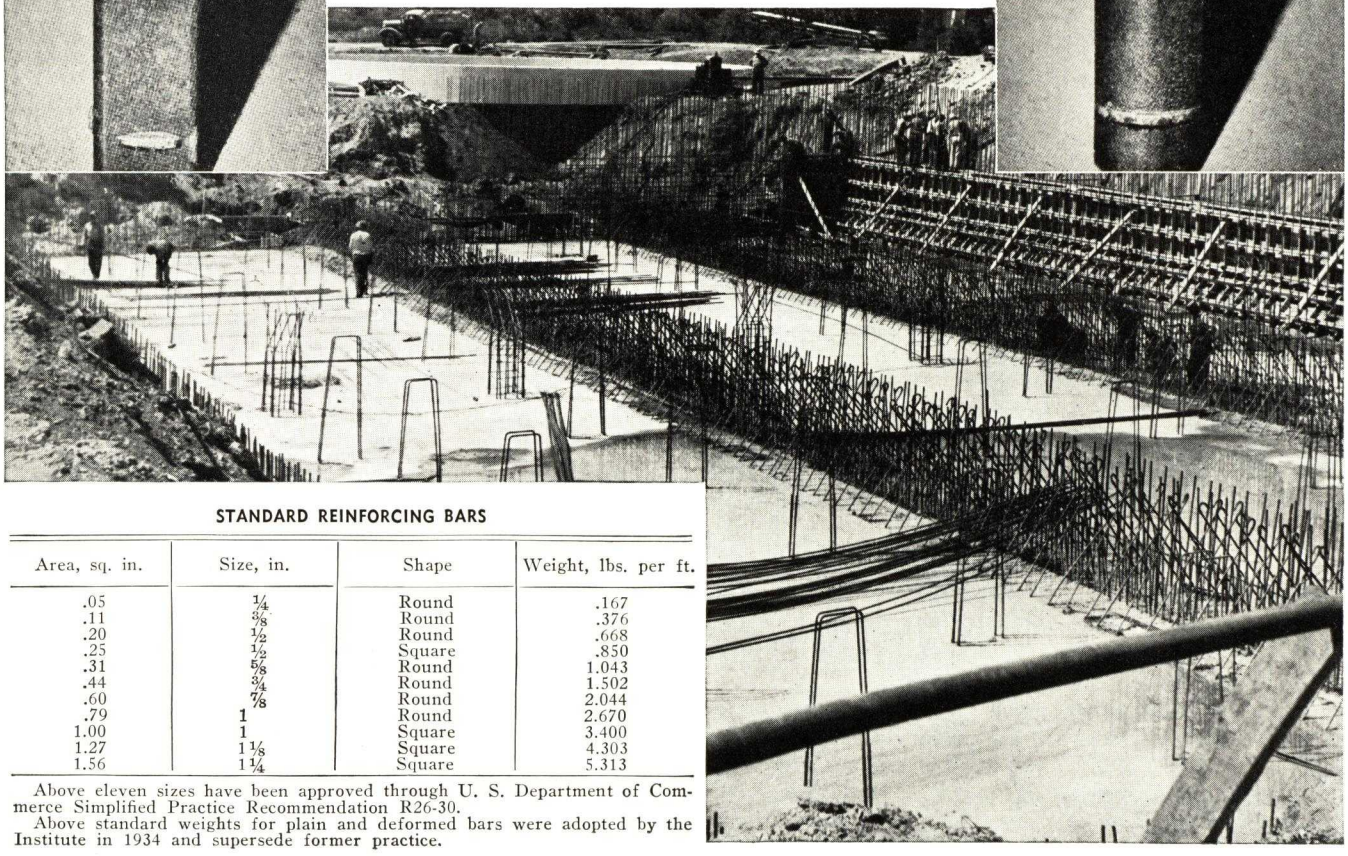
In addition to the Concrete Reinforcing Steel Institute mark of quality, shown on these bars, concrete reinforcing bars made by UNITED STATES STEEL CORPORATION SUBSIDIARIES bear the following mill identification marks:

Carnegie-Illinois Steel Corporation, Pittsburgh and Chicago—"C" or "G". Duluth—"D".

Columbia Steel Company, San Francisco—"C" inside of a diamond.

Tennessee Coal, Iron & Railroad Company, Birmingham—"T".





STANDARD REINFORCING BARS

Area, sq. in.	Size, in.	Shape	Weight, lbs. per ft.
.05	¼	Round	.167
.11	⅜	Round	.376
.20	½	Round	.668
.25	½	Square	.850
.31	⅝	Round	1.043
.44	¾	Round	1.502
.60	⅞	Round	2.044
.79	1	Round	2.670
1.00	1	Square	3.400
1.27	1⅛	Square	4.303
1.56	1¼	Square	5.313

Above eleven sizes have been approved through U. S. Department of Commerce Simplified Practice Recommendation R26-30.

Above standard weights for plain and deformed bars were adopted by the Institute in 1934 and supersede former practice.

WICKWIRE SPENCER STEEL COMPANY

GENERAL OFFICES
41 East Forty-second Street, NEW YORK, N. Y.

OFFICES AND WAREHOUSES
WORCESTER, MASS., 80 Webster Street
CHICAGO, ILL., 221 No. La Salle Street
LOS ANGELES, CAL., 214 No. Alameda Street
BUFFALO, N. Y., 70 Niagara Street
SAN FRANCISCO, CAL., 101 Townsend Street
PORTLAND, ORE., 1127 Northwest 16th Ave.

Product

CLINTON ELECTRICALLY WELDED WIRE FABRIC for Concrete Reinforcement.

For our pages on Chain Link and Iron Fences and Gates, Woven Wire Lath, Metal Grilles, and Radiator Enclosures, see File Index.

Clinton Electrically Welded Wire Fabric Scope of Use

Clinton Electrically Welded Wire Fabric is the ideal mesh reinforcement for concrete. It is extensively used in concrete floors, walls, roads, sidewalks, pipe, sewers, reservoirs, levees and all forms of concrete slab construction.

When used to reinforce floor slabs the larger longitudinal wires are located in line of greatest stress while the transverse members arranged at right angles to the longitudinal afford the most efficient means of distributing concentrated loads in a direction perpendicular to the main reinforcing members.

Because of its effective lateral as well as longitudinal strength, Clinton Welded Fabric is particularly efficient in resisting stresses caused by temperature changes.

Material—It is a square or rectangular wire mesh with its points of intersection electrically welded and can be furnished in various gauges of wire and spacings. The wire used in manufacture is a special grade of high quality steel wire that has a minimum tensile strength of 70,000 lbs.

Finish—Clinton Electrically Welded Wire Fabric can be furnished with either plain steel or galvanized wire.

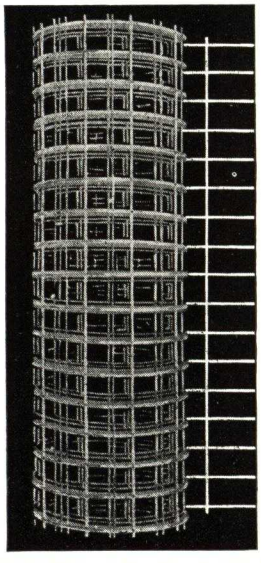
Economy and Accuracy of Installation

The fabric is delivered in rolls or sheets. Rolls any desired length not exceeding 150 ft. for heavy sizes and 400 ft. for light sizes. Great quantities can be placed quickly and accurately by unskilled labor, with the assurance that every strand is in its proper position. This renders it a simple, safe and most economical reinforcing material for all forms of slab construction.

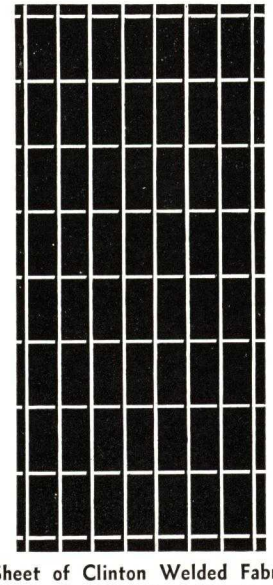
STANDARD SIZES—CLINTON WELDED FABRIC

Style No.	Spacing of wires		Size wires W&M gauge		Sec. area of steel per ft. width, sq. in.		Weight per 100 sq. ft., lbs.
	Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal	Transverse	
2x16 2/8	2	16	2	8	.325	.015	119
2x16 3/8	2	16	3	8	.280	.015	104
2x16 4/9	2	16	4	9	.239	.013	89
2x16 5/10	2	16	5	10	.202	.011	75
2x16 6/10	2	16	6	10	.174	.011	65
3x16 2/8	3	16	2	8	.217	.015	83
3x16 3/8	3	16	3	8	.187	.015	72
3x16 4/9	3	16	4	9	.160	.013	61
3x16 5/10	3	16	5	10	.135	.011	52
3x16 6/10	3	16	6	10	.116	.011	45
4x16 3/8	4	16	3	8	.140	.015	56
4x16 4/9	4	16	4	9	.120	.013	48
4x16 5/10	4	16	5	10	.101	.011	40
4x16 6/10	4	16	6	10	.087	.011	35
4x16 7/11	4	16	7	11	.074	.009	30
4x12 8/12	4	12	8	12	.062	.009	26
4x12 9/12	4	12	9	12	.053	.009	22
4x12 10/12	4	12	10	12	.043	.009	19
4x12 12/12	4	12	12	12	.026	.009	13
5x9 12/12	5	9	12	12	.021	.012	12
6x12 0/6	6	12	0	6	.148	.029	65
6x12 3/3	6	12	3	3	.093	.047	51
6x12 4/4	6	12	4	4	.080	.040	44
6x12 5/5	6	12	5	5	.067	.034	37
6x12 6/6	6	12	6	6	.058	.029	32
2x2 12/12	2	2	12	12	.052	.052	37
2x2 14/14	2	2	14	14	.030	.030	21
3x3 10/10	3	3	10	10	.057	.057	41
3x3 12/12	3	3	12	12	.035	.035	25
3x3 14/14	3	3	14	14	.020	.020	14
4x4 6/6	4	4	6	6	.087	.087	62
4x4 8/8	4	4	8	8	.062	.062	44
4x4 10/10	4	4	10	10	.043	.043	31
4x4 12/12	4	4	12	12	.026	.026	19
4x4 13/13	4	4	13	13	.020	.020	14
4x4 14/14	4	4	14	14	.015	.015	11
6x6 2/2	6	6	2	2	.108	.108	78
6x6 3/3	6	6	3	3	.093	.093	68
6x6 4/4	6	6	4	4	.080	.080	58
6x6 5/5	6	6	5	5	.067	.067	49
6x6 6/6	6	6	6	6	.058	.058	42
6x6 8/8	6	6	8	8	.041	.041	30
6x6 10/10	6	6	10	10	.029	.029	21

Above sizes regularly used—other sizes can be furnished upon request.



Roll of Clinton Electrically Welded Wire Fabric, 48-in. Width
Shipped also in sheets if desired



Sheet of Clinton Welded Fabric
Also furnished in rolls when desired

THE BULL DOG FLOOR CLIP CO.

Floor Clips, Buck Anchors, Veneer Anchors, Furring Anchors, Wall Plugs

108 North First Avenue, WINTERSET, IOWA

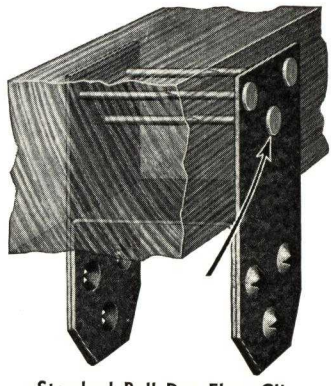
163 BRANCH REPRESENTATIVES AND 20 CONVENIENT DISTRIBUTING PLANTS

BULL DOG FLOOR CLIPS

The use of Bull Dog Floor Clips to secure strips or sleepers for wood floor laid over concrete assures both structural efficiency and economy.

Rigid tests indicate that firm anchorage is assured when our instructions are followed. This means a firm level floor, no buckle, dome, or squeak. Friction-tight nails for securing sleeper to clip are furnished gratis with all Bull Dog Floor Clips.

When Bull Dog Standard width (1¼ in., illustrated) or Bull Dog Super Junior width (1⅜ in.) is used, no fill is necessary or required. Dead air space eliminates dry rot.



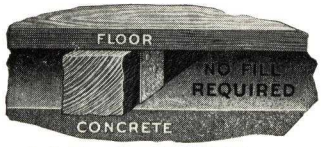
Standard Bull Dog Floor Clip

floor area, which means a proportionate reduction of reinforcing steel.

Quick delivery is assured at all times. We have 163 representatives throughout the United States with stocks maintained at 20 well-located shipping points.

Where Ordinances Require a Fill

With a fill, it is not necessary to use the Standard or Super Junior Bull Dog Clip. The Junior ⅝-in. wide (see table) is suitable for this type of construction and effects a still greater saving in anchoring floors to concrete. With sleepers spaced 16 in. on centers and clips spaced 30 in. on centers along each sleeper 300 clips are required for each 1000 sq. ft. of slab at a cost of *$6.00*. This cost is more than offset in the time and expense of bracing the strips, beveling, etc., and a large saving in expense of fill, material and labor.



Bull Dog Standard Without a Fill

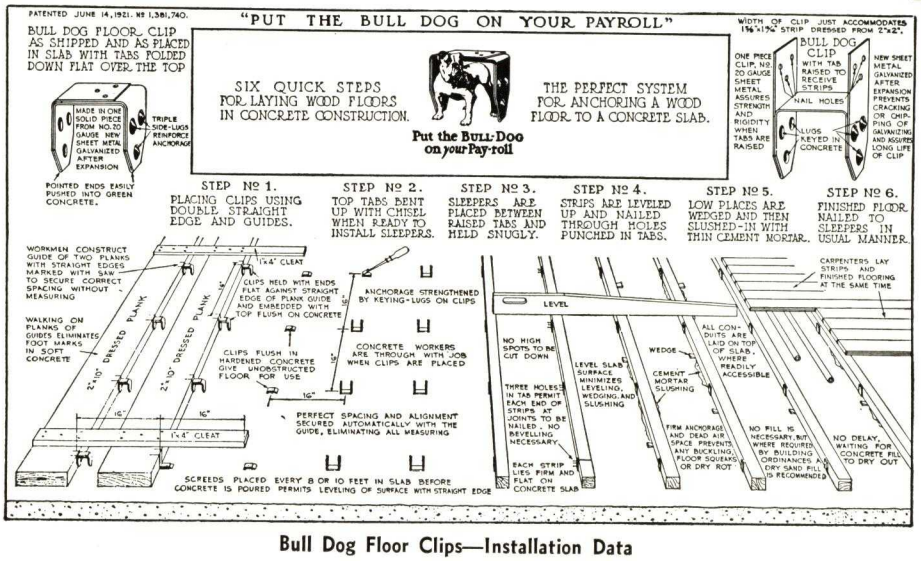
Bull Dog Junior Where Fill Is Required

BULL DOG FLOOR CLIPS FOR WOOD FLOORS ON CONCRETE NOW MADE IN THREE WIDTHS

Types	Width of G. I. metal strips	Gauge metal used	Prices	Sizes
Standard..... Used without fill	1¼ in.	20 ga.	2-in. $35.00 M 3-in. 40.00 M 4-in. 45.00 M	Each type available in three sizes to fit 2, 3, or 4-in. dressed sleepers
Super Junior..... Used with or without fill	13/16 in.	18	All sizes $25.00 M	
Junior..... Used with fill	⅝ in.	18	All sizes $20.00 M	

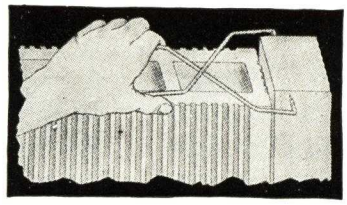
Economy

The use of Bull Dog Floor Clips saves 5¢ per sq. ft., because cost of material and labor for a concrete fill is eliminated. Bull Dog Clips can be placed rapidly, and sleepers can be laid 50% faster than if anchored by a fill material. Clips spaced 16 in. on centers require 576 anchors per 1000 sq. ft. of floor slab. This reduces dead load 18,000 lb. per 1000 sq. ft. of



Bull Dog Floor Clips—Installation Data

NEW BULL DOG BUCK ANCHOR



This buck anchor, as used in tile or other types of masonry partitions, is a time saver. It is efficient, strong, and economical. Literature and details are available.

BULL DOG WALL AND CEILING ANCHOR

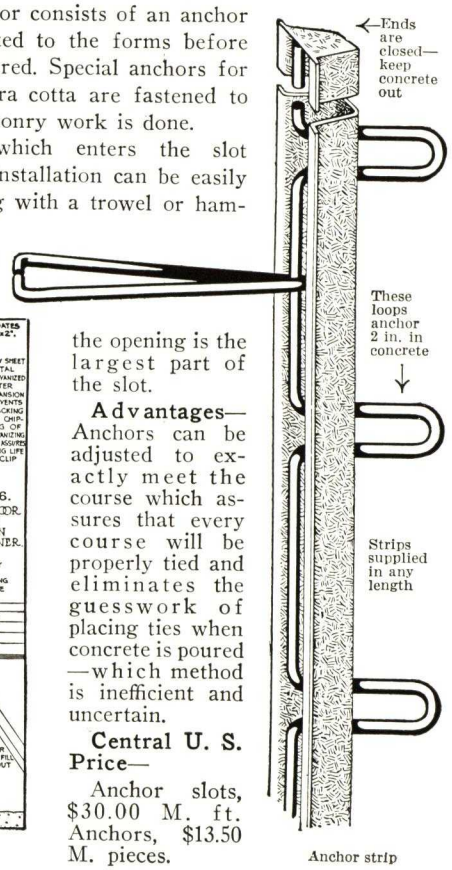
This veneer anchor consists of an anchor strip which is tacked to the forms before the concrete is poured. Special anchors for brick, stone or terra cotta are fastened to the strip when masonry work is done.

Any concrete which enters the slot through improper installation can be easily removed by tapping with a trowel or hammer, due to the half-moon shape of the slot whereby the opening is the largest part of the slot.

Advantages—Anchors can be adjusted to exactly meet the course which assures that every course will be properly tied and eliminates the guesswork of placing ties when concrete is poured—which method is inefficient and uncertain.

Central U. S. Price—

Anchor slots, $30.00 M. ft. Anchors, $13.50 M. pieces.



Anchor strip

D-B STUD AND SPREADER COMPANY

Mogul Inserts—D-B Form Spacers—Mogul Floor Clips

N. W. Bank Building
MINNEAPOLIS, MINN.

MOGUL ADJUSTABLE CONCRETE INSERTS

For Anchoring Shelf Angles, Lintels and Other Attachments to Beams and Columns

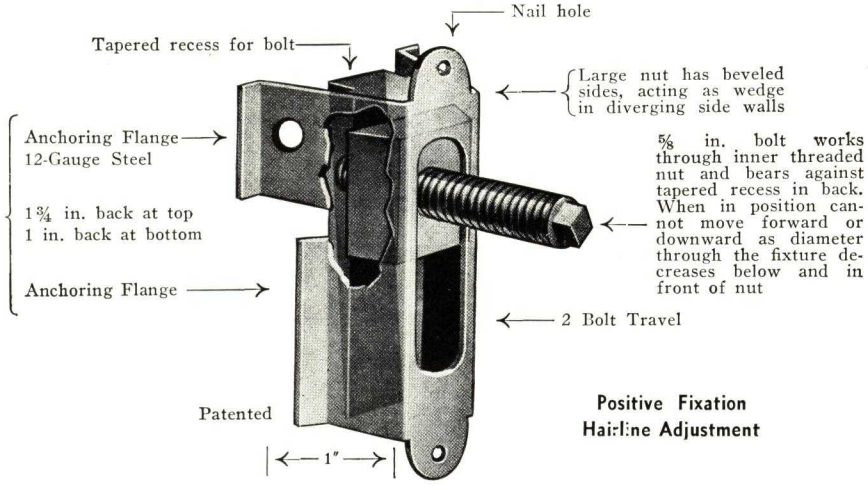
The Mogul Insert is an adjustable holder for shelf angle bolts. It provides a 2 in. vertical adjustment for the bolt, with permanent anchorage at any point desired. The position of the bolt can be adjusted to a hairline. The slotted holes in the angles provide lateral adjustment.

Thus, the Mogul Insert obviates the necessity of enlarging holes in the angles to receive misplaced bolts cast in the concrete, avoids trouble of locating bolts in the form and boring holes, eliminates cutting of masonry to fit a fixed angle previously attached, and facilitates lowering of material to workmen as no bolts protrude from the building.

Mogul Adjustable Inserts provide maximum strength and double security against failure. The wing sections are made of 12-gauge steel with diverging sidewalls. The large inner nut is beveled to fit the walls, thus providing a wedge action in the concrete by both the fixture and the nut. Concrete displacement is negligible, the contents of the box being only 3½ cu. in.

The face of every fixture is sealed watertight at the factory, and seal is not broken until the bolt is inserted. This insures a dry, clean interior. No concrete can enter.

The cost of Mogul Inserts installed is less than ordinary bolts, and they are far more satisfactory.



Specification

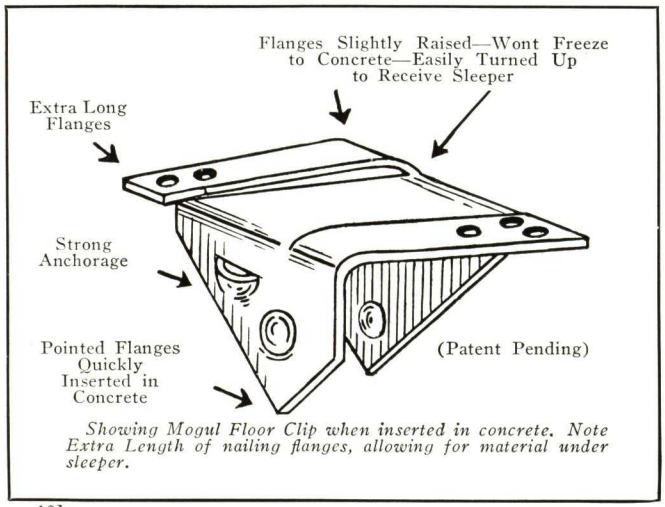
For anchoring shelf angles and lintels, install Mogul Shelf Angle Fixtures as manufactured by the D-B Stud and Spreader Company, Minneapolis, Minnesota. Fixtures shall provide a 2-in. vertical adjustment with fixation of bolt at any point, shall be coated with standard rustproof material, and shall be spaced on 30-in. centers.

MOGUL FLOOR CLIP FOR BETTER FLOOR CONSTRUCTION

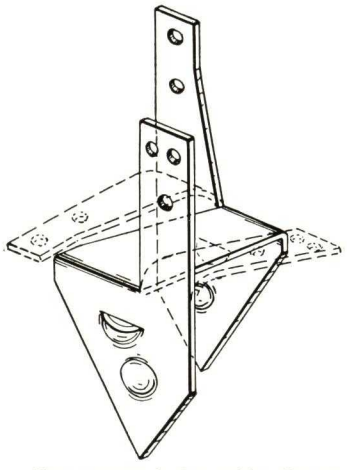
The Mogul Floor Clip eliminates concrete fill between sleepers which can be placed in one-half the time required when a fill is used. Avoids delay in waiting for fill to dry. Reduces dead weight 18,000 lbs. per 1000 sq. ft. floor space, resulting in an additional saving of 6c per sq. ft. Pipes and conduits can be placed on top of slab and under the floor. Dry air spaces prevent rotting and prolong the life of the floor.

Mogul Floor Clips are scientifically designed to provide every advantage lacking in other floor clips.

The pointed flanges that insert in the concrete are easily and quickly placed. These flanges are embossed and have inverted louvres, providing strong anchorage in slab. Nailing flanges do not freeze to concrete while it is drying. They are more easily raised into vertical position to receive sleeper. These nailing flanges are extra long, to accommodate a layer of material under sleeper, if desired. Nails do not register opposite each other to weaken sleeper, as nailing flanges are offset. Ends of sleepers can be joined within the clip. The Mogul is rustproofed after forming, leaving no raw edges to corrode. Made for 2, 3, and 4-in. sleepers Packed 500 clips per carton.



Showing Mogul Floor Clip when inserted in concrete. Note Extra Length of nailing flanges, allowing for material under sleeper.



After concrete is dry, nailing flanges are turned upward to receive sleeper. These flanges are offset. Nails do not register opposite each other to weaken sleepers. Ends of sleepers can be joined within clip.

Specifications

Where wood floors occur over concrete slabs, the sleepers shall be anchored to the concrete with Mogul Floor Clips manufactured by D-B Stud and Spreader Company, Minneapolis, Minn. Clips shall be rustproofed after they are formed, shall be spaced on 16-in. centers along sleeper course and sleepers laid in accordance with manufacturer's directions.

MEMORANDA

3/56

ANKO RITE
BUILDING PRODUCTS

BUILDING ACCESSORIES

FOR MASONRY
FOR FLOORS, WALLS
AND DOORWAYS

FLOOR ACCESSORIES CO., INC.

Philadelphia, Pa. Kansas City, Mo.

Floor Accessories Co., Inc.

In the preparation of this catalog we have endeavored to give a concise description and illustration of the application of the products shown. For brevity and to avoid duplication we have omitted our name and address in the specifications outlined. It is suggested for the benefit of contractors estimating plans that architects include "as manufactured by the Floor Accessories Co., Inc., Kansas City, Mo., or Philadelphia, Pa." Prices, information and service can be obtained from the nearest address as we have manufacturing plants and stocks at both places.

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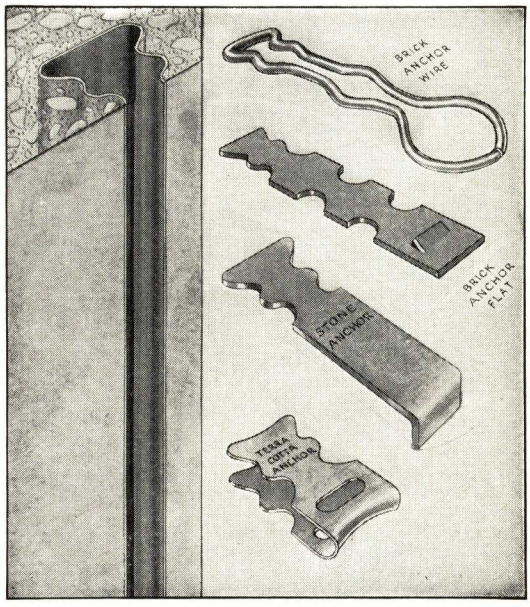
» » » MASONRY ACCESSORIES « « «

MASONRY SLOTS FOR ANCHORING MASONRY FACINGS TO CONCRETE

Ankortite Masonry Slot and Anchors provide an adjustable and secure method of anchoring brick, stone and terra cotta facings with substantial economies in time and labor.

The slot is nailed inside the concrete forms, eliminating any boring of forms and effecting a substantial labor-saving in installation as well as in stripping the forms, also in the salvage value of lumber. Thus the slot becomes an integral part of the building and the anchors which key into it are placed in the mortar joints as the masonry courses are built up.

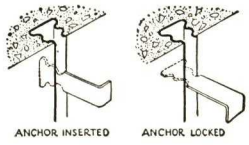
Ankortite Slot is wider at the back than at the mouth and has corrugated sides, thereby giving it the maximum anchorage in the concrete and providing two shoulders on each side to lock the anchors whose heads correspond to the contour of the slot. The slot is punched through the back on alternate sides for nailing into forms, the nails acting as an additional safeguard against the slot closing slightly from pressure of the wet concrete. Wood end blocks are furnished to prevent concrete from entering during the pouring process.



Patented

TYPICAL SPECIFICATIONS

Anchor Slots—In all concrete columns, beams or walls to be faced with brick, stone or terra cotta, the concrete contractor shall furnish and install Ankortite Masonry Slots one slot vertically in all columns up to 16 in. wide and two or more in wider columns. In all walls and beam faces the slots shall be spaced on 16-in. centers. The masonry contractor shall furnish and install anchors suitable for the types of masonry used having ends that match the contour of the slot. Anchors are required in each slot, one or more to each stone or terra cotta unit and one in each fourth course of brick.



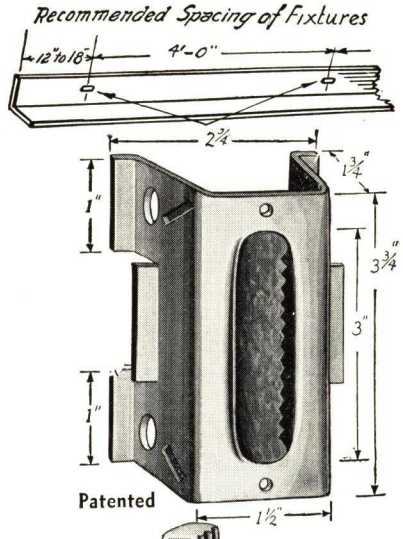
ANKORTITE SHELF ANGLE FIXTURES « « « « « « «

These Fixtures displace the use of long bolts cast in the concrete and provide bolt adjustment vertically for attaching shelf angles and lintels for supporting masonry facings. The fixtures are nailed in the concrete forms in lieu of bolts and the bolts are inserted in the fixtures as the masonry courses are built up and the proper position of the shelf angle determined.

A special advantage of placing the shelf angles as the masonry is laid is that there is no necessity for chipping or marring the masonry, as the angles are set in the mortar line wherever it occurs through the adjustment provided in the fixtures. This not only saves labor but an additional saving is also made through the elimination of measuring and boring holes through the form boards and burning holes in the angles to receive bolts that are misplaced. Where such holes are enlarged they rarely, if ever, can be made the proper size and are practically useless whereas with Ankortite Fixtures every bolt carries its load.

The Fixtures consist of a rectangular box with serrations inside which mesh with notches underneath the bolt head, preventing it from turning or slipping after the nut is tightened. The diverging sides and outwardly extending flanges give them a tremendous anchorage in the concrete with minimum displacement. Laboratory tests show their load capacity is several times the weight ordinarily placed upon them even when the heaviest masonry is used. They are used in either steel frame or reinforced concrete construction and ordinarily spaced on 3-ft. centers. The cost of the units is less, therefore, per linear foot of angle than ordinary bolts on 18-in. centers, so the saving in time, labor and form lumber as well as the better anchorage they provide is clear gain.

Ankortite Shelf Angle Fixtures are made in malleable iron or of 12-gauge steel cadmium plated after forming for rust protection. They receive either a ⅝ in. or ¾ in. lock-head bolt. The standard length of ⅝ in. bolts is 1½ in. and of the ¾ in. bolt 2 in. under the head. Longer bolts can be furnished when necessary at slight additional cost.



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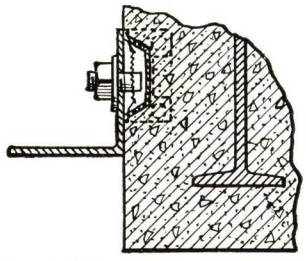
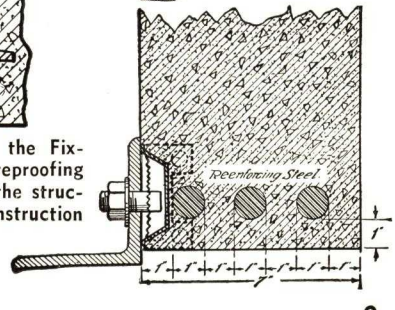




In steel frame construction the Fixtures are placed in the fireproofing eliminating bracketing from the structural steel. In concrete construction they permit re-enforcing rods to be placed within one inch of the face.

TYPICAL SPECIFICATION

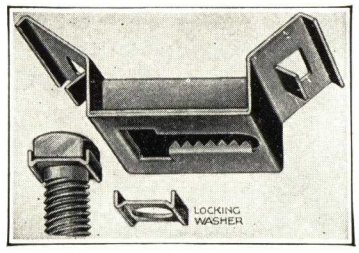
Shelf Angle Fixtures—For anchoring shelf angles and lintels to support the masonry facings, place and nail in an upright position in the concrete forms and spaced to correspond with the punchings in the angles, Ankortite steel (malleable) Shelf Angle Fixtures. Bolts for attaching the angles shall be ⅝ in. (¾ in.) lock-head type as furnished by the manufacturer.

ANKORTITE ADJUSTABLE INSERTS

Malleable Iron and Pressed Steel (Patented)

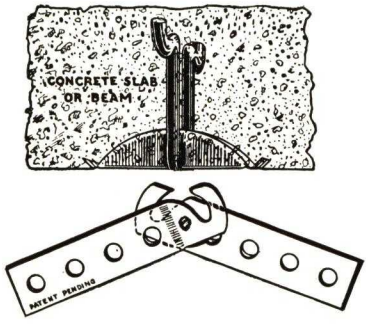
The Malleable Insert

These inserts are designed for hanging steam or water pipes, sprinkler systems, trolleys, motors, line shafts, etc. and may be used in either slab concrete or beam and girder ceilings. They are also used in floors for anchoring theatre, restaurant or stadium seats, manual training equipment, machinery and other objects where adjustment to position and solid anchorage is desired. They take ordinary machine bolts with or without the locking washer. They are made in malleable iron and 12-ga. steel. The steel inserts are cadmium plated for rust protection.



The Steel Insert

ANKORTITE HANGER INSERTS



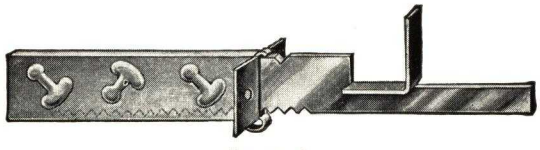
This is a most practical, convenient and economical insert for suspended ceilings, electrical conduit, lighting fixtures and similar objects to be hung from concrete slab or beam ceilings. The formed wire loop is made of No. 6 galvanized wire and anchors into the concrete. The metal shell provides the opening underneath it. The combined loop and shell is nailed in the concrete forms and when the forms are removed the loop is flush with the face of the concrete with a small opening on either side to make it accessible. If provision for future exigencies is desired, the inserts may be placed in the ceiling slab and completely concealed by the plaster until such time as they may be needed. This is especially advantageous in office and loft buildings where partitions and walls have to be changed from time to time.

We also manufacture the Ankortite Hanger Hook for use with the inserts in suspending pipes, etc. This is a double hook of strap steel perforated and riveted together near one end. It opens to engage the wire loop of the insert and when closed is absolutely locked. Perforated straps around the suspended object can then be bolted through the holes provided, making it impossible for the hooks to open. Inserts are sold with or without hooks.

TYPICAL SPECIFICATIONS

Hanger Inserts—For suspended ceilings install ANKORTITE Hanger Inserts in the bottom of the concrete joists or ceiling slab. On flat ceiling construction they shall be spaced four feet on centers both ways. On joists they shall be spaced 16 in. along the joist and in line crosswise. These inserts are nailed in wood form construction or anchored with cement pads in steel pans.

ANKORTITE FURRING SPACERS



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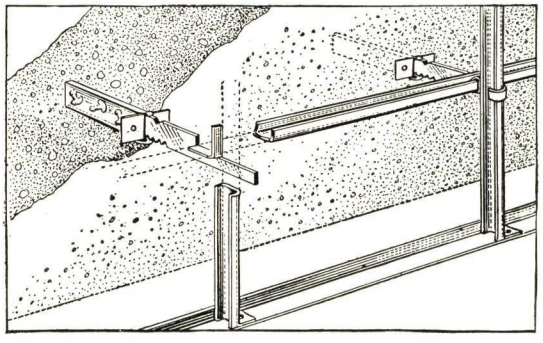


For Spacing and Anchoring Plaster Walls to Brick or Concrete, providing a dry space between and preventing moisture from reaching the plaster.

By this method the metal channel bars for supporting the metal lath are anchored to and spaced from the outside wall any distance from 1½ in. to 24 in. The unit consists of a box member which is nailed in the concrete forms or placed in the mortar line between brick or stone courses, and an anchor that locks into it and ties around the vertical channel as well as supports the horizontal channel. Both members are cadmium plated for rust protection. Ordinary channels are used.

TYPICAL SPECIFICATION

Furring Spacers—All plaster walls shall be furred from the main walls with Ankortite Furring Spacers a distance of .... inches. These spacers shall be spaced on 3-ft. centers vertically and horizontally.

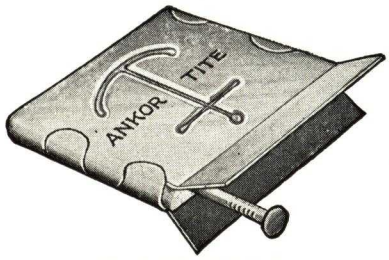
ANKORTITE WALL PLUGS

All Metal and Wood Filled

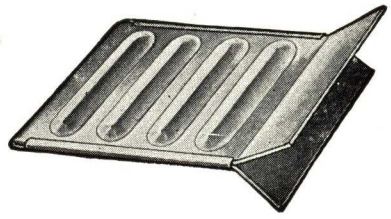
The all-metal wall plugs are 2¼ in. wide and are made of 24-ga. galvanized metal. They are made in two sizes, the larger extending into the mortar 2½ in. and the smaller size 1¾ in. The wood-filled plug has a creosoted wood filler, is 3 in. wide and extends into the mortar 2¼ in.

TYPICAL SPECIFICATION

Nailing Grounds—As nailing grounds for baseboard, chair rails or other wood trim, furnish and install in the mortar line Ankortite All-Metal (Wood-filled) Wall Plugs spaced not farther than .. inches apart.



Wood-Filled Wall Plug



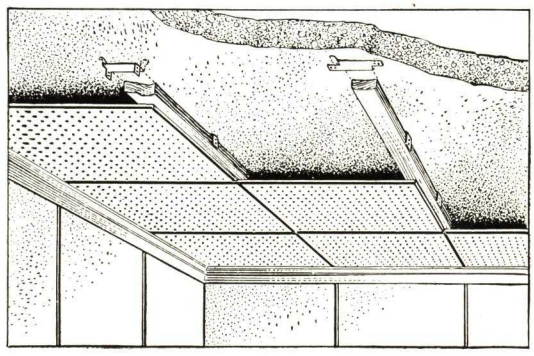
All-Metal Wall Plug

ANKORTITE ACOUSTICAL CLIP

For anchoring furring strips for attaching acoustical ceilings we have developed a special clip similar to the Ankortite Floor Clip except it is smaller and is placed in the bottom of the ceiling slab or beam forms. When the forms are removed the tabs bend down to receive the furring strips. The clips are only 1 in. wide which permits their use in connection with pan forms. They are made for 1 in., 2 in. or 3 in. widths of strips.

TYPICAL SPECIFICATION

Acoustical Ceilings—Furring strips shall be secured to the ceiling with Ankortite Acoustical Clips of the proper size to accommodate the widths of strips specified. Clips shall be placed in the concrete forms and spaced 16 inches apart in true alignment along each furring strip.



ANKORTITE FLOOR CLIPS

Ankortite Floor Clips produce the most solid wood floor anchorage to concrete slabs at the lowest possible cost. This method of setting the clips in the concrete while it is plastic and subsequently attaching the wood sleepers to them eliminates the cost and weight of a fill between sleepers and provides an air space between them that safeguards the floor from dry rot.

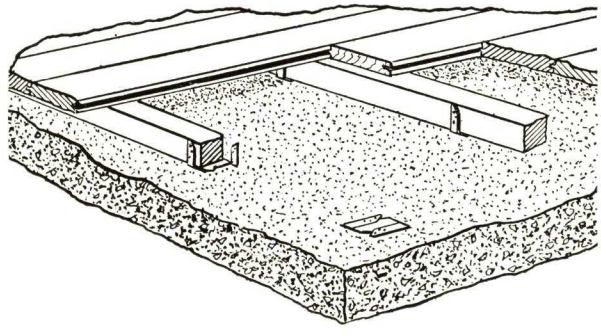
Ankortite clips are designed to meet every requirement of anchorage, strength, practicability and economy. They are made of 18-ga. galvanized metal with an embossed anchor and inverted louvre on each flange that inserts in the concrete to provide a positive anchorage in the concrete. The ends of these flanges are pointed, making them easily and quickly placed.

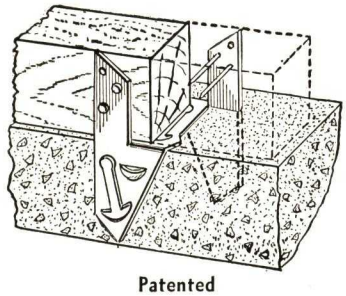
The clips lie flat on the concrete surface, leaving it free for trucking, stacking, etc., until the floor is to be laid. The tabs that receive the sleepers are then raised, the sleepers placed, leveled and nailed. The nailing tabs have a direct pull against the anchored portion of the clip and are extra long to permit nailing over uneven floor slabs. The generous width of the clip permits sleeper ends to be joined within the clip, while the nails are offset so they do not register opposite each other to weaken the sleeper.

Clips are packed 500 per carton. They are made for 2 in., 3 in. and 4 in. sleepers.

TYPICAL SPECIFICATION

Sleeper Anchors—Where wood floors occur over concrete slabs they shall be anchored with Ankortite Floor Clips spaced on 16 in. centers.





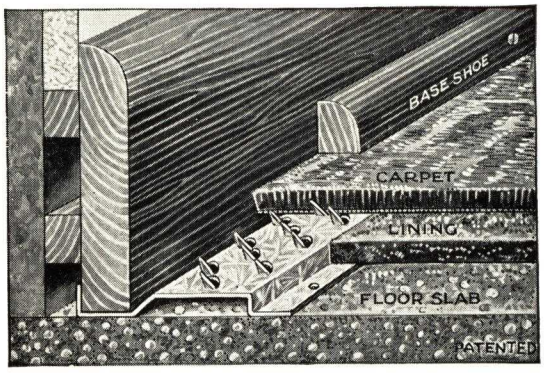
Patented

Spaced 16 in. on centers each way 570 clips are required per 1000 sq. ft. of floor area

FLOOR ACCESSORIES COMPANY, INC.

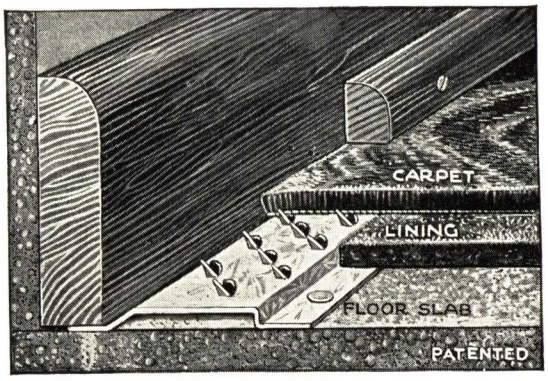
FLOORING AND WALL MATERIALS

TACKLESS CARPET STRIP



Left: Design No. 1 for installing at the same time as the baseboard.

Right: Design No. 2 for use where baseboard is already attached.

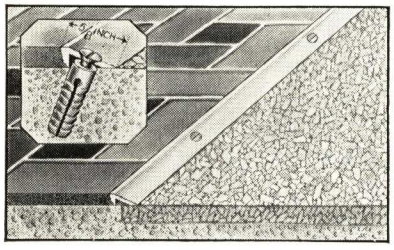


The growing use of carpets over concrete floors created a problem of fastening them. The Tackless Carpet Strip solves it in an admirable manner. The strip fits under the baseboard and is secured to the floor with concrete nails. The teeth in the strip engage the carpet from the underneath side and hold it securely, while the base shoe completes the installation. Elimination of tacks gives a perfectly smooth, sanitary carpet finish.

TYPICAL SPECIFICATION

In all rooms and corridors to be carpeted from wall to wall provide and install the Metal Tackless Carpet Strip as manufactured by the Floor Accessories Company, Inc. The base of the teeth on the strip shall be the same height as the thickness of the carpet lining.

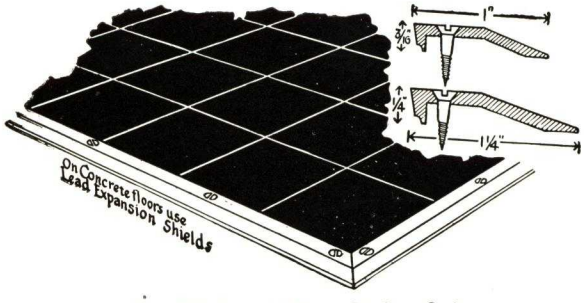
NOSINGS AND BINDERS



No. 300 Beveled Brass Binding Strip

No. 300—Brass only, for ⅛ in., $\frac{3}{16}$ in. and ¼ in. coverings.

No. 200—Brass only, for $\frac{3}{16}$ in. and ¼ in. coverings. The $\frac{3}{16}$ in. height is 1 in. wide and the ¼ in. height is 1¼ in. wide.



No. 200 Beveled Brass Binding Strip

No. 400—Brass only, 1 in. and 2 in. widths.

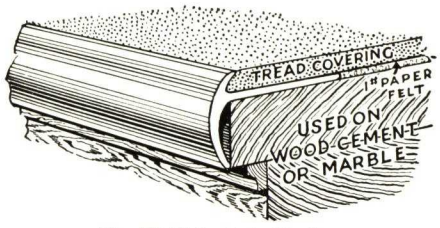
No. 50—Brass or White Metal for $\frac{3}{32}$ in., ⅛ in., $\frac{3}{16}$ in. and ¼ in. coverings.

No. 100—Brass or White Metal in 1¼ in. flange for $\frac{3}{16}$ in. and ¼ in. coverings. Brass only in 2 in. flange for $\frac{3}{16}$ in. and ¼ in. coverings.

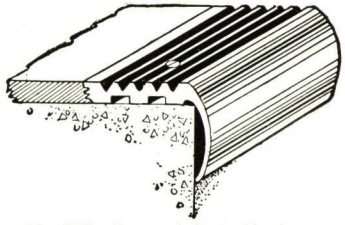
No. 600—Brass or White Metal for $\frac{3}{32}$ in., ⅛ in., $\frac{3}{16}$ in., or ¼ in. coverings.

No. 500—Brass for $\frac{3}{16}$ in. and ¼ in. coverings. White Metal for $\frac{3}{32}$ in., ⅛ in., $\frac{3}{16}$ in. and ¼ in. coverings.

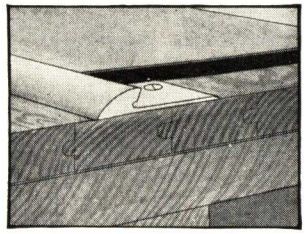
All of above may be furnished with polished or satin finish.



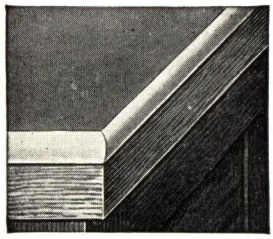
No. 50 Plain Stair Nosing



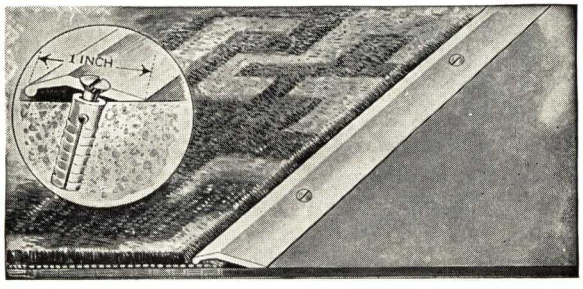
No. 100 Grooved Stair Nosing



No. 600 Floor Edging



No. 500 Desk Edging



No. 400 Carpet Binder Bar

ANKORTITE BUCK ANCHORS

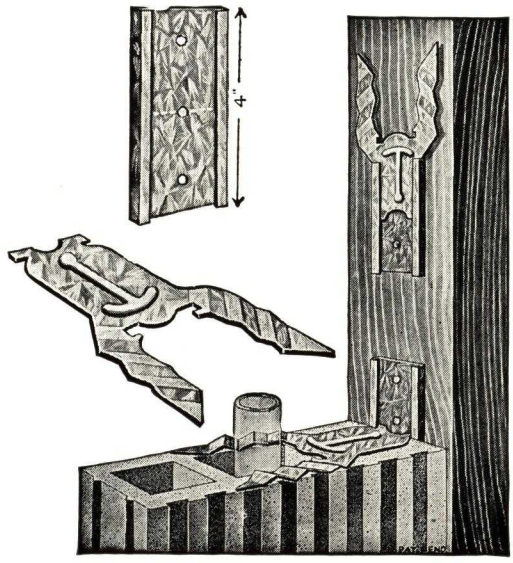
The adjustable buck anchor consists of a channel which nails to the buck and an anchor with bifurcated ends that engages it and extends into the mortar line between courses of brick, clay tile or gypsum blocks. Furnishes a positive anchorage and is conveniently in place for the mason.

The Floor Buck Anchor is nailed to the bottom of the buck then adjusted to position and nailed to the concrete floor with special nails provided. It is then covered over by the blocks.

Floor Buck Anchor

TYPICAL SPECIFICATION

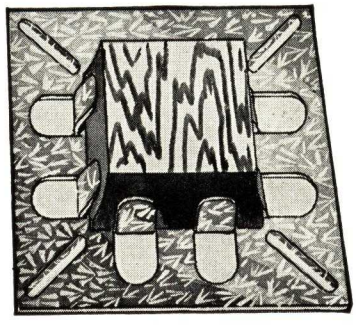
All wood bucks shall be anchored to partitions or walls with Ankortite Adjustable Buck Anchors, using three anchors to each side of the buck properly placed. Where wood bucks occur over concrete or terrazzo floors they shall be fastened to the floor with Ankortite Floor Buck Anchors with one anchor to each side of the opening.



Adjustable Buck Anchor

ANKORTITE SPOT GROUNDS

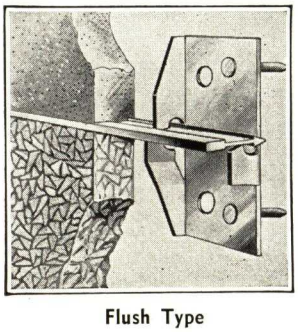
Ankortite Spot Grounds are used as a ground or base for attaching wood or metal trim, such as picture moulding, chair rails, etc., to walls. They consist of a flat metal base, which holds a wood block, and are spotted in position on the rough wall on pads of ordinary gypsum plaster. The mortar keys through the holes and holds them securely in place. The wood blocks are beveled on all four sides and when the wall is plastered this makes for additional anchorage. The blocks are Pondosa wood creosoted and will not swell or rot, nor split when nails are driven into them. Made in 5/8 in. and 3/4 in. depths to correspond to the plaster thickness.



TYPICAL SPECIFICATION

Spot Grounds—Where picture moulds and/or chair rails are shown on plans place in true alignment and on approximately 18 in. centers Ankortite Spot Grounds for a nailing base.

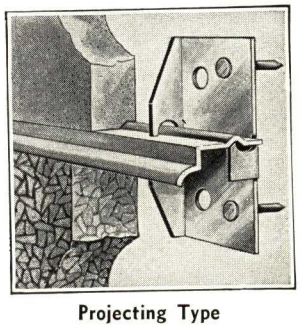
ANKORTITE BASE SCREED



Flush Type

Ankortite Base Screeds consist of a brass or white metal strip that are attached to the wall with metal base anchors on approximately 12 in. centers by nailing to wood grounds or wiring to metal lath. This method of attaching is superior to a continuous flange, since it permits both plaster and terrazzo to bond direct to the rough wall.

The flush type is furnished in thicknesses of 1/16 in. to 1/4 in., while the projecting type which extends beyond the plaster line 1/4 in. is in 18-ga. only.



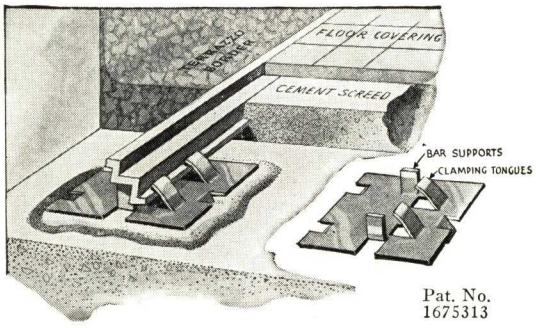
Projecting Type

TYPICAL SPECIFICATION

Base Screeds—The plaster contractor shall provide and install between base and plaster and parallel to the finished floor Ankortite Brass (White Metal) Base Screed of the flush (projecting) type of .. gauge or thickness. Where necessary wedges shall be used behind the anchors to establish the screed in a true plane with the plaster finish.

» ANKORTITE DIVIDING STRIPS AND BARS «

ANKORTITE RECESSED FLOOR BARS « « « « « « «



Pat. No. 1675313

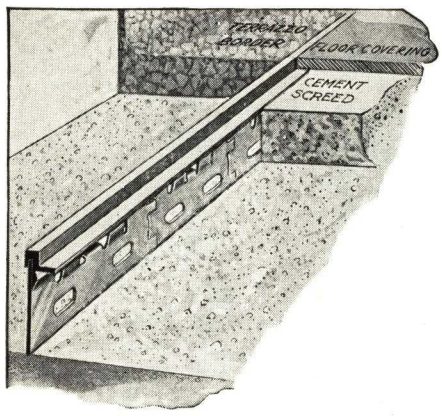
This is a heavy, rigid bar which provides an offset for linoleum or other applied floor covering over concrete where it joins a terrazzo or concrete base. It has an exposed wearing surface of $\frac{5}{32}$ in. and makes a perfect, protective joint between both materials. The top of the bar serves as a screed for finishing off the base while the shoulder of the bar is a screed for finishing the inside fill to the proper level. The Recessed Floor Bar is made in either brass or white metal for ⅛ in., $\frac{3}{16}$ in., 6 mm. or ¼ in. floor coverings.

TYPICAL SPECIFICATION

Recessed Floor Binding Bars—Between terrazzo (or cement) borders and linoleum (or rubber tile) flooring set Ankortite Recessed Brass (White Metal) Floor Bars with horizontal anchors spaced on 18 in. centers. Finish outside border flush with top of bar and inside fill flush with shoulder of bar.

ANKORTITE LINOLEUM BAR « « « « « « « «

Type 3



Patented

This bar is similar to the Recessed Floor Bar for joining terrazzo and applied floor coverings except that it has an exposed wearing surface of ⅛ in. and has vertical anchorage. The anchors are 3 in. long and may be placed end to end, forming a continuous anchoring flange, or spaced apart on 6 in., 9 in. or 12 in. centers. A reduction in price is allowed for anchors omitted.

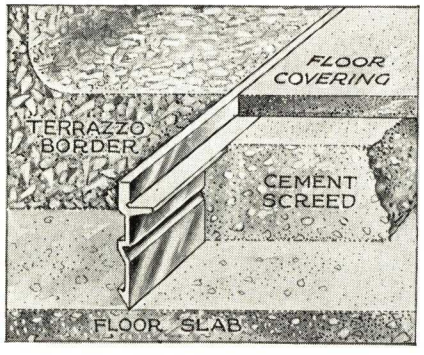
The Linoleum Bar is made in brass or white metal with the offset for ⅛ in., $\frac{3}{16}$ in., 6 mm. or ¼ in. floor covering and in over-all depths of ⅞ in., 1 in., 1¼ in. or 1½ in. Stock lengths, 6 feet.

TYPICAL SPECIFICATION

Linoleum Bar—For all fields of linoleum, rubber or compressed asphalt tile, furnish and install brass (white metal) Ankortite Linoleum Bars with offset same thickness as floor covering; bars to have continuous anchorage (or distributed anchors on 6 in., 9 in., 12 in. centers) and an over-all depth of .. inches.

ANKORTITE ONE-PIECE LINOLEUM BAR « « « « « «

Type 4



Patented

As the name indicates, the one-piece Linoleum Bar has the anchoring flange and the upper portion fabricated in one-piece so there is no possibility of the head becoming separated from its anchorage at any point. The anchoring flange is pointed, making it easily set and giving it a continuous hold in the concrete. It is extremely rigid which is another advantage in setting.

This bar is made in brass or white metal in 1 in. and 1¼ in. over-all depths and for ⅛ in., $\frac{3}{16}$ in., 6 mm. or ¼ in. coverings. Its exposed wearing surface is ⅛ in. wide. Stock lengths 6 feet.

TYPICAL SPECIFICATION

Linoleum Bars—For all fields of linoleum, rubber or compressed asphalt tile, furnish and install Ankortite Brass (white metal) One-Piece Linoleum Bars with offset same thickness of floor covering and an overall depth of 1 in. (1¼ in.).

ANKORTITE HEAVY TOP TERRAZZO BARS « « « « « «

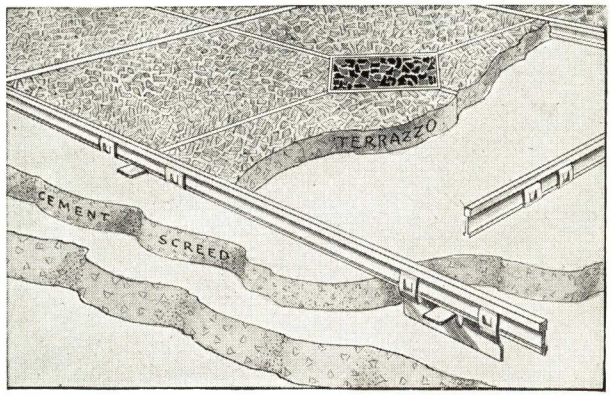
Type 2—With Distributed Anchorage

This type of bar has a number of unique features and is lower in cost than bars with a continuous anchoring flange. The anchors are spaced on the bars, usually on 6 in., 9 in. or 12 in. centers, and are slidable so that they can be moved over high spots in the slab, conduits, etc. Aside from the anchorage provided by the anchors themselves, the ledges on both sides of the bar also anchor it in the floor, making it absolutely secure.

Furnished in brass or white metal with top widths ⅛ in., $\frac{3}{16}$ in. or ¼ in. for ½ in., ⅝ in. and ¾ in. terrazzo and anchors for overall depths of 1 in., 1¼ in., and 1½ in. Stock lengths, 6 ft.

TYPICAL SPECIFICATION

Terrazzo Dividing Bars: Ankortite Dividing Bars of Brass (White Metal) with top surface ⅛ in. ($\frac{3}{16}$ in. or ¼ in.) and slidable anchor clips shall be furnished and installed in all terrazzo floors as shown on plans. The anchor clips shall be spaced on the bars on .. in. centers and imbedded in the cement screed so that the top edge of the bars will be level with the finished floor surface.



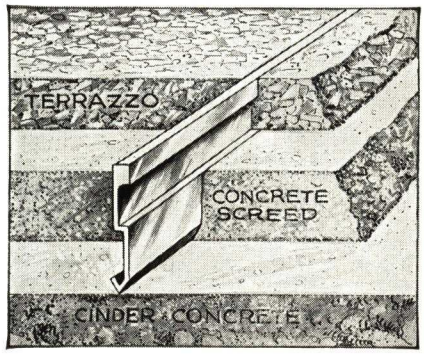
Patented
A Bar with Unique Features

Type 1—With Continuous Anchorage

The Ankortite Heavy Top Dividing Bar in one piece is a recent improvement in the construction of terrazzo strips inasmuch as the flange and heavy top are fabricated in one piece instead of attaching two separate members at intervals.

Since the object of dividing bars is to divide, so cracks cannot run from one section into another, it is important to note that this bar has no perforations through which the floor mixtures can flow, thereby making an absolute division both of the screed and terrazzo.

Being one piece, there is no possibility of the top becoming detached from the anchored portion and no separation wherever cut, nor any edgewise curvature when tapping into the cement screed. The continuous V-shaped hook on the bottom gives the bar a tremendous anchorage in the cement screed as well as making it easily placed. The ledge offset in the center serves as a depth gauge for inserting the bar in the screed and also anchors in the terrazzo coat. Cross strips may be joined at any point on either side of the bar without slicing. The bar is made of brass or white metal with tops ⅛ in., $\frac{3}{16}$ in. and ¼ in. wide and in depths of 1 in. and 1¼ in.



Patented
A Heavy Top Bar Made in One Piece

TYPICAL SPECIFICATION

Dividing Bars—Install in the cement screed underbed while still in a plastic state Ankortite Brass (White Metal) One-Piece Heavy Top Dividing Bars with a top surface of ⅛ in. ($\frac{3}{16}$ in. or ¼ in.) and an overall depth of 1 in. (1¼ in.).

Rigid Rib Type Dividing Strips

The stiffening rib through the center of the strip gives the Rigid-Rib type unusual rigidity, which is especially advantageous in the lighter gauges for setting and alignment. It also increases the anchorage afforded by the oblong lugged-out locking holes. The center of the stiffening rib serves as a depth gauge for inserting in the cement screed. This type is furnished in gauges 16 to 20 inclusive, brass or white metal, and in all standard widths. Stock lengths, 6 feet.

TYPICAL SPECIFICATION

Terrazzo Dividing Strips—Where terrazzo floors are shown install in the cement screed underbed Ankortite Rigid-Rib Dividing Strips of .. gauge B & S gauge brass (white metal) 1 in. (1¼ in.) deep.

Pat. Pending

Double Lock Type Dividing Strips

In the Double-Lock type the twin anchoring lugs are spaced on 4½ in. centers and give a tremendous anchorage as well as hold the strips firmly upright. This type is particularly recommended for strips 14-ga. and heavier which are sufficiently rigid without the stiffening rib. The strip is inserted in the cement screed to the full depth of the anchoring lugs, the top of the lugs thus serving as a depth gauge. This design can be furnished in the lighter gauges, however, if preferred. It is furnished in brass or white metal in all standard widths. Stock lengths, 6 feet.

TYPICAL SPECIFICATION

Terrazzo Dividing Strips—Where terrazzo fields are shown install in the cement screed underbed Ankortite Double Lock Dividing Strips of .. gauge B & S Brass (White Metal) 1 in. (1¼ in.) deep.

Patented

For the convenience of architects who specify and contractors who use our products we have a staff of representatives located in all of the larger cities and many of the smaller ones who will be glad to render any possible service. Likewise our facilities at both our Kansas City and Philadelphia plants are available for any assistance we may be able to render and we invite your communications.

We are equipped also to make all kinds of building anchors, wall ties, wire soffit hangers, beam spacers, etc. Quotations made upon receipt of sketches.

FLOOR ACCESSORIES CO., Inc.

14th & Chestnut Sts.
Kansas City, Mo.

D. St. Above Erie
Philadelphia, Pa.

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GRIP-TITE MANUFACTURING CO.

WINTERSET, IOWA

REPRESENTATIVES IN PRINCIPAL CITIES

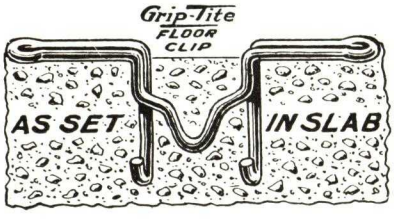
GRIP-TITE FLOOR ANCHORS

Grip-Tite Floor Anchors make it possible to efficiently and economically fasten sleepers to concrete base with out beveling or without fill.

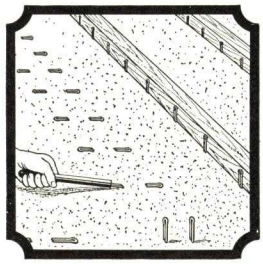
Strong and Positive—Note that the Grip-Tite Anchor has three members which are securely embedded in concrete when the slab is poured. Floors installed by the Grip-Tite method do not "move" or "squeak."

Specifications—Furnish in place according to manufacturer's directions "Grip-Tite" Floor Anchors as manufactured by the GRIP-TITE MANUFACTURING Co., of Winterset, Iowa, for attaching all sleepers where wood floor occurs over concrete. Drive wedges under sleepers from both sides to level. Nail anchors to sleeper. Slush a concrete grout of 1:5:8 mix under sleepers to give them a solid base their entire length.

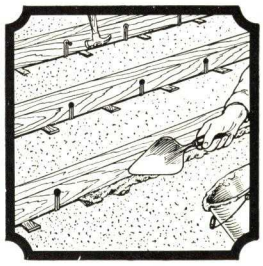
Note: If a fill is required, a dry fill will prove very efficient and economical. Fill between sleepers to within ⅛ in. of top with (dry sand—dry-fill, gypsum—insulex—cinder concrete—concrete of 1:5:8 mix, state which).



First insert anchors in wet concrete. This is quickly and accurately done by using a Plank Guide (blue print furnished free) and placing four rows before shifting



When ready to lay floor, raise the side loops of the anchor and place an ordinary 2x2, 3x3 or 4x4 between anchors. *No beveling is necessary*



Wedge sleepers up to level. Nail anchor to sleeper and grout with rich mixture of cement. *No fill is necessary* but, if specified, a dry fill will prove advantageous and economical

THE GRIP-TITE METHOD OF FLOOR SUPPORT

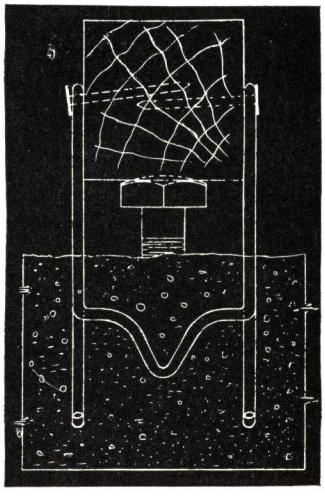
Patented March 31, 1925

Wherever wood floors occur over concrete slab, the Grip-Tite method using the Grip-Tite Floor Anchors and Grip-Tite Floor Supports absolutely assure a floor that will not "move" or "squeak." Also eliminates grouting or the use of wood shims.

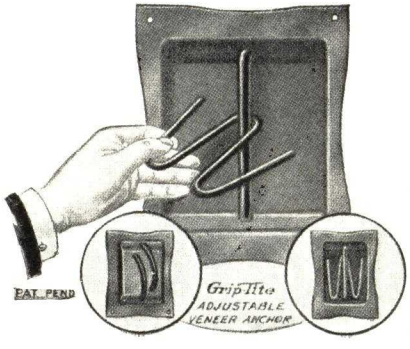
Specifications—Furnish in place according to manufacturer's directions "Grip-Tite" Sleeper Clips and "Grip-Tite" Sleeper Supports, as manufactured by GRIP-TITE MANUFACTURING Co., of Winterset, Iowa, for attaching and supporting all sleepers where wood floors occur over concrete.

At time of placing sleepers, loosen all bolts in supports, adjust them to perfect level on top, raise side loops of clips, place wood sleepers between clips and firmly down on top of supports, with all joints over supports. Nail solid with one nail to each clip loop.

After nailing, tighten all supports up under sleepers by turning bolts, raising each bolt same number of turns, according to manufacturer's instructions.

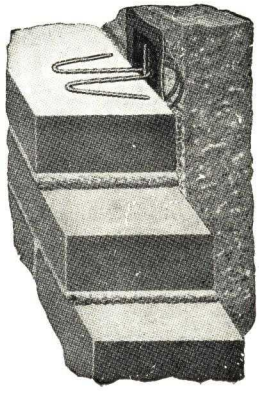


GRIP-TITE ADJUSTABLE VENEER ANCHOR



Regardless of where the Veneer Anchor is placed on the form, the anchor always lays flat between the brick mortar joints. The anchorage is all in one unit and the Veneer Anchor is in pan ready for use. The Grip-Tite Adjustable Veneer Anchor is simply tacked on the inside of the wood forms and when the forms are removed the anchor is in proper position and ready for use without any further placing of anchors.

Specifications — Where brick veneer, stone, terra cotta, or tile occurs against concrete columns or girders, use Grip-Tite Adjustable Veneer Anchors at every seventh course of brick perpendicular and on 12-inch centers laterally, or for stone and terra cotta use Grip-Tite Adjustable Veneer Anchors at every joint perpendicularly and on 12-inch centers laterally.

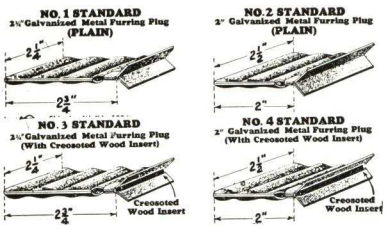


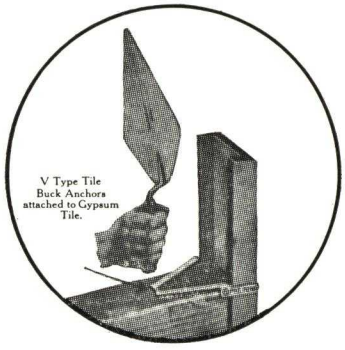
HECKMAN BUILDING PRODUCTS CO.

Manufacturers of Building Specialties

Phone
Van Buren 8564-8565

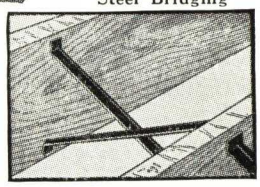
4018 West Lake Street, CHICAGO, ILL.



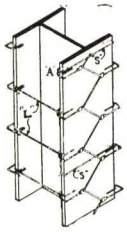


SOFFIT CLAMP

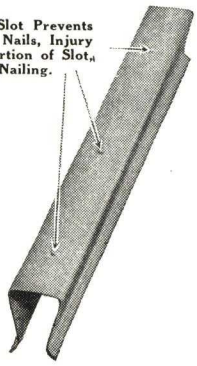
Steel Bridging



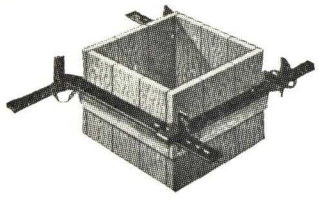
Beam Wrapping



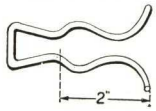
Indentations in Slot Prevents Non-Skidding of Nails, Injury to Fingers, Distortion of Slot, and insures Easy Nailing.



COLUMN CLAMPS

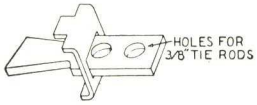


Slot Furring Wire Anchor

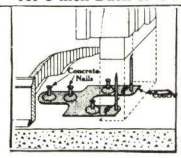


"V" Type Buck and Tile Anchor

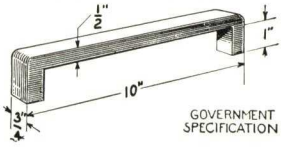
Slot Terra Cotta Anchor



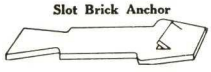
Concrete Floor Buck Anchor with Nails for 3 inch Buck or Over



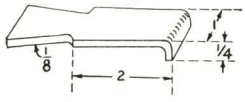
STANDARD ½" x ¾"x10" STONE CRAMP
DIPPED IN ASPHALT PAINT



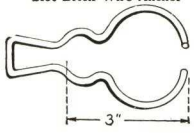
Slot Brick Anchor



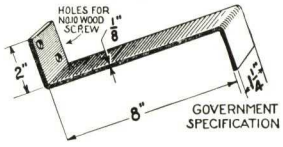
Slot Furring Anchor



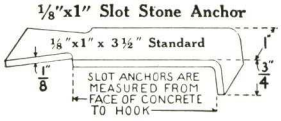
Slot Brick Wire Anchor



Buck and Frame Anchor
"Z" Shaped Dipped in Asphalt Paint



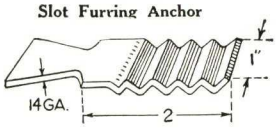
⅛"x1" Slot Stone Anchor



WEDGE SPACER-TIE

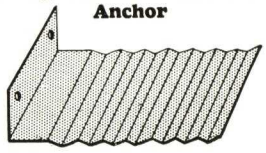
The new wall tie for the new way of tying forms.

Slot Furring Anchor

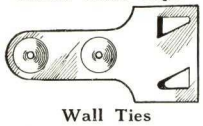


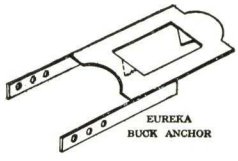
Stone Anchors "Z" Shaped

Corrugated Buck and Frame Anchor

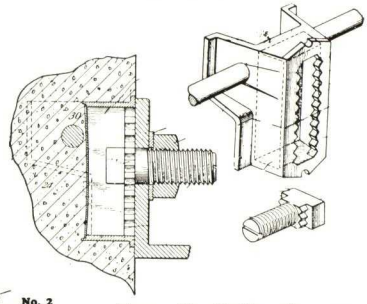


Corner Bead Clips





"LAST WORD" ADJUSTABLE INSERTS



Wall Ties

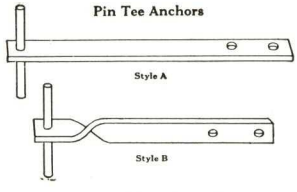
No. 1 Standard Combination

No. 2 Whale Bone Combination

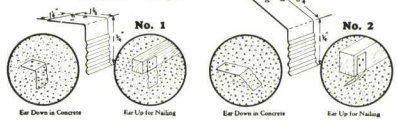
No. 3 Duplex Combination

Threaded Inserts

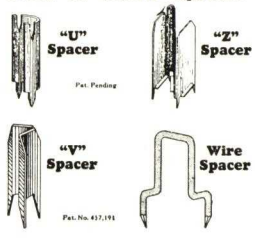
Pin Tee Anchors



"L" Type Sleeper Floor Clips

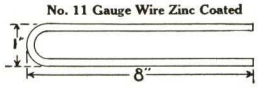


Form Or Soffitt Spacers

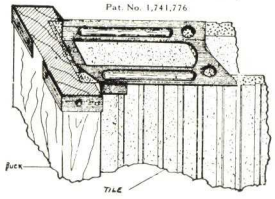


"U" Shaped Wire Wall Tie

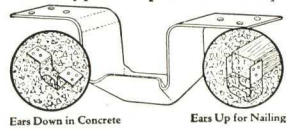
No. 11 Gauge Wire Zinc Coated



Split Tail Buck Tile Anchor
(Made in two sizes, 3 and 4 inch)
Pat. No. 1,741,776



"U" Type Sleeper Floor C'ips



Looped Wire Wall Tie

No. 10 Gauge Wire

V-W COMPANY

Tiger Sleeper Anchors

218 Oak Street, COLUMBUS, OHIO

ADams 3054

Tiger Sleeper Anchor Features

Cannot Loosen or Pull Out—Tiger Sleeper Anchors (or Floor Clips) are guaranteed not to loosen or pull out. Examination of their construction will prove that they are built so as to become firmly embedded in the concrete. They last as long as concrete.

Set Flush—"Tigers" set flush with the concrete slab surface without obstruction during other stages of construction.

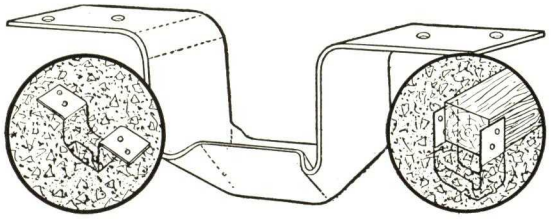
Low Cost—Although efficient, Tiger Anchors are low in price.

Easily and Cheaply Placed—Tiger Anchors are easily and speedily placed in fresh concrete. Just shove in place—that is all until time to place sleepers.

Air Circulation—Dry air space between sleepers eliminates moisture forming, prevents termites and dry rot.

Placing Tiger Sleeper Anchors

A simple guide can be made by using two planks, spaced 12 in. apart from left edge to left edge, and held by strips that extend 12 in. past left edge of plank; 16-in. marks for placing are staggered on the two planks so that two rows can be laid simultaneously. For spacing sleepers 16 in. on centers, space boards 16 in. from left edge to left edge and extend strip 16 in. past left edge. For 24-in. spacing, mark guide boards accordingly.



"Ears" Down on Concrete — "Ears" Up for Nailing

Notice in diagram below how small paddle pushes "Tigers" easily into concrete. Many contractors use pliers, holding with them at narrow cuplike section of anchor, as they push it into concrete.

As paddle or pliers are removed, concrete flows in, filling cup and securely holding anchor in place. These methods are much speedier than by hand.

Suggested Specification

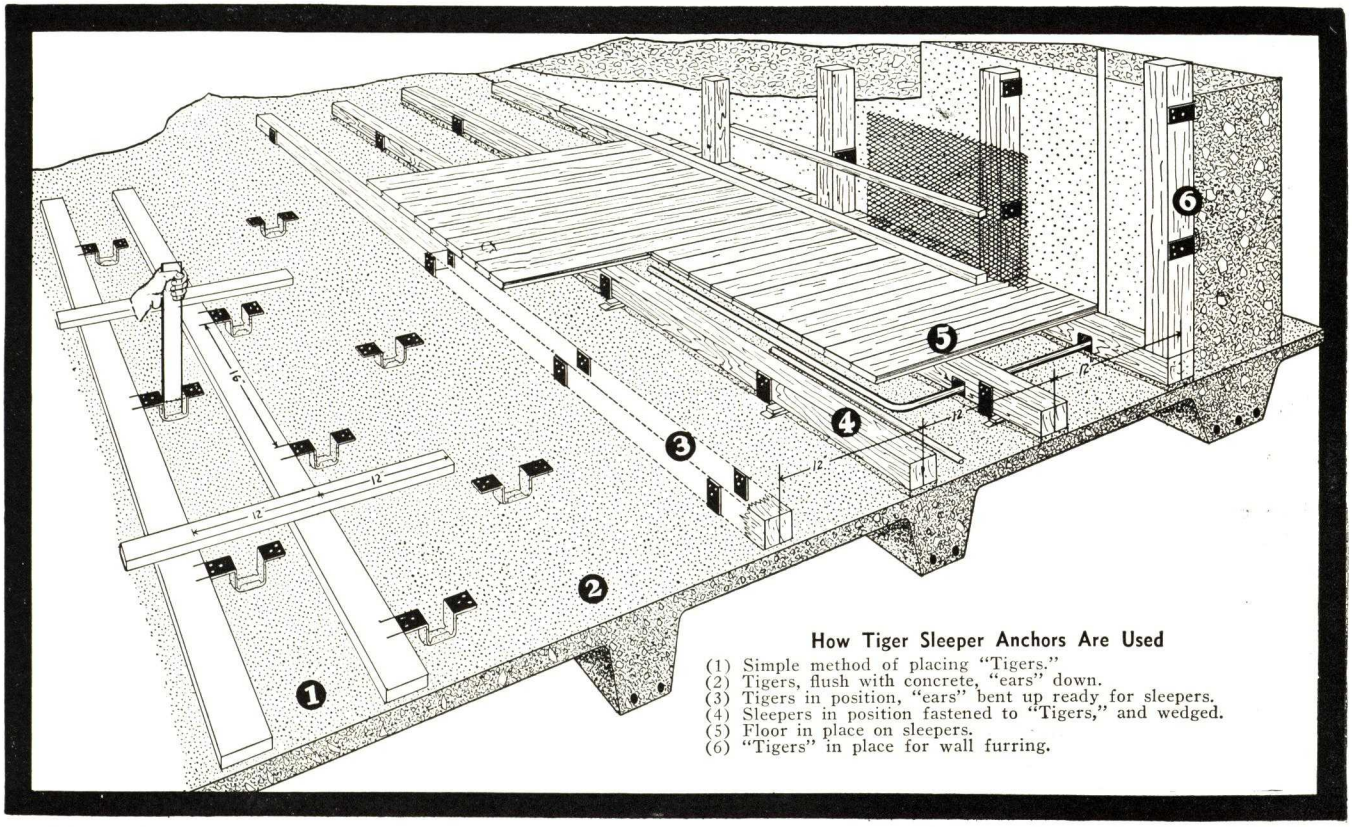
Immediately after pouring concrete upon which wood flooring is to be placed, insert Tiger Sleeper Anchors, manufactured by V-W Company, Columbus, Ohio, of 1¼-in. No. 20 U.S.S. gauge steel, electro-plated with pure zinc. Each anchor will have two vertical side arms joined at lower ends by a horizontal, cup-shaped continuation of side arms that permits it to slide easily into concrete and keeps it from loosening after concrete has set. The upper end of each side arm extends outward horizontally, and can be easily bent to a vertical position when ready to nail sleepers. Anchors will be spaced ... inches on center along ... inch wide sleepers spaced ... inches on center.

HOW TO CALCULATE THE NUMBER OF "TIGERS" REQUIRED

Sleeper spacing, in.	Anchor spacing, in.	"Tigers" per 1000 sq. ft.
12	16	800
16	16	600
12	24	550
16	20	500
16	24	400

Standard sleeper widths: 1⅝, 1¾, 2⅝ and 3⅝ in.

Price Delivered—$25.00 per thousand "Tigers," including electro-zinc-plated nails.



How Tiger Sleeper Anchors Are Used

(1) Simple method of placing "Tigers."
(2) Tigers, flush with concrete, "ears" down.
(3) Tigers in position, "ears" bent up ready for sleepers.
(4) Sleepers in position fastened to "Tigers," and wedged.
(5) Floor in place on sleepers.
(6) "Tigers" in place for wall furring.

Hid-in Wallboard Clips (Patented) — Give a quicker, stronger means of attaching fibre board and acoustical treatment to walls and ceilings without exposed nail heads or glue.

V-W Built-in Ventilators (Patented) — Have vertical R-shaped louvres which check air as it enters, thus giving perfect *ventilation without* draft, dirt, rain or snow. Fine for hospitals and office buildings.

AMERICAN CONCRETE EXPANSION JOINT CO.

221 North LaSalle Street
CHICAGO, ILL.

ACE JOINTS FOR EXPANSION AND CONTRACTION

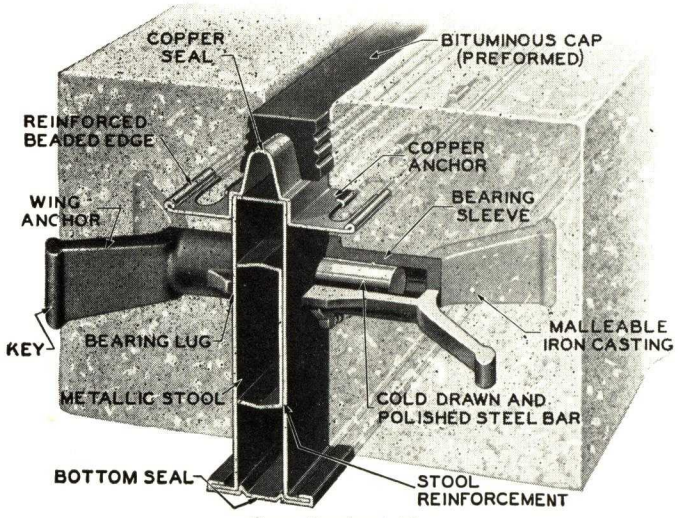
(Copper Sealed-Metallic)

AND

J-BARS for LOAD TRANSMISSION BETWEEN SLABS for

Swimming Pools—Reservoirs—Canal Linings—Warehouse Floors—Docks—Buildings—Industrial Plants—Sidewalks—Driveways—Air Port Runways—Bridges—Railroad Viaducts

ACE JOINTS and J-BARS effectively join adjacent slabs in a wide variety of concrete construction so that free movement is permitted when occasioned by expansion or contraction. The use of ACE JOINTS in the construction of highways, retaining walls and floors prevents transverse cracking, rupturing and disintegration of the concrete.



Cross Sectional View

ACE JOINTS protect parapet walls against pressure from roof slabs. Watertightness is always assured. The unrestricted movement of the slabs is permanently maintained and transmission of loads by means of J-BARS across the joint is satisfactorily provided and proper structural strength insured.

ACE JOINTS

ACE JOINTS form their own bulkhead—concreting may be carried on continuously, without pouring alternate slab sections. Substantial savings in time and labor enable contractors to do better work and make real economies possible. Outstanding examples of the manner in which ACE JOINTS have made construction cheaper, stronger and more durable are found in swimming pools and reservoirs.

ACE JOINTS provide a truly scientific division of slabs with permanent joints forming free air spaces, permitting natural expansion and contraction without injury to the structure. Such air spaces, standardized at one inch in width, are kept clear of foreign matter by copper seals securely anchored to slabs on each side of joint. Premolded bituminous caps are secured to tops of the copper seals. Thus, a permanent compressible seal is formed that will *not extrude* beyond surface level of the slabs during their normal expansion and contraction movement.

J-BARS

J-BARS offer the latest and most improved method of transmitting loads across transverse joints between slabs. J-BARS keep slabs in perfect alignment and permit the free unobstructed movement of slabs caused by expansion and contraction.

J-BARS are easy to install and possess approximately twice the carrying capacity of the ordinary ¾-in. dowel.

TYPES

ACE JOINTS and J-BARS are manufactured in a variety of types for wall, floor and roof construction.

Detailed information and a highly informative booklet will be mailed on request. Our Engineering Department solicits the opportunity to consult with you, without obligation, as to the application of ACE JOINTS and J-BARS to your particular problem.

THE DUPLEX HANGER CO.

East 53rd Street and Lakeside Avenue

CLEVELAND, OHIO

BRANCH OFFICES

BOSTON, MASS., 88 Broad Street
CHICAGO, ILL., 6310 Wentworth Avenue
NEW ORLEANS, LA., 3728 So. Prieur Street
NEW YORK, N. Y., 16 Warren Street
PHILADELPHIA, PA., 1316 No. 18th Street
PORTLAND, ORE., 316 S. E. Madison Street

Products

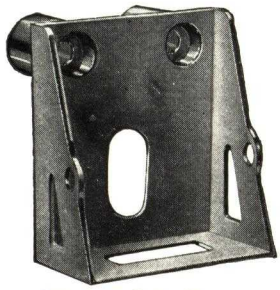
"DUPLEX" JOIST, WALL, CONCRETE BLOCK and I-BEAM HANGER; "DUPLEX" POST CAPS, POST BASES, WALL PLATES and WALL BOXES, for warehouses, factories, heavy mill construction and all other wood constructed buildings.

For Duplex Incinerators, see File Index.

When Specifying

"Duplex" hangers and post caps are designed with a large factor of safety to carry timbers for which they are intended. If architects and engineers, when using hangers and post caps, specify "Duplex," proper hangers and post caps for the timbers will be furnished. Specifications are to be included in carpentry specifications.

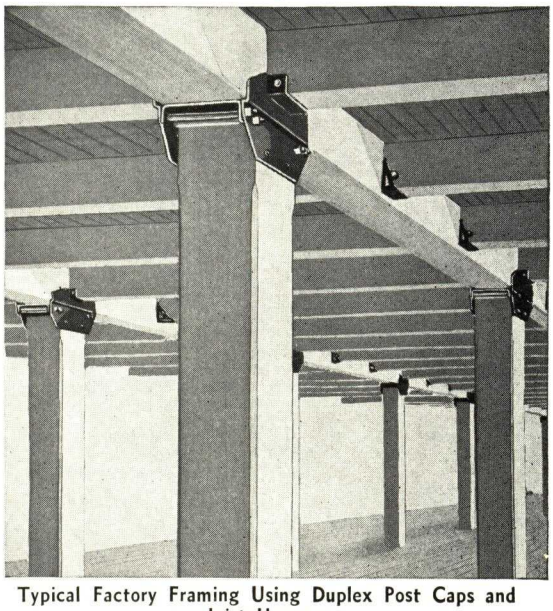
DUPLEX POST CAPS, BASES AND HANGERS—THE QUALITY LINE FOR HEAVY MILL CONSTRUCTION



"Duplex" Joist Hanger

Economical hanger for timber framing. Made of malleable iron and every hanger is thoroughly tested.

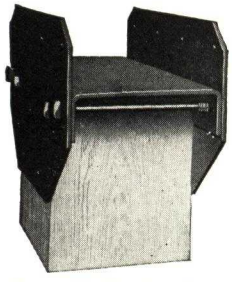
"Duplex" Joist Hangers reduce the shrinkage of joists to a minimum



Typical Factory Framing Using Duplex Post Caps and Joist Hangers

R & L Joist Hanger

For the heaviest type of mill construction. By using this type of hanger, the entire building is tied together laterally. No other method of construction does this. Made in two parts and can be adjusted to fit the various timbers for which they are intended

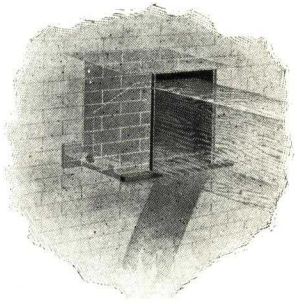


Two-way Construction

"Duplex" Steel Post Caps

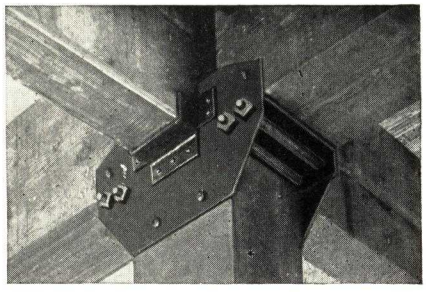
"Duplex" Post Caps are made of mild, open hearth steel and consist of three pieces: a bearing bracket and two side plates bolted together with four heavy bolts. Engineers who have investigated and used this cap are unanimous in declaring it to be an ideal design for rigid construction.

Tests have fully proven the great strength of this design and that it is not possible to break the cap when even more than six times the ultimate safe load of the timber is applied. These caps are furnished for 1-way, 2-way, 3-way and 4-way construction and may be had for timbers larger than the post.



"Duplex" Wall Box

The "Duplex" Wall Box is designed for anchoring timber beams and girders in brick and masonry walls and as a protection against dry rot. A steel box is riveted to the Duplex Wall Plate, providing for a free circulation of air around the timber. Furnished with a cover plate if required



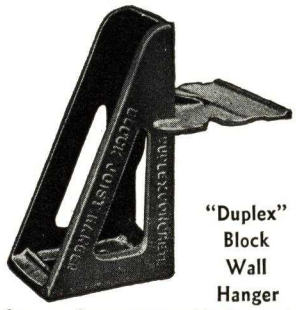
Four-way Construction

"Duplex" Wall Hanger, Extra Heavy

"Underwriters' Type" steel wall hanger for heavy mill construction. Carries timbers clear of the wall and distributes the load perfectly over the bearing surface of the masonry. Furnished for standard and extra heavy construction

"Duplex" Steel Post Base

Made of steel plates and angles to fit the post. More economical than cast iron plates



"Duplex" Block Wall Hanger

This hanger for concrete block construction is made with a larger bearing plate than our ordinary wall hangers so as to distribute the load over a greater area of the concrete block. Very practical where it becomes necessary to frame joists into old brick walls or party walls. Avoids the cutting of a large hole

THE IDEAL HANGER COMPANY

Manufacturers of Timber Fittings for Mill Type Buildings

1270 East 53rd Street, CLEVELAND, OHIO

PHILADELPHIA, PA., Kahn Products Co.—Telephone Poplar 2924

Products

IDEAL JOIST HANGERS:

Wall Hangers, Wall Boxes and Metal Lumber Hangers.

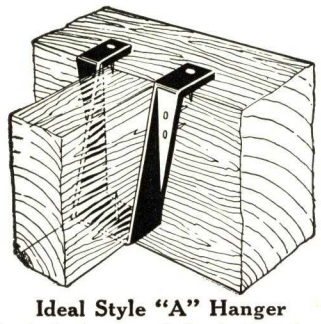
POST CAPS.

POST BASES.

Also Barn Framing Fittings.

Service

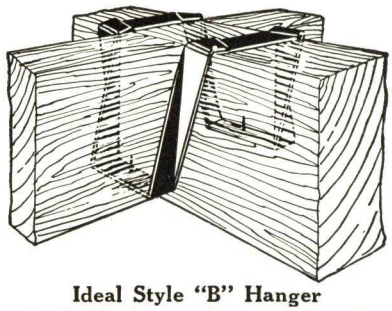
Ideal post caps, Ideal hangers and other Ideal products are made of the best material obtainable by competent workmen on modern machines. Prompt shipments are made from stock. Estimates and quotations cheerfully furnished and designs submitted by engineers who are specialists in timber construction.



Ideal Style "A" Hanger

A single hanger of the best grade open-hearth steel, formed cold to shape best adapted to framing timbers of every size. Fastens to timber with spike or lag screw.

2x6-in. up to 12x16-in. hangers in stock



Ideal Style "B" Hanger

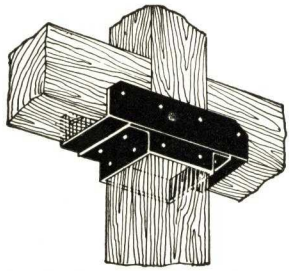
A double hanger for use where joists frame opposite each other on a wood girder or I-beam. Made of two single hangers with riveted strap connections, the strongest possible construction.

2x6-in. up to 12x16-in. hangers in stock

Ideal Style "C" Hanger

Where timbers are framed to I-beams, this hanger with the arms crossing the top of the girder provides safest and most economical construction. Also used with wood girders.

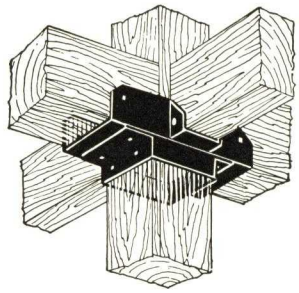
2x6-in. up to 12x16-in. hangers in stock



Ideal Steel Post Cap, No. 2

Easily installed—no framing necessary. Channel of open-hearth steel riveted to socket, provides rigid construction.

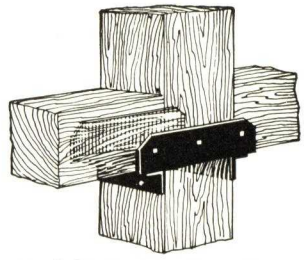
6x6-in. up to 16x16-in. post caps in stock



Ideal Steel Post Cap, No. 2

(Showing 3 and 4-way Construction)

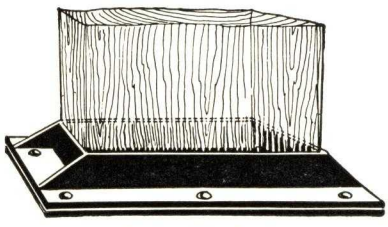
Built with the same attention to engineering standards as other Ideal Framing Products. The brackets on the side of the cap are riveted thereon to carry the beams framing in at the side, and are placed so the girder and beams will be flush on top, unless otherwise noted



Ideal Steel Post Cap, No. 3

The strongest light weight post cap made. Meets every demand for framing posts and girders under moderate loads.

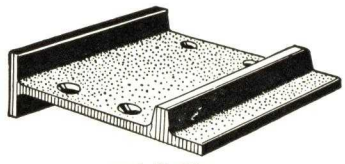
6x6-in. up to 12x16-in. post caps in stock



Ideal Post Bases

A heavy steel plate, with angles riveted thereon, furnishes the best possible socket for timber posts.

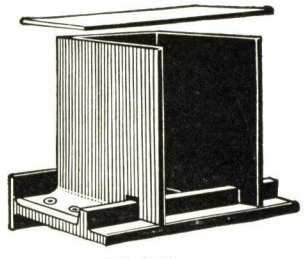
6x6-in. up to 16x16-in. in stock



Wall Plates

One-piece construction of malleable iron, far superior to cast iron. Note features of superiority in use.

Carried in stock in all sizes



Wall Box

To anchor beams in brick walls, and to protect them against dry rot. Malleable plate and steel box riveted thereto.

In stock in all sizes

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Portland Cement

Blue Bond 4/55
Kosmortar 4/51
Kosmos Portland Cement Co., Inc. 4/51
Maximent Co. 11/19
Maxtone 11/19
Medusa-BrikseT 4/53
Medusa Portland Cement Co. 4/53
Medusa-StoneseT 4/53
North American Cement Corp. .. 4/55
R.I.W. 5/27
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Granite

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ORNAMENTS

Terra Cotta

See Terra Cotta—Architectural

PARTITION

Tile

See Tile Form—Hollow Clay or Terra Cotta; Tile Form—Hollow Gypsum—Partition

PAVING

Granite

See Blocks—Paving Granite

PLASTER

Blocks

See Tile Form—Hollow—Gypsum

Cement—Portland

See Cement—Portland

Portland Cement

See Cement—Portland

PORCELAIN

Brick

See Brick—Enameled

PORTLAND

Cement

See Cement—Portland

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Chimney

See Chimney—Caps and Pots—Clay or Terra Cotta

PRECAST

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Hand—Terra Cotta

Kraftile Co. 11/5

RIPRAP

Granite

See Granite

RUBBLE

Granite

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Golden Tone 4/16

Natural

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Briar Hill Stone Co. 4/16
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Longmeadow 4/17
McCormick Longmeadow Brownstone Co., Inc. 4/17
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Stone
See Specific Type of Stone, as: Bluestone; Granite; Marble; Stone—Soapstone

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Terra Cotta
See Terra Cotta—Architectural

STATUARY

Terra Cotta
See Terra Cotta—Architectural

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(See also Bluestone; Granite; Marble; Sandstone; Slate; Colored—Pre-mixed)

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(See also Specific Type of Stone)
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Guastavino, R., Co......10/42
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Chicago Art Marble Co......11/36
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Virginia Black Serpentine..... 4/12
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Stone
See Specific Type of Stone

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See Terra Cotta

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See Tile—Hollow—Clay or Terra Cotta, Exterior and Load Bearing; Tile Form—Hollow or Solid—Cinder Concrete

Hydraulic Lime
See Lime—Hydraulic Masons; Cement—Portland

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See Tile—Hollow—Clay or Terra Cotta

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(Exterior and Interior)

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Ashlar
American Terra Cotta Corp.... 4/22
Atlantic Terra Cotta Co...... 4/23
Conkling Armstrong Terra Cotta Co. 4/24
Eastern Terra Cotta Co...... 4/25
Enduro 4/26
Federal Seaboard Terra Cotta Corp. 4/26
Northwestern Terra Cotta Corp. 4/28

Blocks
See Tile—Hollow—Clay or Terra Cotta

Chimney Caps
See Chimney—Caps and Pots—Clay or Terra Cotta

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Backup
See Tile Form—Hollow or Solid—Cinder Concrete — Load Bearing; Partition, Furring, Floor, Arch, etc.

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See Tile—Hollow Clay or Terra Cotta—Glazed

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Glazed
See Tile—Hollow Clay or Terra Cotta—Glazed; Brick—Salt Glazed

Hollow—Clay or Terra Cotta—Backing Up
See Tile—Hollow—Clay or Terra Cotta—Load Bearing

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See Tile—Hollow—Clay or Terra Cotta—Partition, Furring, etc.

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Atlantic Terra Cotta Co...... 4/23
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Arketex Ceramic Corp...... 4/36
Atlantic Terra Cotta Co...... 4/23
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Federal Seaboard Terra Cotta Corp. 4/26
Glazed Brick & Tile Institute.. 4/38
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Marble
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Virginia Alberene 4/12
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Granite
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Virginia Alberene 4/12
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Virginia Tremolite Green 4/12

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WATERPROOFING

Lime
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COLD SPRING GRANITE COMPANY, INCORPORATED

Quarriers and Producers of Granite

GENERAL OFFICES AND PLANT

COLD SPRING, MINNESOTA

Largest Variety of Colorful Granites

COLD SPRING RAINBOW GRANITE
COLD SPRING PEARL PINK GRANITE
COLD SPRING PEARL WHITE GRANITE
COLD SPRING CARNELIAN GRANITE
COLD SPRING VEINED EBONY BLACK GRANITE
COLD SPRING BLACK DIAMOND GRANITE

Recommended Economical Finishes

Polished—A permanent high polish.
Rubbed—A uniformly smooth surface produced by rubbing with carborundum. In all but polished portions, we suggest this finish for texture, cleanliness, and economy, especially for moulds and step risers which require true profiles and sharp arrises.
For Step Treads—Machine smooth finish, which is a shot rubbed, non-slip surface.

Service

The Cold Spring Granite Company is prepared to fully cooperate with Architects and Contractors in the successful economical use of its products. Preliminary estimates will be furnished immediately upon request.

THIN POLISHED GRANITE IS IDEAL FOR STORE FRONT MODERNIZATION

The use of Polished Granite in thin slabs of one (1), one and one-half (1½), and two (2) inch thicknesses for the facing of street level facades of both new and modernized business buildings, store fronts, bulkheads, etc., has been proven not only most attractive in appearance but actually the most economical material that can be selected for these purposes. It is interesting to note that the leading merchants throughout the country for the past several years, realizing the inherent, permanent beauty of color and finish of polished granite and its negligible maintenance cost, have selected this material for their store fronts. In sawing thin slabs of granite, it is necessary that ½ inch thickness variation be allowed.

Outstanding Advantages and Economies

1. Permanence of color and finish.
2. Variety of colors and types of granite.
3. Saving in stock due to modern quarry methods.
4. Saving in manufacturing costs on return heads, etc., due to thinner stock.
5. All cutting, fitting, drilling, etc., is done at the plant with modern machinery, thus saving expensive field fabrication.
6. Saving in freight.
7. Saving in erection cost in handling and setting.

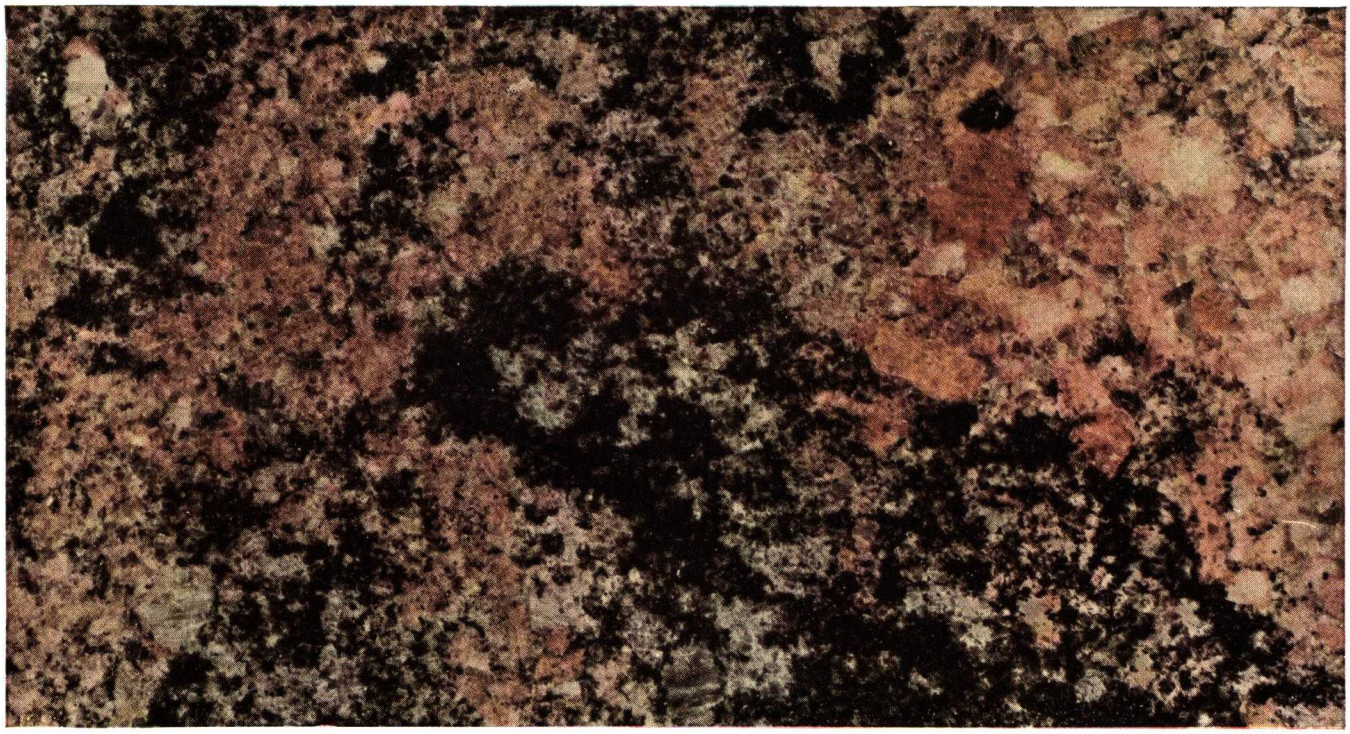
Prompt Shipments

Having furnished granite for hundreds of store fronts, we recognize the importance of maintaining opening dates in construction schedules, and therefore we:

1. Have a large supply of granite slabs on hand in the most popular sizes and thicknesses.
2. Have an experienced drafting department which will secure the necessary information in time for us to maintain prompt shipping dates.
3. Can make shipments on moderate sized jobs within three days after the receipt of all working information.
4. Can arrange for truck shipments to many parts of the country which assures transit time of from one to two days.

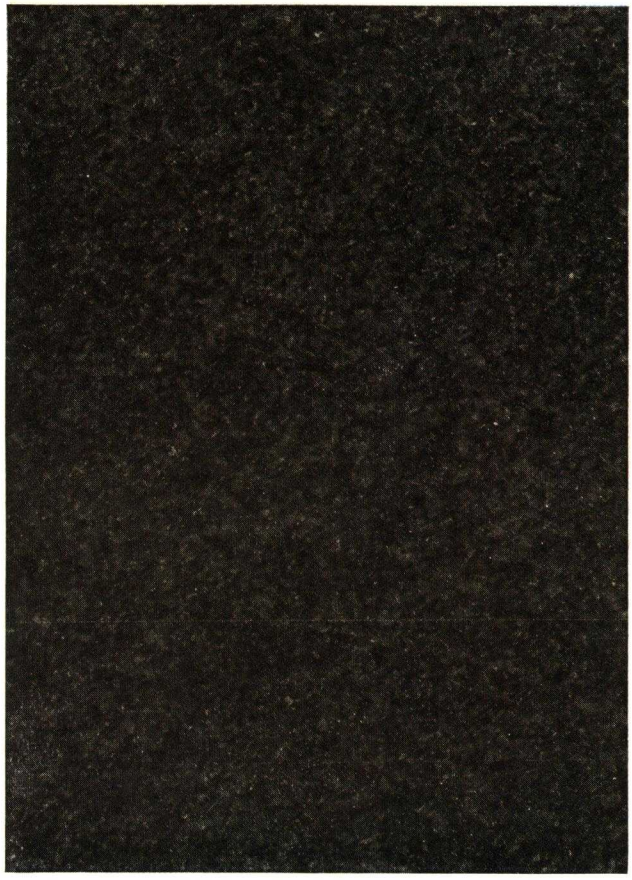
Cold Spring Rainbow Granite
Polished Finish

PRODUCED ONLY BY COLD SPRING GRANITE CO., INCORPORATED, COLD SPRING, MINN.



Cold Spring Rainbow Granite
Polished Finish

Cold Spring Rainbow Granite
Rubbed Finish



Cold Spring Black Diamond Granite
Polished Finish

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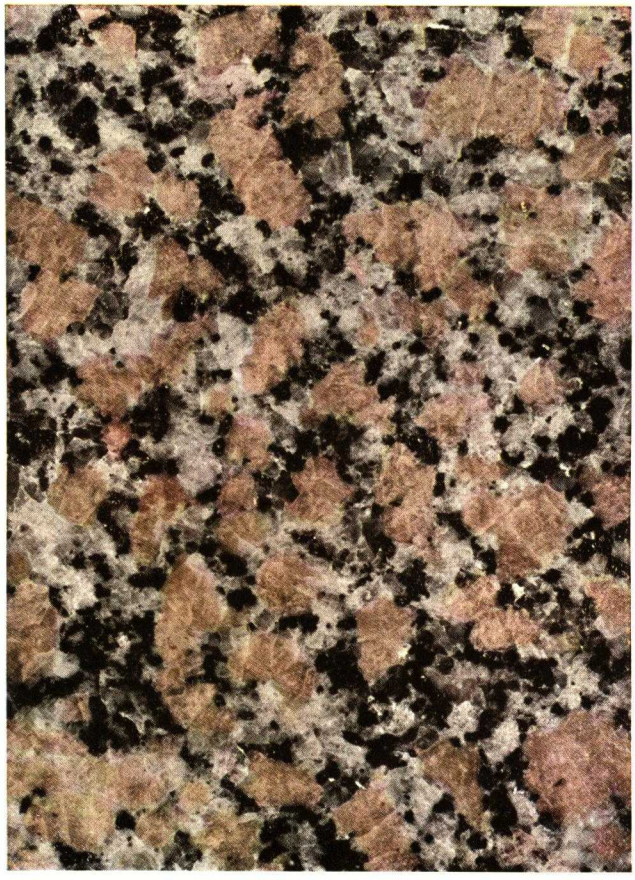
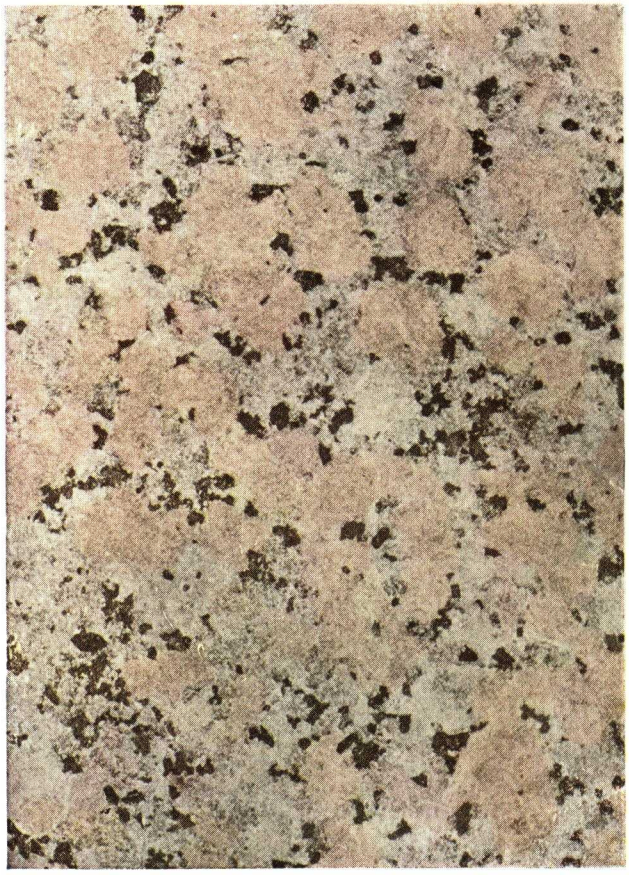
Cold Spring Veined Ebony Black Granite
Polished Finish



Cold Spring Pearl Pink Granite
Polished Finish



Cold Spring Pearl Pink Granite
Rubbed Finish

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Cold Spring Pearl White Granite
Polished Finish

Cold Spring Pearl White Granite
Fine Rubbed Finish

Cold Spring Carnelian Granite
Polished Finish

Cold Spring Carnelian Granite
Rubbed Finish

PRODUCED ONLY BY COLD SPRING GRANITE CO., INCORPORATED, COLD SPRING, MINN.

CAPE ANN GRANITE COMPANY, INC.

Producers and Fabricators of Granite

HOME OFFICE
60 East 42nd Street
NEW YORK, N. Y.

QUARRIES AT GLOUCESTER, MASS.

BOSTON OFFICE, 10 STATE STREET

AGENTS FOR ULTIMITE PAVING BLOCK CORPORATION

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CAPE ANN GRAY GRANITE PAVING BLOCKS

CAPE ANN GOLDEN BROWN SAP STONE CURBING

CAPE ANN SEAM FACE RIP-RAP

Cape Ann Granite has always been known as a stone of character. It is a hornblend granite of medium to coarse grain, gray in color with a blueish green tinge. It is individual and distinctive. It has a French coefficient of 14, a toughness test of 10 and an ultimate strength of 26,400 lbs. per square inch.

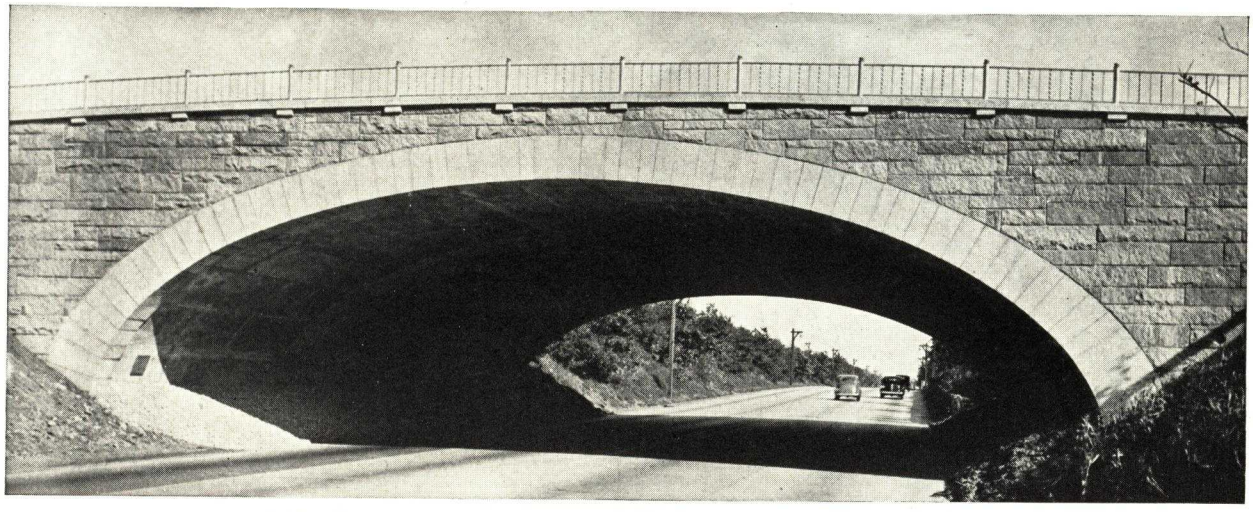
The quarry is equipped to furnish saw blocks in any size up to 60 tons, and also sawed slabs in any dimensions.

The seam face stone runs from a light tan to dark brown and from a light orange to a deep orange.

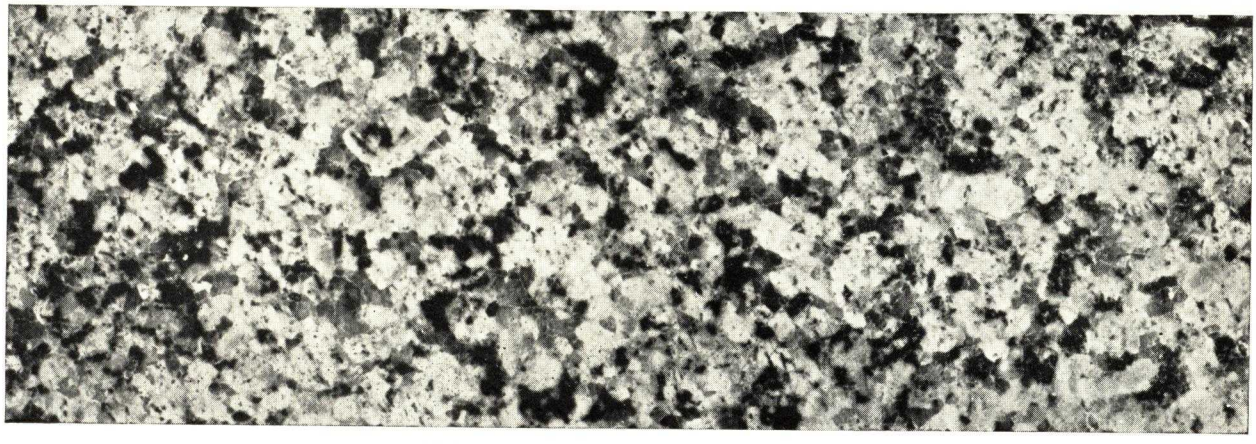
A complete organization is maintained to furnish estimates, setting plans, and details on granite for all types of building and bridge construction.

Shipments can be made by water to sea-coast cities, by rail, and by truck direct to job-site.

Samples will be furnished upon request. Also samples and information regarding Ultimate Paving Blocks will be furnished on request.



Bridge Carrying Main Street over Grand Central Parkway, Queens County, N. Y.



Color of Granite Texture Shown Is a Greenish Gray

H. E. FLETCHER COMPANY

Producers and Fabricators of Granite

WEST CHELMSFORD, MASS.

AGENTS

NEW YORK, N. Y.
J. W. Dutton, 110 E. 23rd Street

PHILADELPHIA, PA.
Gavin W. Muir, Architects Building

PRODUCERS OF

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FABRICATORS OF

DEER ISLAND PINK
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SOMES SOUND, AND
ANY OTHER AVAILABLE GRANITES

QUARRY FACILITIES

Fifty years of quarry development have produced quarry faces containing millions of feet of granite, available for immediate quarrying under numerous derricks. New quarry methods eliminate high explosives which cause wasteful production.

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Gang Saws, Circular Shot Saws, Carborundum Saws, Polishing Wheels, Sand Blasts, Surfacing Machines.

With this extensive machinery and modern equipment we can produce any finish or texture on granite.

INSTALLATIONS

Building	Location	Architect or Engineer
The Apex Building	Washington, D. C.	Bennett, Parsons and Frost, Architects
District Police Court Building	Washington, D. C.	Nathan C. Wyeth, District Architect
Federal Reserve Board Building	Washington, D. C.	Paul P. Cret, Architect
New Building for Department of Interior	Washington, D. C.	Treasury Department Procurement Div. Waddy B. Wood, Architect
Archives Building	Washington, D. C.	John Russell Pope
P. O. Department Building	Washington, D. C.	Delano & Aldrich
U. S. Supreme Court Building	Washington, D. C.	Cass Gilbert, Jr. & J. R. Rockart, Cass Gilbert
New Jersey State Office Buildings	Trenton, N. J.	J. Osborne Hunt and Hugh A. Kelly
Pennsylvania State Capitol, West Approach, North Office Building, South Office Building No. 2	Harrisburg, Pa.	Gehron & Ross
The Sailors and Soldiers Memorial Bridge	Harrisburg, Pa.	Gehron & Ross and J. E. Greiner Co., Engineers
New York State Office Building, Park Work	Albany, N. Y.	State Architect Wm. E. Hougaard
Massachusetts State House Wings	Boston, Mass.	R. Clipston Sturgis
Federal Reserve Bank	Boston, Mass.	R. Clipston Sturgis
Shawmut National Bank Addition	Boston, Mass.	Parker, Thomas & Rice
Hartford County Courthouse	Hartford, Conn.	Paul P. Cret and Smith & Bassette, Assoc.
Camden County Courthouse and Camden City Hall	Camden, N. J.	Edwards & Green
Boston Post Office	Boston, Mass.	Cram & Ferguson
Lowell Post Office	Lowell, Mass.	Supervising Architect of the Treasury
Thirty Columns in Facade, Treasury Building	Washington, D. C.	Supervising Architect of the Treasury
New Orleans Post Office	New Orleans, La.	Supervising Architect of the Treasury
Cambridge Post Office	Cambridge, Mass.	J. D. Leland Co. and Charles R. Grecco
Fidelity Mutual Life Insurance Co., Building	Philadelphia, Pa.	Zantzinger, Borie & Medary
Lehman Hall, Harvard University	Cambridge, Mass.	Coolidge, Shepley, Bulfinch & Abbott
St. Louis Masonic Temple	St. Louis, Mo.	Eames & Young, Albert B. Groves, Assoc.
Metropolitan District Commission Building	Boston, Mass.	Densmore, LeClear & Robbins
Olin Memorial Library	Middletown, Conn.	McKim, Meade & White
Philadelphia-Camden Bridge	Philadelphia, Pa.	Paul P. Cret, and R. Modjeski, Engr.
Worlds Fair Bridges 1 and 2	New York, N. Y.	Aymar Embury, 2nd, Architect
Goethals Memorial Bridge	New York, N. Y.	York & Sawyer, N. Y. Port Authority
Kill Van Kull Bridge	New York, N. Y.	Cass Gilbert, Inc., N. Y. Port Authority
Ridge Road Bridge	Rochester, N. Y.	Gehron & Ross and Frank McKibben, Engr.

JOHN L. GOSS CORPORATION

Producers of "Goss Pink Deer Isle Granite"

QUARRIES AND HOME OFFICE

STONINGTON, MAINE

SALES OFFICE, 77 Summer Street, BOSTON, MASS.

SALES AGENTS

NEW YORK, N. Y., A. LePoidevin & Co., Inc., 286 Fifth Avenue
LOS ANGELES, CAL., Bly Stone Co., 1985 E. 16th Street
PHILADELPHIA, PA., Frank Williamson, 2302 Spruce Street
SEATTLE, WASH., Clark H. Grunewald, 314 Eitel Building

GOSS PINK DEER ISLE GRANITE

A Standard and Universally Distributed Granite for Building and General Purposes

Color and Texture

Goss Pink Deer Isle Granite is a sound, hard and non-absorbent natural granite produced in large quantities, and available in any sizes, at a moderate cost. Rough granite is widely distributed among dealers and manufacturers, many of whom carry it in stock to enable them to give better deliveries. The color of the material is a warm lavender-pink, mixed with gray. It is medium to coarse grained, and of strong character. It harmonizes well with other standard building materials, as brick, limestone and bronze.

A 2000-ton Block of Goss Pink Deer Isle Granite Ready to be Cut up for Shipment

STANDARD FINISHES

Finish	Characteristics	Where Used
Polished	High gloss, keeps clean, brings out color, resulting in darker tone	Base courses. Lower stories
Honed	Dull gloss, smooth surface	Same as above
Rubbed	Smooth surface without gloss. Same shade as natural granite. A special finish	Carving in connection with polished work, and for smooth texture without gloss or change of color
8-cut (Bush Hammered)	Uniformly corrugated by fine tool marks, gives appearance of lighter color than the unfinished granite.	High class general building work close to the eye—entrances, fine moulded details
6-cut	Similar to above but coarser	General building work, first stories, risers of steps
4-cut	Similar to 6-cut but coarser texture	General building work, steps, curb, upper stories
Pointed, fine, medium or coarse	Pebbled or stippled effect. Coarse pointed is an economical finish for large surfaces	Platforms, treads and where strong texture is wanted. Trim of bridges
Rockface	Bold, irregular, natural surface. Least expensive finish for heavy work	Bridges, retaining walls, armories or for rugged effect
Sawed	Fairly smooth plane surface, with marks of shot at irregular intervals. Rusty stain may occur and special treatment is necessary if this is objectionable	Steps, platforms and thin ashlar

References

Building	Architect
Stevens Hotel, Chicago, Ill.	Holabird & Roche
Federal Reserve Bank, Boston, Mass.	R. Clipston Sturgis
Lafayette Building, Philadelphia, Pa.	John T. Windrim
Evans Memorial Galleries, Boston, Mass.	Guy Lowell
Insurance Co., of North America Building, Philadelphia, Pa.	Stewardson & Page
Neils Esperson Building, Houston, Tex.	Eberson & Eberson
Southern California Edison Building, Los Angeles, Cal.	Allison & Allison
Security Trust & Savings Bank, Los Angeles, Cal.	John Parkinson
Public Ledger Building, Philadelphia, Pa.	Horace Trumbauer
East Boston (Mass.) Savings Bank	Thomas James
Pilgrim Memorial Tower, Provincetown, Mass.	Willard T. Sears
South Office Building, State Capitol, Harrisburg, Pa.	Arnold W. Brunner
Merchants National Bank, New Bedford, Mass.	Adden & Parker
Pioneer Monument, Harrodsburg, Ky.	Francis Keally
Industrial Trust Building, Providence, R. I.	Walker & Gillette
Security Building, Miami, Fla.	Robert Greenfield
New York State Office Building, Albany, N. Y.	Sullivan W. Jones
Salem Fields Entrance, Brooklyn, N. Y.	Percy W. Darbyshire
Fountain of Oceanus, Estate of John D. Rockefeller, Pocantico Hills, N. Y.	Welles Bosworth
Drexel Bank Building, Philadelphia, Pa.	Day & Klauder
Mutual Trust Co., Philadelphia, Pa.	Heacock & Hokanson and The Ballinger Co.
New York State Office Building, New York, N. Y.	Sullivan W. Jones William E. Haugaard
Fountain Memorial to Pilgrim Women, Plymouth, Mass.	McKim, Mead & White
Pennsylvania R.R. Station, Philadelphia, Pa.	Graham, Anderson, Probst & White
New York Historical Society, New York, N. Y.	Walker & Gillette
Post Office Department Building, Washington, D. C.	Delano & Aldrich
Internal Revenue Building, Washington, D.C.	J. A. Wetmore

THE NORTH CAROLINA GRANITE CORPORATION

MOUNT AIRY, N. C.

BRANCH OFFICES

CHICAGO, ILL., 127 No. Dearborn Street
PHILADELPHIA, PA., 1001 Witherspoon Building
NEW YORK, N. Y., 5629 Grand Central Terminal
PITTSBURGH, PA., 207 Fulton Building

CUTSTONE DEPARTMENT: J. D. Sargent Granite Company, MOUNT AIRY, N. C.

Products

DIMENSION GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

Also Polished and Turned Granite; Granite Paving Blocks, Street Curbing, Crosswalk, Rubble Ashlar, Building Blocks, Crushed Granite and Rip Rap.

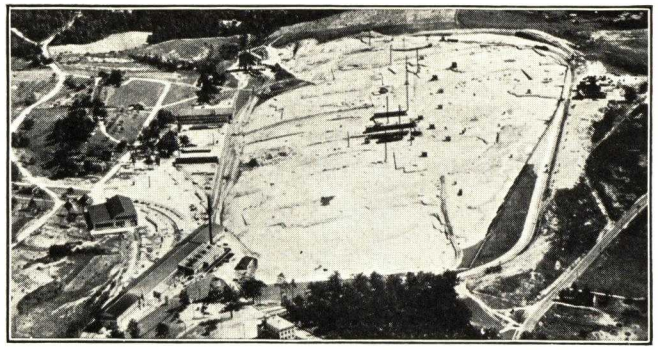
Estimates and Samples

A complete organization is maintained to furnish estimates, setting plans, details, etc., promptly and efficiently. Preliminary estimates cheerfully furnished without obligation on request of architects or contractors.

Samples of Mount Airy Granite furnished on request, and advice as to grade or style of finish desired.

Facilities

Cutting plants and offices are strategically located at the base of the Mount Airy Quarries. Equipment is modern and complete. Electric traveling cranes, polishing machinery and turning lathes, sandblast and carborundum machines, gang saws, compressed air driven tools of all kinds; this equipment, together with the unlimited supply of rough granite available, enables large contracts to be executed in quick time.



An Aerial View of Quarry and Plant

At the present production rate of 3000 carloads per year 500 years will not exhaust this great deposit of white Mount Airy granite

MOUNT AIRY GRANITE

"The Granite of Individuality"

Colors and Texture of Mount Airy Granite

Mount Airy Granite, *"The Granite of Individuality,"* is a light-gray, almost white, biotite granite of medium texture. Feldspar, quartz and mica characterize the granite megascopically. Feldspar is nearly white, the quartz is a blue gray and the mica black and very evenly distributed, giving an appearance of decided strong character.

The Chemical Analysis and tests are significant:

SiO_2	70.70
Al_2O_3	16.50
Fe_2O_3	2.34
MgO	0.29
CaO	2.96
Na_2O	4.56
K_2O	2.45
FeS_2	0.09
Total	99.89
Weight per cu. ft.	165 lbs.
Water absorbed per cu. ft.	0.33 lb.
Crushing strength	23,068 lbs. per sq. in.

From Bulletin No. 2, page 155, North Carolina Geological Survey, "The building and ornamental stones of North Carolina."

JOSEPH HYDE PRATT, State Geologist.

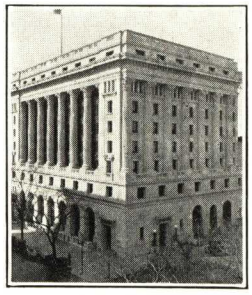
Buildings and Bridges

Quarry finishing plants and drafting departments are equipped to handle building and bridge jobs efficiently. Granite cut at Mount Airy is cut right.

These references are significant:

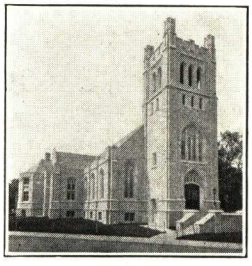
Bridges

Arlington Memorial Bridge, Washington, D. C.
Fall Creek Bridge, Indianapolis, Ind.
Delaware River Bridge, Philadelphia, Pa.



Public Building

Memorial



Church

Buildings

Union Trust Building, Washington, D. C.
Guilford County Courthouse, Greensboro, N. C.
Citizens National Bank Building, Long Branch, N. J.
U. S. Bullion Depository, Fort Knox, Ky.

Memorials

Mount Airy has been used in more private mausoleums than any other American granite. Its availability in uniform color and texture free from defects in sizes up to the limits of railway transportation has made Mount Airy Granite the choice for outstanding private and public monuments.

REFERENCES

O'Brien Mausoleum, Cincinnati, Ohio
Dodge Mausoleum, Detroit, Mich.
Rose Hill Mausoleum, Chicago, Ill.
Patterson Monument, Dayton, Ohio
Pennsylvania State Monument, Gettysburg, Pa.
Wright Brothers Memorial, Kitty Hawk, N. C.

Churches and Schools

The dignity and beauty of Mount Airy Granite has been made available to churches and school buildings through development of economical materials. Our 1 & 2 Man Rubble, building blocks, and a sawed bed ashlar merit careful consideration. Write for samples and literature containing valuable information about broken range ashlar.

REFERENCES

St. Charles Borromeo Seminary, Overbrook, Pa.
Bethesda M. E. Church, Salisbury, Md.
St. Margarets R. C. School, Lancaster, Pa.
Church of the Holy Child, Philadelphia, Pa.
C. W. Banner Residence, Greensboro, N. C.

GRANITE

IN ARCHITECTURE

GRANITE ASSOCIATION

NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION

INCORPORATED

5619 Grand Central Terminal Building

TELEPHONE
MURRAY HILL 9-2465

NEW YORK

ARCHITECTURAL GRANITE

Granite's unchallenged qualities as a high grade building material have long been recognized by architects and engineers. Its strength and durability, its inherent beauty and character, and the wide range of colors and textures available, are well known facts.

Many, however, are not familiar with the latest technological developments in quarrying and processing granite, which have reduced its cost and widened its field of application in architecture and engineering.

Few building materials are as cost-sensitive to methods of detailing as granite. Up-to-date information is more important than ever before, if full advantage is to be taken of the economies and extended application made possible by improved methods and facilities. To that end the information on the following pages is offered, and architects and engineers are invited to call upon the granite manufacturer or the Association for any specific information desired.

ARCHITECTURAL AND ENGINEERING USES

The aesthetic and physical qualities of granite adapt it to widely divergent types of use in architecture and engineering. Reduced cost and faster deliveries now apply in all fields of application, and have especially stimulated the use of granite in remodeling work and light construction.

The varied uses to which building granites are specially adapted may be summarized under three major groups, each having design and specification requirements applicable to type and function of product involved:

I—STANDARD BUILDING GRANITE

For buildings of standard type construction in which the exterior material is used structurally, either self-supporting or as bonded masonry, such as:

Monumental, Institutional, Office and Commercial Buildings, Mausoleums, and similar high grade building work.

II—GRANITE VENEER

For buildings in which the exterior material is primarily a decorative or protective veneer, without having any particular structural function, such as:

Store Fronts, Remodeling Work, and Light Construction.

III—MASONRY GRANITE

For more rugged types of masonry construction in which the exterior material is an integral part of the masonry and in which massive strength and durability are primary requirements, such as:

Rock Face Building Work, Bridges, Heavy Engineering Construction, Retaining Walls and Rubble Masonry.

SPECIFICATION POINTS

TOLERANCES—Any tolerances which the architect can permit in respect to stock, color, finish, beds and joints, thickness of material, or in dimensions, all tend toward economy.

STANDARD CUT GRANITE WORK

Outline of essential points and suggested requirements as they may apply to work involved.

(1) WORK INCLUDED—Furnishing—Delivery—Setting.
All granite work shown or specified.
State portions to be of granite.

(2) MATERIAL—Granite—Sound, of good quality, free from defects which would impair strength, durability or appearance.
Equal to approved samples.
Name granites to be considered or color, tone and grain.

(3) SAMPLES—State number and size required.
Provide for samples to show extreme range in color, texture, and quality of stock and finish.

(4) SHOP DRAWINGS—Requirements as to preparation, submittal and approval.

(5) FINISHES—Name finish or finishes required on drawings and specifications.

(6) CUTTING—Specify quality of surface, arrises, beds and joints to conform with normal requirements for grade of finish specifed.

Note—The kind of surface finish controls trueness and quality of arris lines.

Points to cover and suggested requirements:

(a) Surface—All exposed surfaces shall be—

(For Polished, Rubbed and Fine Hammered) Out of wind and free from apparent waves.

(For Coarse Hammered and Sawed) Approximately plane.

(For all Hammered finishes) Free from raw spots, smooth or depressed areas, with bush hammer marks uniformly distributed, approximately parallel (in direction required for bushing).

(For Pointed Finishes) Approximately plane, indented surface, with point marks reasonably uniform in depth and distribution.

(For Rock Face) Pitch lines in approximate plane. State average minimum or maximum projection required—for average work 1" projection per foot of rise.

No depressions in face below pitch plane.

Face free from drill holes.

(b) Arrises—To conform with finish of face as to trueness and sharpness.

(c) Beds and Joints—Sawed or cut full and square for at least 2" from face (1½" for joints), and may fall off not over 1" in 12" (1½" for joints), reasonably free from large depressions.

(d) Jointing—As shown on approved drawings and (see note) in thickness at arris line.

Note—Generally ¼" for polished and the finer finishes, ⅜" for coarser finishes, and from ½" to 1" or more for pointed, rock face and more rugged work.

(7) BONDING—As shown on approved drawings.
Beds on projecting courses at least equal to projection, unless otherwise shown.

(8) MOLDING—Uniform profile throughout length in conformity with full size details, flush at joints with arrises true and straight in conformity with surface finish.

(If hammered)—Bushing parallel to run of mold and square to edge for facias and flats.

(9) WASHES AND DRIPS—Cut washes on stones having exposed tops, unless otherwise shown.

Drips—cut or abrasive sawed on underside of projecting stones.

Reglets for flashing where shown or specified.

(10) MODELS—State models required—to be furnished to granite contractor.

(11) ROUGHING FOR CARVING—State requirements if carving is to be done by others than the granite contractor.

(12) CARVING—State requirements—character of work, where to be done.

Note—Unless carving is otherwise specified, it is understood to be tooled finished.

(13) HANDLING, SHIPPING AND STORAGE—The finished granite shall be protected from damage in transit, and shall be handled and stored at site in such manner as to avoid breakage, staining or other damage to the finished granite.

(14) SETTING—Shall be done by competent, experienced stone setters, and in strict accordance with the approved drawings and specifications.

All granite to be brushed clean and drenched immediately before setting, and carefully bedded in a full bed of non-staining mortar.

Facing not to be built up over two courses ahead of backing.

Facing to be kept free of mortar at all times.

Face joints to be immediately raked out to depth of 1".

Sills and similar stones subject to unequal pressure to be bedded only at ends.

Waterproof mortar for joints on level or washed surfaces exposed to weather.

Note—It means nothing to specify that granite be set on its natural bed, as the cleavage plane in some granites is at right angles and in others is parallel to the quarry beds.

(15) ANCHORING—Galvanized iron anchors, ¼" x 1¼", turned down into granite 1¼", extending 8" (if possible) and turned up 1½" into the backing.

Show or describe any special anchoring required.

(16) CLEANING AND POINTING—After all danger of stain or damage from other operations on the building has passed, the granite work shall be carefully cleaned down, removing all dirt, mortar stains and other defacements.

Prohibit use of wire brushes (liable to cause rust stains), and acids or solutions which might discolor the granite.

All face joints—brush clean, thoroughly wet and fill with pointing mortar, and strike joint as directed by the architect.

(17) DEFECTIVE WORK—No patching or hiding of defects. Defective stones to be replaced unless otherwise directed by the architect.

GRANITE VENEER

Surface Finish—Finishes best adapted for granite veneer include: Polished; Honed; Rubbed; Sawed; and Special Sand, Shot or Abrasive treatments.

Hammered or pointed finishes are not recommended for work under four inches in thickness.

Beds and Joints—Sawed or cut full and square at least two-thirds back from face, reasonably free from depressions, and may fall off at back not over one inch.

Width of Joint—For average work one-quarter inch. For close jointed polished work 3/16" or ⅛" may be specified.

Setting—Granite veneer should be set in non-staining mortar. Backs of mortar joints should be suitably damp-proofed or parged to prevent moisture seeping through the joint from the backing.

Anchoring—For veneer over 2" thick use ⅜" round iron, galvanized after bending, turned down 1¼" for 4" veneer, or 1" for 3", using two anchors in top bed of each stone.

For 1½" to 3" veneer use ¼" round iron turned down ¾".

For veneer under 1½" thick use 1¼" x ⅛" strap anchors.

COLOR CLASSIFICATION

GRANITES QUARRIED BY ASSOCIATION MEMBERS

COLOR	GRAIN	NAME OF GRANITE	LOCATION	QUARRIED BY
WHITE				
White	Medium	Chelmsford White	West Chelmsford, Mass.	H. E. Fletcher Co.
White	Medium	Cold Spring Pearl White	Isle, Minn.	Cold Spring Granite Co.
White	Medium	Mount Airy White	Mount Airy, N. C.	North Carolina Granite Corp.
GRAY				
Very light gray	Medium	Mount Airy	Mount Airy, N. C.	North Carolina Granite Corp.
Very light gray	Fine	North Jay	North Jay, Me.	Maine & New Hampshire Granite Corp.
Light gray	Fine	Chelmsford Gray	West Chelmsford, Mass.	H. E. Fletcher Co.
Light gray	Fine, inclined to medium	Milford, N. H.	Milford, N. H.	H. E. Fletcher Co.
Light to medium gray	Fine to medium	Swenson Gray	Concord, N. H.	The John Swenson Granite Co.
Pinkish gray	Medium	Carolina Gray	Salisbury, N. C.	The Harris Granite Quarries Co.
BUFF				
Light grayish buff	Fine to medium	Chelmsford Bulfinch	West Chelmsford, Mass.	H. E. Fletcher Co.
Greenish gray and brown variegated	Medium	Bears Den Quarry	Mason, N. H.	H. E. Fletcher Co.
Light to medium brown	Fine to medium	Swenson Buff Antique	Concord, N. H.	The John Swenson Granite Co.
Brown with dark spots	Medium to coarse	Milford Buff	Milford, Mass.	H. E. Fletcher Co.
PINK				
Lavender pink	Medium	Dunn Mountain	Near Granite Quarry, N. C.	The Harris Granite Quarries Co.
Pinkish, lavender tinted medium gray	Medium or coarse	Goss Pink Deer Isle	Crotch Island, Stonington, Me.	John L. Goss Corp.
Pinkish gray	Medium	Deer Island	Stonington, Me.	Deer Island Granite Corp.
Pink	Medium	Cold Spring Pearl Pink	Cold Spring, Minn.	Cold Spring Granite Co.
Pink	Medium	Pink Milford	Milford, Mass.	S. Haskel & Sons, Inc.
Pink with dark spots	Medium to coarse	Milford Pink	Milford, Mass.	H. E. Fletcher Co.
Light pink with occasional black waves and pink stripes.	Medium to coarse	Swenson Pink	Wells, Me.	The John Swenson Granite Co.
Light pink mottled with large gray and small black spots	Coarse	Conway Pink	Redstone, N. H.	Maine & New Hampshire Granite Corp.
Light mottled pink	Medium, inclined to coarse	Carolina Pink	Near Granite Quarry, N. C.	The Harris Granite Quarries Co.
Light uniform slightly purplish pink	Medium	Balfour Pink	Granite Quarry, N. C.	The Harris Granite Quarries Co.
Pink and black	Fine	Cold Spring Rainbow	Morton, Minn.	Cold Spring Granite Co.
BROWNISH RED				
Brownish red	Medium	Cold Spring Mahogany	Milbank, S. D.	Cold Spring Granite Co.
GREEN				
Dark yellowish greenish gray with black spottings	Coarse	Conway Green	Redstone, N. H.	Maine & New Hampshire Granite Corp.
BLACK				
Black	Medium	Cold Spring Veined Ebony	Mellen, Wis.	Cold Spring Granite Co.
Black	Fine	Cold Spring Black Diamond	Escondido, Calif.	Cold Spring Granite Co.
Black	Fine	Gibraltar Black	Coopersburg, Pa.	S. Haskel & Sons, Inc.

FOR LOCATION OF SAMPLE EXHIBITS SEE BACK COVER

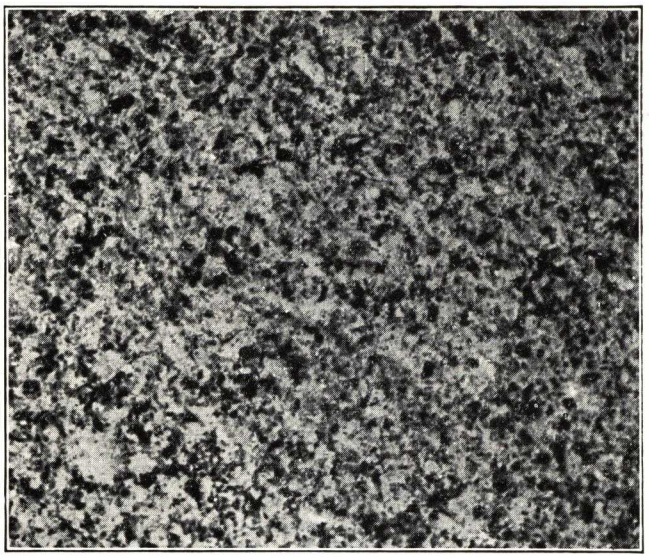
SURFACE FINISHES

For Full Size Reproductions of Standard Building Granite Finishes see Pages 6 and 7

FINISH	CHARACTERISTICS	APPLICATION
POLISHED	Mirror gloss, sharp undistorted reflections. Brings out full crystalline color and pattern Deeper in tone than natural or split face. Keeps clean. Practically impervious to moisture or stain.	For color effects and protection from stain or moisture. Store fronts, Entrance features, Lower stories, Base courses. Thin facing and veneer.
HONED	Dull gloss without reflections. Softer toned than polished but darker toned than split face. Free from scratches. Costs less than polished.	For softer color effects. Otherwise same as polished.
RUBBED	Smooth without gloss—finely sanded effect. Tone approximates split face. Grade—Fine, Medium or Coarse—determined by type and fineness of abrasive used.	Where smooth finish is desired without gloss or marked change in natural tone. Thin facing and veneer.
EIGHT CUT	Fine hammered using eight-cut bush hammer. Lighter in tone than split face. Corrugated by approximately parallel cut marks.	Fine finished work close to eye. Fine molded details. Entrances and window trim.
SIX CUT	Medium hammered using six-cut bush hammer. Similar to 8-cut, but somewhat coarser and less expensive.	General building work. Ashlar and molded features. Medium scale details. Lower stories—4-cut above. Monumental bridge construction.
FOUR CUT	Coarse hammered using four-cut bush hammer. Similar to six-cut, but stronger texture. Least expensive bush hammered finish.	General building work. Lower stories. Upper stories above finer finish. Steps, Curb. Large scale details. Bridge work.
SAWED	Fairly smooth plane surface, similar to hammered in tone. Varied texture— depth and location of saw scoring impractical to control. Subject to rust stain unless cleaned after sawing.	Steps, Platforms, Ashlar. Thin facing and veneer. Upper stories above finer finish. Bridge work.
POINTED	Roughly indented finish with fairly uniform texture. Grade—Fine, Medium or Coarse—determined by size of point used and density of distribution. Coarse pointed is economical finish for large surfaces.	Treads of steps and platforms. Rugged texture effects. Bridge work.
PEEN HAMMERED	Very coarse axed finish, less regular than 4-cut. Roughly levelled with uneven texture. Occasional raw spots and point marks.	Curb, Rough sills and steps. Rough or obscure parts of better grade building work. Rugged texture effects.
ROCK FACE	Split face with edges pitched to approximate plane. Character determined by smoothness, and amount of projection. Least expensive finish for cut granite work. Cost varies with character of face and quality of beds and joints. Freedom from limitation of projection tends to reduce cost.	Bridges. Retaining Walls. Heavy Masonry. Rugged effects.
OTHER FINISHES	Additional finishes, more or less special include: Two-cut; Cross or Random Bushed; Special Pointed; Special Sand, Shot or Abrasive Rubbed.	
ARRISES	Kind of surface finish controls trueness and quality of arris lines.	

FOR LOCATION OF EXHIBITS OF STANDARD FINISHES SEE BACK COVER

STANDARD



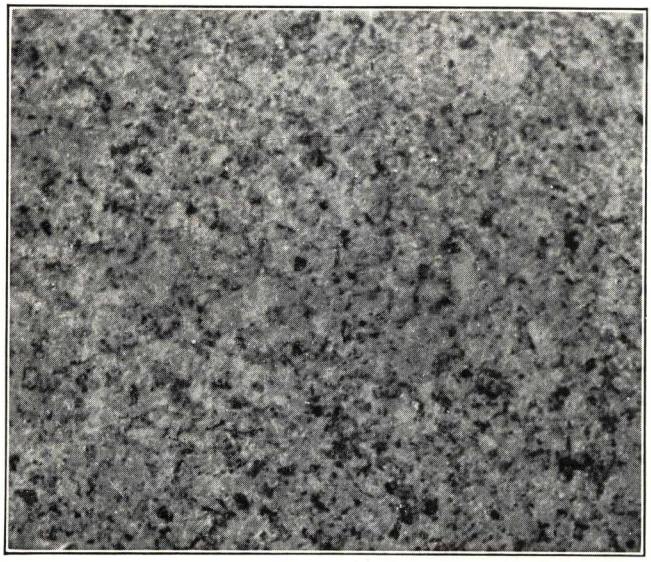
POLISHED

These full size, half tone reproductions show standard grades of surface finish most commonly used on building granite. The illustrations are darker than the actual granite to bring out more clearly the texture of the finish.

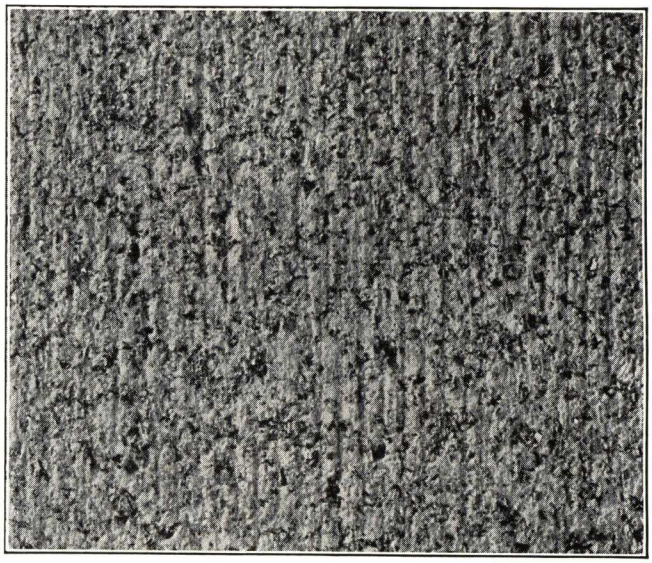
Sawed and Rock Face are not shown, as they cannot be adequately represented in small area.

To clear up a common misunderstanding, full size cross-sections of hand bush hammer cuts (or blades) which produce Eight, Six and Four Cut work, are shown on opposite page. The fallacy of specifying hammered work as so many cuts to the inch is shown by these sections, and by checking the half-tones with a rule.

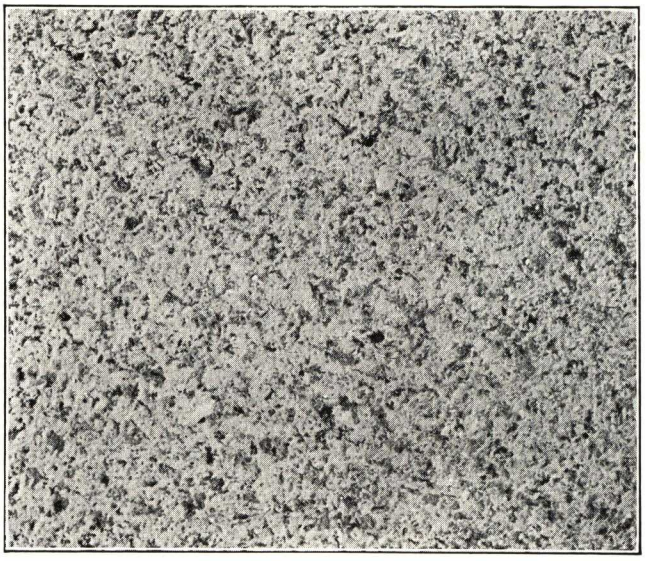
To produce equivalent cut finishes with pneumatic surfacers, the blades are wider spaced.



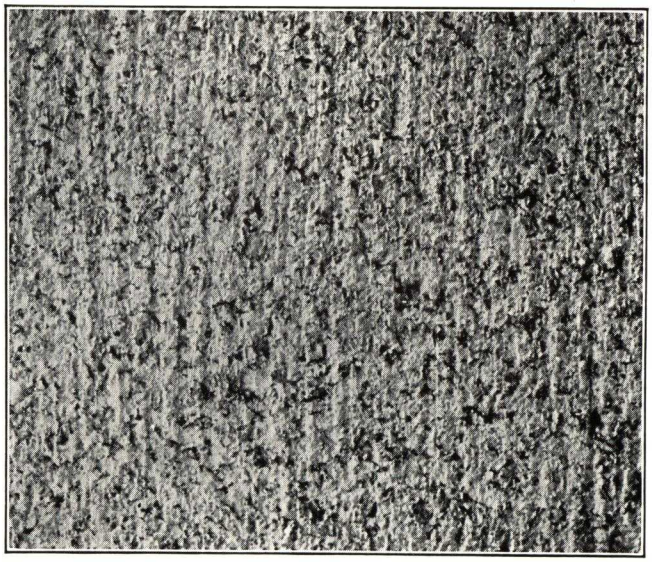
HONED



EIGHT CUT



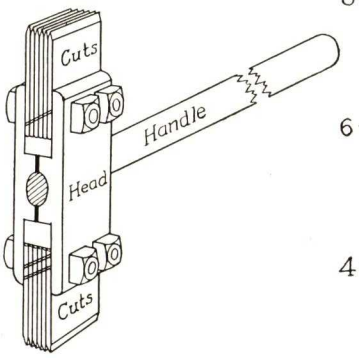
RUBBED



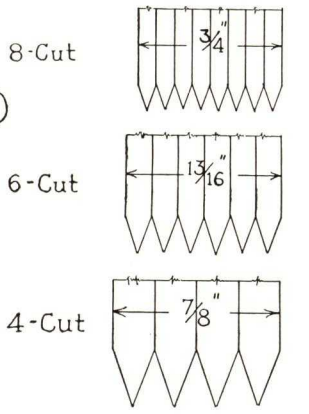
SIX CUT

FINISHES

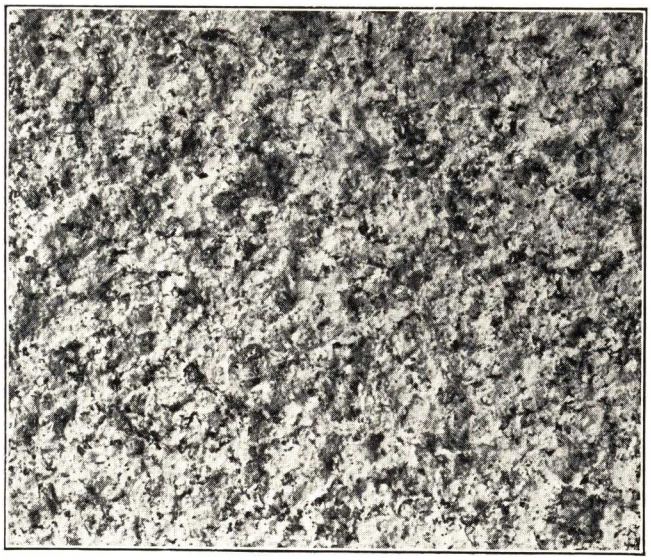
HAND BUSH HAMMER



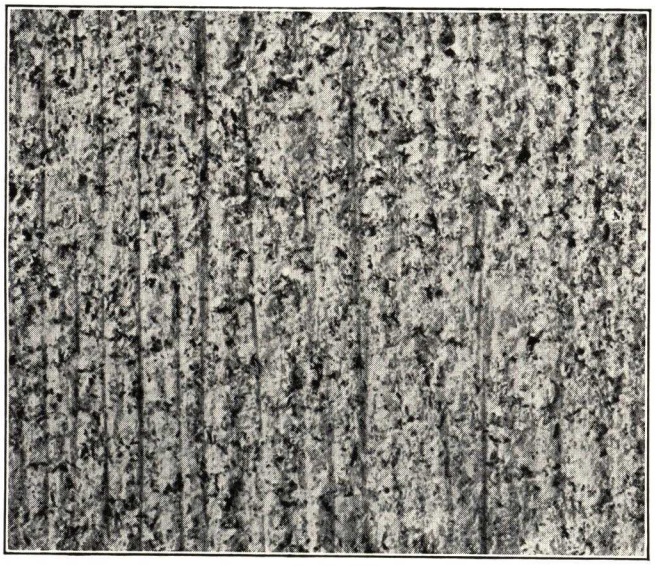
Isometric View



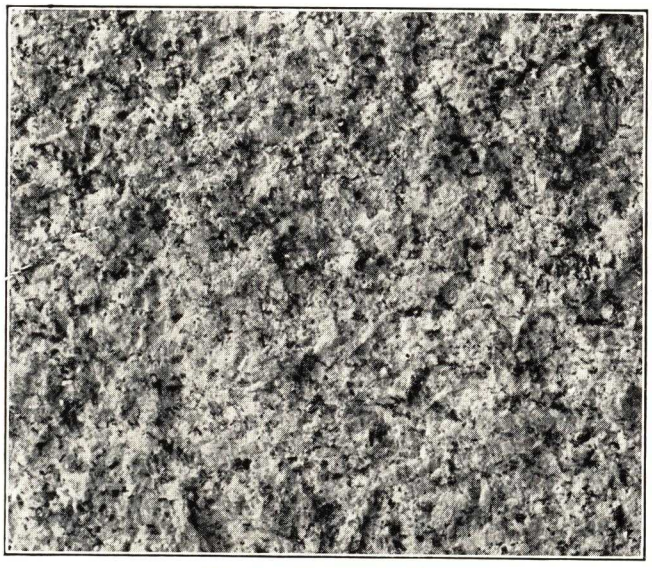
F. S. Sections of Cuts



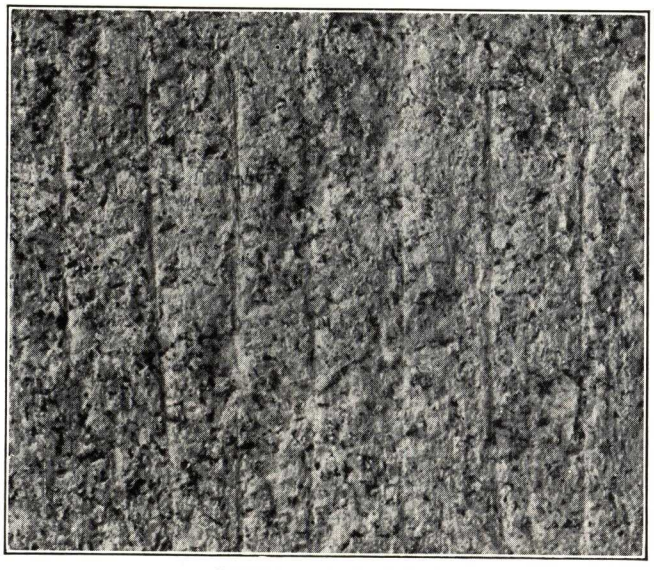
FINE POINTED



FOUR CUT



MEDIUM POINTED



PEEN HAMMERED

COARSE POINTED

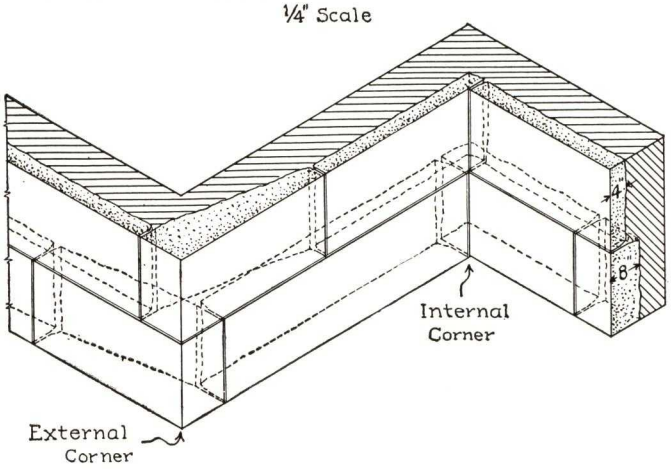
DETAILING

STANDARD GRANITE WORK
Bonded Construction

For best results and maximum economy detail specifically for granite, not for stone. Methods, tools and machines for processing granite are quite different than for other stones, with different limitations and cost effects.

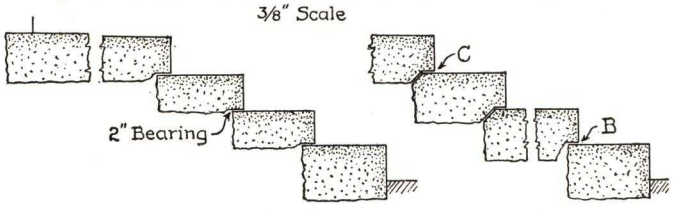
DETAILS SHOWING BONDING OF CORNERS

¼" Scale



SECTIONS SHOWING BEARINGS FOR STEPS

⅜" Scale

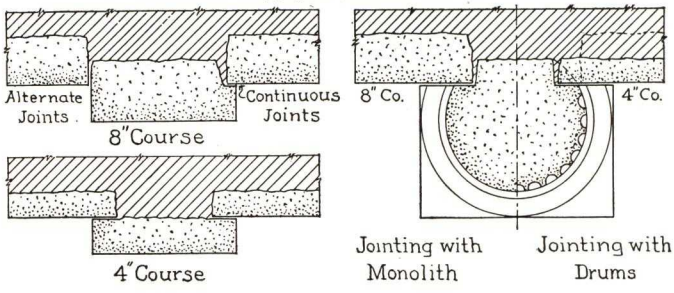


SECTION A SECTION B&C

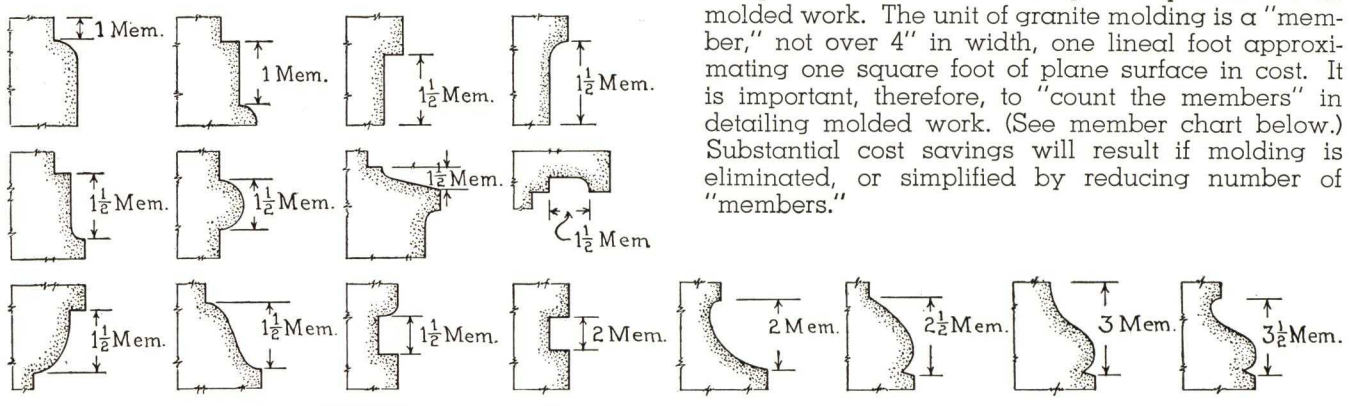
NOTE - For wide flights bearings shown at B or C are used to prevent sliding. B is practical and less expensive than C.

BONDING OF PILASTERS & COLUMNS

⅜" Scale Plans



GRANITE MOLDINGS - BASIC MEMBER COUNTS



WALL ASHLAR

Reduce thickness to minimum consistent with type of finish and structural requirements.

Rock face—make minimum thickness one-third rise.

Hammered finishes—Minimum thickness 3" or 4".

Sawed, Rubbed or Polished—ordinary minimum 2".

Make ashlar faces of large area for economy.

Keep heads within ashlar thickness if possible.

Eliminate internal angles cut in the solid.

Avoid checking for steel or concrete by jointing, or reducing thickness of facing.

STEPS AND PLATFORMS

Avoid raised seats or lugs—Keep to flat surfaces to permit sawing.

Set steps and platforms to pitch ⅛" to foot.

Keep concrete 2" low to avoid unnecessary bedding of granite.

Specify 4-cut, pointed or shot-rubbed treads or sawed for less expensive construction.

PILASTERS AND COLUMNS

Large monoliths cost more than if jointed.

Flutes add substantially to cost.

Alternate joints cost less than continuous.

MISCELLANEOUS DETAILS

Raised panels cost less than sunk panels.

Flat top coping costs less than apex or saddle-top.

Permit optional false jointing of jambs or flat arches, and of molded courses having facias or flats 4" or wider.

Avoid projections in courses which might otherwise be sawed, by jointing or eliminating projections.

Detail drips to be abrasive sawed.

GRANITE MOLDINGS

Expensive hand labor is generally involved in molded work. The unit of granite molding is a "member," not over 4" in width, one lineal foot approximating one square foot of plane surface in cost. It is important, therefore, to "count the members" in detailing molded work. (See member chart below.) Substantial cost savings will result if molding is eliminated, or simplified by reducing number of "members."

FOR GRANITE

GRANITE VENEER

Machine Processed Work

Moderate cost and superior architectural qualities have stimulated wide use of machine processed granite as exterior facing for modern fronts, remodeling work and light construction.

Granite veneer is produced from sawed slabs with machine polished, honed, rubbed, sawed, or special sand, shot or abrasive treatments, and abrasive sawed joints. Effective decoration may be added at moderate cost in the form of sub-surface ornament, abrasive sawed or sand blasted.

This type of granite work has little in common with the time-honored forms and precedents of dressed granite masonry, either as to structural or design requirements. It is attached to the steel work or supporting structure as a protective and decorative veneer, the type of ties and anchoring depending on the character of the supporting structure.

THICKNESS AND TOLERANCES

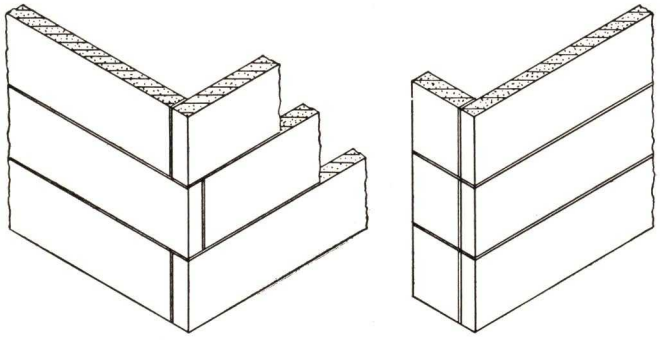
Granite facing from 4" to 1" in thickness may be utilized with a recommended practical tolerance in thickness of ±½" for slabs 2" or over and ±¼" for slabs under 2" thick. Surface areas up to the limits of the average gang saw (see page 10) are available to the designer.

ABRASIVE SAWED JOINTS

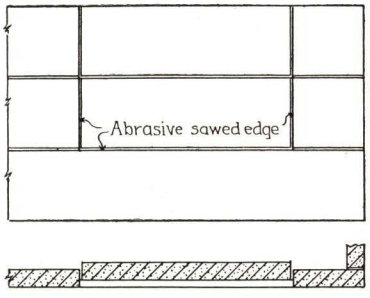
Abrasive sawed beds and joints will bond as effectively with setting or pointing mortar as ordinary chiselled or pointed joints. It is not necessary to remove or roughen the semi-glaze left by the abrasive saw, and adds needless expense.

Accompanying sketches illustrate typical features and applications, and indicate something of the scope and possibilities which machine processed granite offers to modern designers.

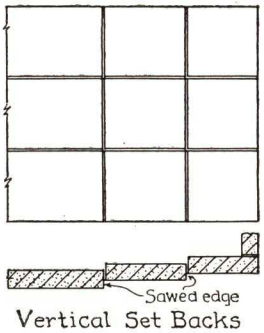
DETAILS AND APPLICATIONS



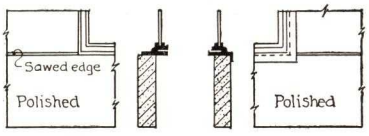
Jointing at Corners and Deep Reveals



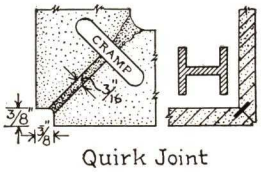
Panel Jointing



Vertical Set Backs

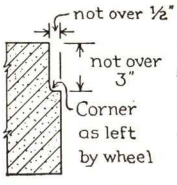


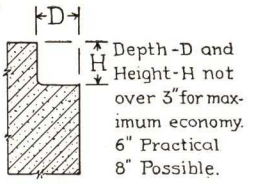
Show Window Trim



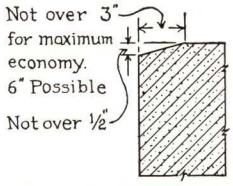
Quirk Joint

ABRASIVE SAWED CHECKS AND CHAMFERS



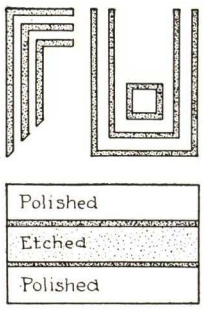


Sawed Checks

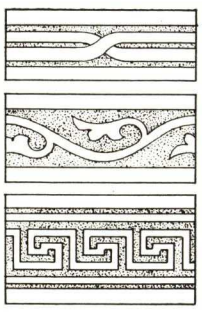


Sawed Chamfers

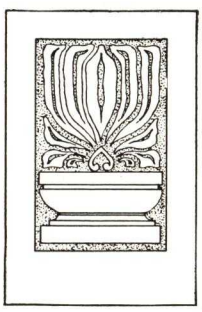
SAND BLASTED ORNAMENT



Line Ornament

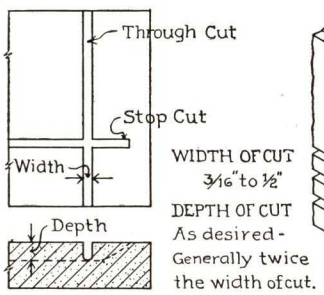


Band Ornament

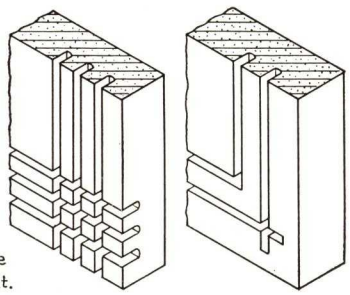


Panels

ABRASIVE SAWED ORNAMENT



Basic Saw Cuts

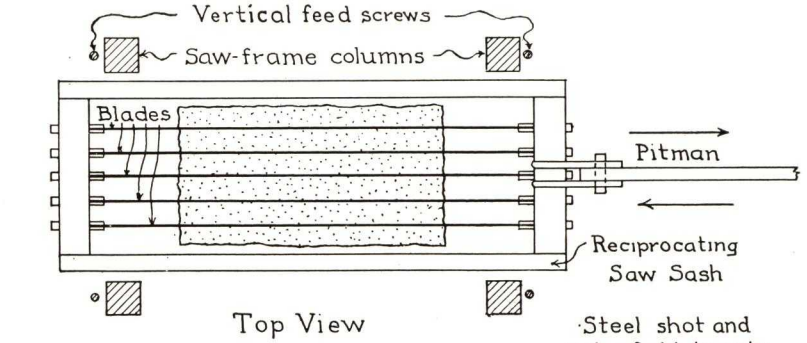


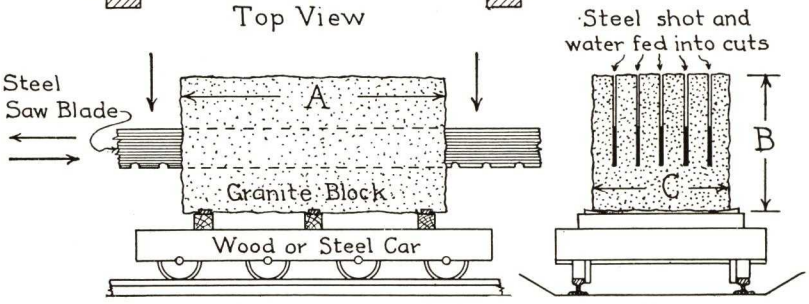
Applications

PROCESSING

Present day developments in processing granite have opened up entirely new possibilities in form, finish and application. The basic principles of some

THE GRANITE GANG SAW





THICKNESS OF SLABS

4"—Ordinary Minimum
2"—Practical Minimum
1"—Special

THICKNESS OF CUT OR SAW KERF

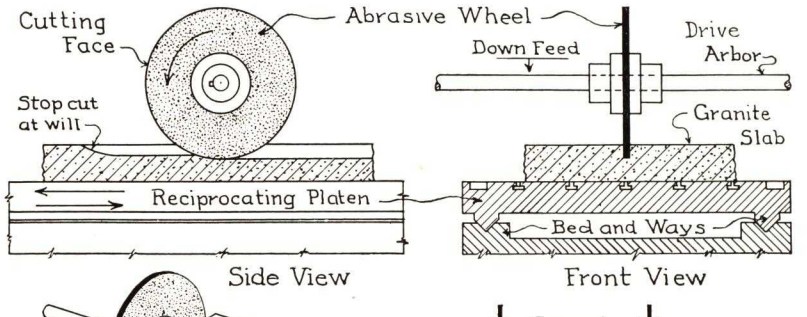
Small Saws—⅝"
Average Saws—¾"
Large Saws—⅞" to 1⅛"

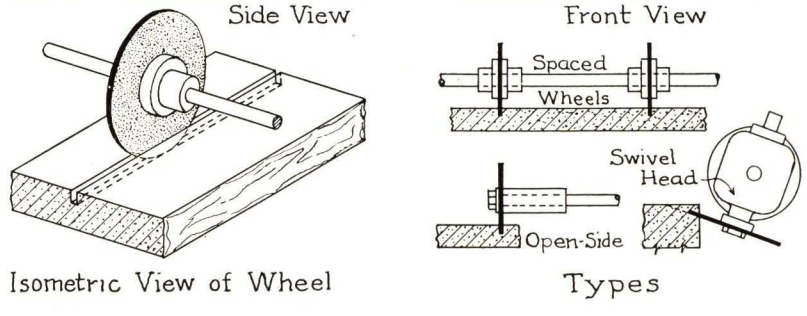
COST

Three to seven blades most economical for average sawing. Ordinarily no additional saving for slabs under 3" or 4" thick. Veneer under 2" thick will ordinarily cost more per sq. ft. than 4" work.

MAXIMUM SAW BLOCK SIZES	LENGTH—A	HEIGHT—B	WIDTH—C
Small Gang Saws	10 ft.	5 ft.	5 ft.
Average Gang Saws	12 or 14 ft.	6 or 7 ft.	6 ft.
Special Gang Saws	14 to 18 ft.	6 to 14 ft.	.....
Rotary Saws	No limit	3½ to 5 ft.	.....

THE ABRASIVE SAW—EDGING AND COPING MACHINE





DATA

Wheel sizes up to 30" in diameter.

Thickness of wheel and cuts—3/16" to ½".

Depth of cut—3" practical, up to 9" possible.

Special wheels for flats, washes and molded forms up to 6" wide.

APPLICATION

Edging and jointing.
Small heads and chamfers.
Checks, rabbets and drips.
Small moldings and line ornament.

INFORMATION

of the more important processes now utilized are briefly outlined here as a matter of information and possible aid to the designer and specification writer.

THE SAND BLAST PROCESS

The cutting medium is white silica sand or other abrasive, driven at high velocity through a hand controlled nozzle. For ornament or lettering the face is covered with a rubber-like blanket in which a stencil of the design is cut out, leaving only those parts of the granite exposed which are to be etched.

APPLICATION

1—Cleaning and finishing sawed surfaces.

2—Relieving carving and projections, and for perforated work.

3—Etching surface ornament, low relief carving, and lettering.

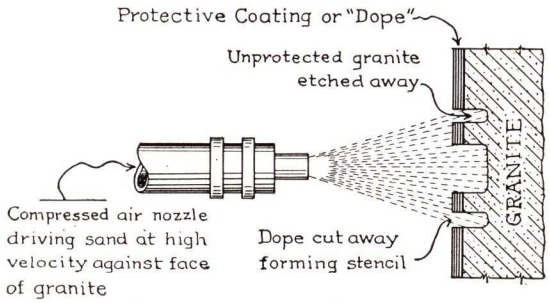


Diagram Showing Principle of Sand Blasting Process

MACHINE POLISHING

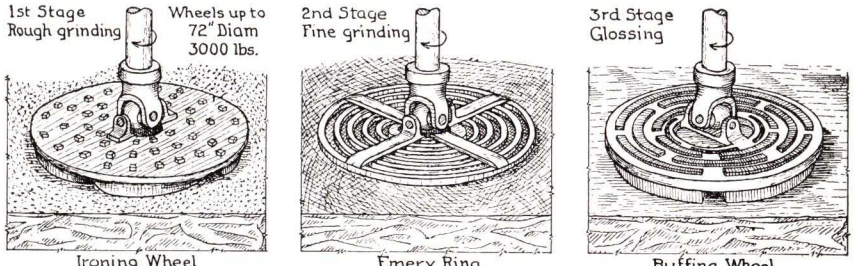
APPLICATION

For rubbing, honing and polishing sawed or roughly levelled surfaces.

Plane surfaces without projection.

Plane surfaces below a projection (as a nosing), if clear of projections on three sides.

Small surfaces, using small hand-controlled machines.



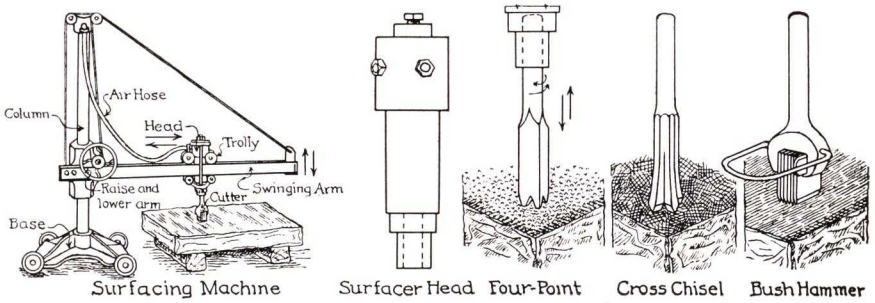
Ironing Wheel (Steel Shot) | Emery Ring (Fine Abrasive) | Buffing Wheel (Putty Powder)

PNEUMATIC SURFACING MACHINES

APPLICATION

Roughing, pointing and bushing plane or flatly curved surfaces.

For finishing practically every bush-hammered surface of any considerable area, from the rough or sawed.

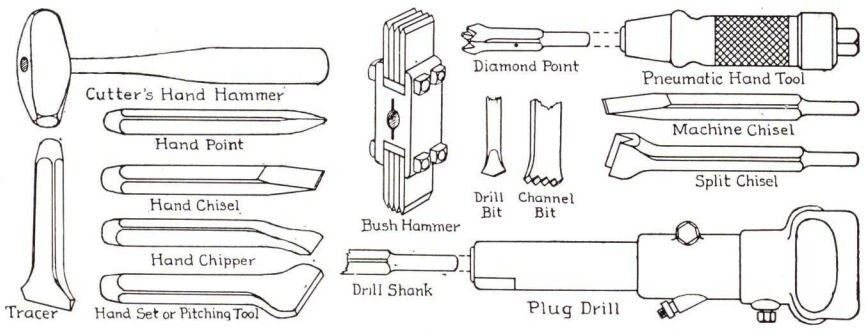


Surfacing Machine | Surfacer Head | Four-Point | Cross Chisel | Bush Hammer

HAND CUTTING TOOLS

APPLICATION

Hand work is required where a sawed surface cannot be utilized, or an edge or sinkage produced by sawing. This applies generally to molded work, surfaces below a projection, heads, internal angles, beds and joints unless sawed, and practically all irregular pattern stones.



LIST OF MEMBERS

COLD SPRING GRANITE COMPANY
Cold Spring, Minn.

DEER ISLAND GRANITE CORPORATION
5617 Grand Central Terminal Building, New York

H. E. FLETCHER CO.
West Chelmsford, Mass.

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Philadelphia,	Gavin W. Muir, Architects Building

JOHN L. GOSS CORPORATION
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Sales Office, 77 Summer Street, Boston, Mass.

Representatives:

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Philadelphia,	Frank Williamson, 2302 Spruce Street
Los Angeles,	Bly Stone Co., 1985 East 16th Street

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S. HASKEL & SONS, INC.
100 Harrison Place, Brooklyn, N. Y.

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Baltimore,	James J. Miller, 1822 Bolton Street
New York,	A. M. Goldsmith, 5629 Grand Central Terminal Building

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SAMPLE EXHIBITS

Architects Samples Corp., 101 Park Avenue, New York
Master Stone Cutters Assn., Architects Building, Philadelphia
The Association Office, New York

NATIONAL BUILDING GRANITE QUARRIES ASS'N, INC.

5619 Grand Central Terminal Building
NEW YORK

Telephone Murray Hill 9-2465

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ESTABLISHED 1837

SULLIVAN GRANITE COMPANY

INCORPORATED 1907

Sole Producers of Extra Fine Grained Blue-White Westerly Granite
Known as Sullivan-Westerly Granite

WESTERLY, R. I.

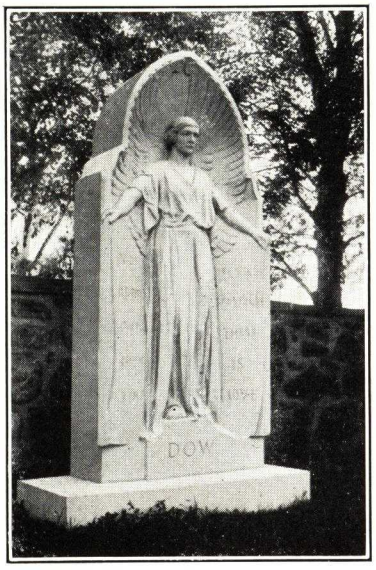
SULLIVAN-WESTERLY GRANITE

One Quality—One Price—One Name—Always the Same

The Extra Fine Grained Blue-White Westerly Granite is used for Mausoleums, Monuments, Statues and other Memorials. Trade name SULLIVAN-WESTERLY GRANITE.

CHARACTER OF GRANITE

All the Westerly Granite known as Extra Fine Grained Blue-White Westerly Granite is quarried by the SULLIVAN GRANITE COMPANY. This Granite is uniform in color, white when hammered, and very fine grained and exceedingly hard. Because of its especially fine grain this granite is particularly suited for memorial purposes. Its hardness and clear light color give effective definition to the most delicate details of ornament. When polished it is a bright blue color.



Dow Memorial

Sullivan-Westerly Granite, quarried since 1837, has been proved absolutely dependable in every respect.

ONE GRADE ONLY

Only one grade of Sullivan-Westerly Granite, of unvarying fine quality, is sold; at one standard price. When you specify Sullivan-Westerly Granite for a memorial, you are sure to get perfect granite as only one grade, the best, is used for monumental work.

LARGEST BLOCKS AVAILABLE

Every modern device for quarrying and handling granite in all sizes is used by the SULLIVAN GRANITE COMPANY. This makes it possible to fulfill large contracts promptly and satisfactorily. Some of the largest granite blocks ever produced have been shipped from these quarries.

Our tracks are connected with the main line of the New York, New Haven & Hartford Railroad.

SERVICE

Architects and other users of granite are invited to visit our quarries at any time.

Prompt attention is given to requests by mail for information or estimates. Samples are willingly furnished upon request.

LONG LIFE TERRAZZO FLOORS

Westerly granite granules are the best adapted for terrazzo work where long wear and beauty of color is desired.

Our granite has a crushing strength of 29,500 pounds per square inch.

At the same time it machine rubs well and can be used with marble, thus giving longer life to such floors, or it can be used by itself as desired by the architect.

Prepared in sizes 1, 2 and 3 and in colors from blue to pink.

Particularly adapted for floors subject to trucking or other hard wear.

APPALACHIAN MARBLE CO., INC.

Quarriers and Manufacturers of Appalachian Tennessee Marble
Manufacturers of Foreign and Domestic Marble
KNOXVILLE, TENN.

MARBLE IN THE MODERN HOME

The use of marble in and around the modern home is no longer considered a luxury. Appalachian Tennessee Marbles possess beauty, cleanliness and durability and at the same time suggest a dignified luxury not apparent in any other decorative material.

The following illustrations show a few of the many possibilities of marble as applied to different features of the modern home.

We are producers and finishers of Appalachian Tavernelle, Appalachian Roseal, Appalachian Golden Vein, Appalachian Gray, Appalachian Dark Chocolate, Appalachian Mahogany, Bond Pink, American Pink and other Appalachian colors. We also furnish and finish foreign and domestic marbles.

Polished samples showing the beauty of Appalachian Tennessee marble will be sent to those interested upon request.

Quality

Appalachian Marbles are Class A rating, requiring no sticking or waxing; they take a high and permanent polish. They are non-absorbing, strong and easily worked.

	Average
Co-efficient of absorption	.047
Tensile strength (transverse to bed)	1,554 lbs. per sq. in.
Tensile strength (with bed)	1,551 lbs. per sq. in.
Transverse strength (modulus of rupture)	2,686 lbs. per sq. in.
Compressive strength	18,274 lbs. per sq. in.

These tests made by U. S. Bureau of Standards and reported by T. Nelson Dale, Retired Geologist, U. S. Geological Survey.

Exterior and Monumental

Owing to strength and non-absorbing qualities, together with the beautiful effect in the finished operation, Appalachian Tennessee Marble is especially adapted to exterior and monumental work in any climate.

Standard Thickness

Appalachian Marble is cut in standard thicknesses. They are (after honing and polishing) : 7/8, 1¼, 1½ and 2 inches. Other thicknesses on order.

Floor Tile and Stair Treads

Appalachian Tennessee Floor Tile comes in 8x16, 10x20 inches and 12 inches square, standard sizes. It can also be obtained in special sizes the architect may desire for exactly carrying out his own ideas. It can be had in a wide variety of beautiful colorings.

Appalachian Floors and Treads are low in initial cost, low in maintenance cost and last the life of the building. They are easy and economical to keep clean, materially reduce the dust nuisance and make for better health. They subdue traffic noise and afford a safe, comfortable walking surface.

The 8x16 and 10x20-inch tile are always on hand, and shipment can be made on receipt of order.

Fireplace of Appalachian Marble

Fireplaces

There is no other item in the interior features of domestic architecture that plays such an important part as the fireplace and its mantel. Marble has unlimited possibilities in this connection and lends dignity and warmth not obtainable in other materials.

Appalachian Marble can be furnished in many colors and shades to suit individual tastes and color schemes.

Sun Room Floors

Entrance halls and sun rooms are made cool and attractive by the use of Appalachian Tennessee Marble Floor Tile and Base.

The characteristic density of Appalachian Tennessee Marble makes it impervious to all ordinary stains and easy to maintain in its original beautiful condition. An occasional mopping with cold water is all that is necessary to its upkeep.

The neutral background of Appalachian Tennessee Marble Floors will blend with any decorative scheme, while its delicate colors and veining escapes monotony.

Ashlar

Appalachian Marble Tile for ashlar, either hone or polish finish, can be furnished in our standard tile sizes at prices which make marble ashlar available for the comparatively moderately priced home as well as for more pretentious structures. This is because it is one of our by-products.

Tennessee Granito

Sizes No. 1, 2 and 3 for terrazzo floors. In three colors—select light colored, pink and dark cedar.

Abrasive hardness meets all Government specifications.

Tennessee Marble Flagstones

For sun rooms, terraces, garden walks and stepping stones. Can be laid in distinctive and exclusive design, in shapes just as taken from our yard.

To meet the increasing demand for such uses of Tennessee Flagstones, we have provided large storage facilities and can give immediate delivery.

Samples

Polished samples, showing the beauty of the Appalachian Marbles, will be sent to any interested architect or contractor, upon request.

Price

Because of quantity production Appalachian Marbles, although as beautiful as most fine foreign marbles, are a great deal cheaper in price. For the same reason, the cost of Appalachian Marbles is also lower than the majority of first quality domestic marbles.

Installation

Appalachian Marble has been manufactured exclusively by us for over twenty years. More than $1,000,000.00 of it is sold annually in England, Canada, Latin America and every state of the Union.

Many of the most noted public and office buildings, churches, schools, theaters, hospitals, stores, banks, etc., have interiors, including floors and ashlar work, of Appalachian Marble.

Floor Tile and Stair Treads

Foreign Marble

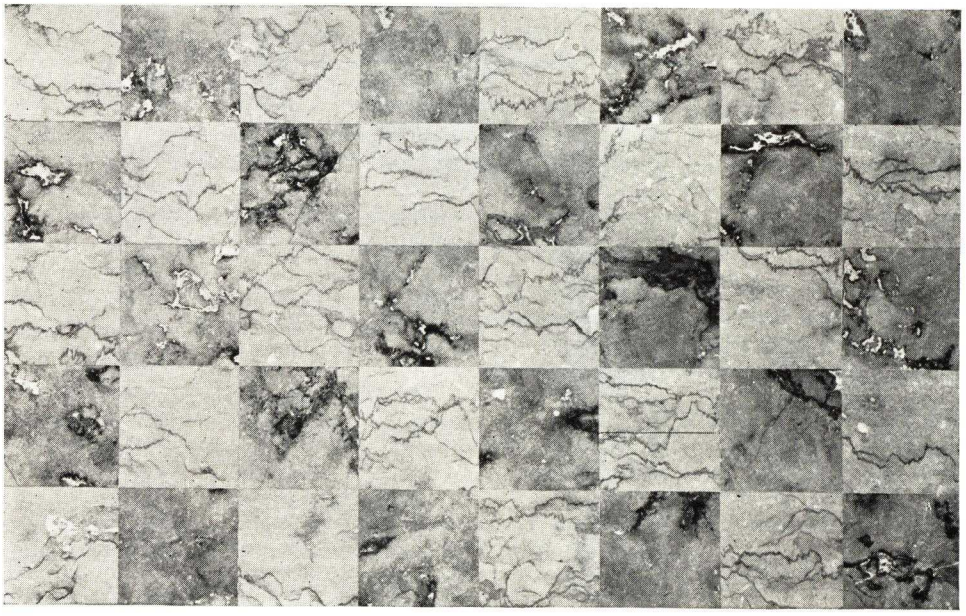
Our established connections with the leading foreign quarries enable us to manufacture practically any desired foreign marble at a substantial cost saving.

Prompt Shipments, Low Rates

Huge production facilities and entire absence of labor troubles insure quick deliveries. Freight rates on marble from the Appalachian mill are estimated at commodity rates to all points in the United States and Canada.

All Marble from One Source

Though a project may contemplate the use of foreign marble in addition to Appalachian Tennessee and other domestic marble, the complete cost estimate may be obtained from the Appalachian Service Department. Obtaining all marble from one source is not only a convenience but has definite shipping and price advantages.



Appalachian Marble for Walls and Floors of Modern Bathrooms

By means of special machinery which greatly reduces the cost of the manufacture, the APPALACHIAN MARBLE CO., INC. offers genuine marble tile for the walls and floors of the modern bath, as well as marble stools for radiator tops.

The tiles are ⅜ to ½ in. thick, cut to standard shape and size.

It is classified and specified under "Tile Work" to be set by the Tile Contractor, using either the buttering or the floating method.

Appalachian Marble Tiling is naturally free from cracks, chipping and crazing and, most important, it remains fast in color.

Being light in weight, it does not require special support or backing.

Genuine marble tile can be adapted for many uses and obtained in any of our Appalachian Marbles, enabling the architect and owner to have the natural beauty and permanency of marble at greatly reduced cost.

Cost Estimates and Co-operative Service

The Service Department of the APPALACHIAN MARBLE CO., INC., welcomes the opportunity to co-operate with the architect.

This co-operation reaches its highest state of efficiency when architects furnish the Appalachian Service Department with blue prints of the projects upon which they are working. The Service Department is then in a position to carefully estimate on work and offer all possible co-operation.

Marble Working Drawings

Complete marble working drawings are made up by our drafting department to be used in submitting to the architects for approval as to jointing and for the securing of accurate Building Measurements.

Catalogue

A copy of the elaborate Appalachian looseleaf catalogue, illustrated in colors, will be gladly furnished to architects and others interested in interior marble.

REPRESENTATIVE MARBLE CONTRACTS RECENTLY COMPLETED

Department of Labor and Commerce, Washington, D.C.
United States Post Office, Gardner, Mass.
Columbus City Hall, Columbus, Ohio
Pottsville City Hall, Pottsville, Pa.
Home Bank Building, Durham, N. C.
Harrison School, Ogden, Utah
Sacramento Memorial Mausoleum, Sacramento, Calif.
Fordtran Residence, Asheville, N. C.
Baker Residence, Miami, Fla.

CARTHAGE MARBLE CORPORATION

Producers of Interior and Exterior Marbles
Fabricators of All Foreign and Domestic Marbles

QUARRIES AND MILLS
CARTHAGE, MO.

BRANCH SALES OFFICES
NEW YORK, N. Y., Alexander Thomson & Co. CHICAGO, ILL., John W. Sinding SAN FRANCISCO, CALIF., John M. Fabbris

PRODUCTS

Ozark Gray Interior Marbles: Tavernelle, Veined and Fleuri
Carthage Exterior Marble.
Finished Foreign and Domestic Marbles.

FACILITIES

Carthage Marble Corporation is equipped to accommodate architects on jobs of any size. Facilities include 5 quarries, 15 channeling machines, 35 gang saws, 10 rubbing beds, 15 polishing machines, 2 carborundum planers and 6 steel planers.

DESCRIPTION

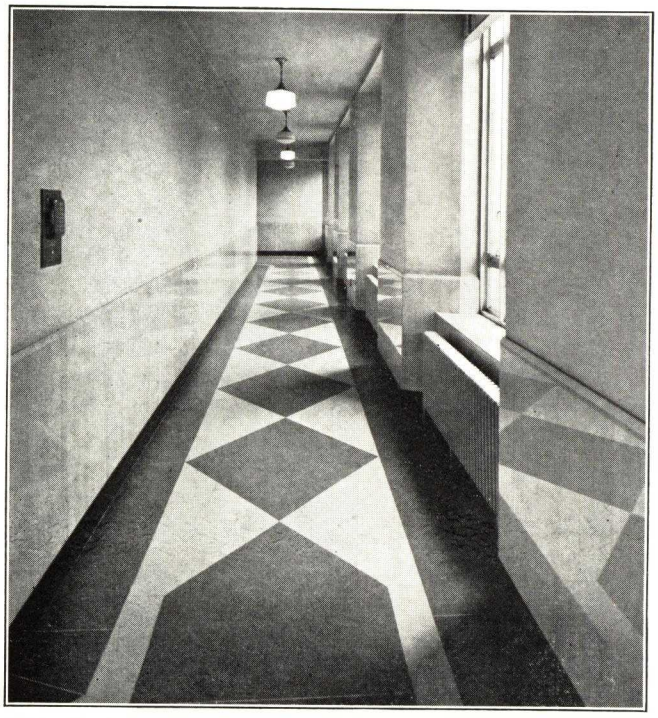
Ozark Tavernelle Marble has a soft light gray, clear face. Almost a monotone, it has a dignified effect of richness.

Ozark Gray Veined has the same texture as Tavernelle, but it is veined and slightly darker in color.

Ozark Fleuri has a soft, light background with a variation of darker cloudings on the face. Ideal where the architect desires a variegated effect.

In combinations, these three marbles can be adapted to the widest variety of architectural designs. Their colors and textures form unusually happy blends.

Carthage Exterior Marble is the ideal marble for exterior building. A warm gray, almost white, with a crushing strength of 20,000 pounds, absorption ¼ of 1%, abrasive hardness of 17.



Office Corridor—U. S. Courthouse and Custom House, St. Louis, Mo.
Mauran, Russell & Crowell, Architects
70,000 sq. ft. of Ozark Marble installed in this modern building

A FEW RECENT INSTALLATIONS

Municipal Auditorium, Kansas City, Mo.
Bank of Manhattan, 40 Wall Street, New York, N. Y.
Stanford University, Palo Alto, Calif.
U. S. Post Office, Little Rock, Ark.
Administration Building, Triborough Bridge, New York, N. Y.
U. S. Post Office, St. Louis, Mo.
I. C. C. Building, Washington, D. C.
U. S. Federal Courts, New York, N. Y.
Rosenwald Museum, Chicago, Ill.
First National Bank, Oklahoma City, Okla.
Paxton Hotel, Omaha, Neb.
Forest Lawn Mausoleum, Glendale, Calif.
Municipal Auditorium, Denver, Colo.
University of Illinois, Urbana-Champaign, Ill.

SUGGESTED SPECIFICATIONS FOR OZARK INTERIOR MARBLE

Special Note—The "General Conditions of the Contract," the "Special Conditions" and other documents bound herein, are a part of this specification and the Contractor shall consult them in detail for instructions pertaining to his work.

Work Required—The work to be done under this contract includes the furnishing of all labor, materials, equipment and services necessary for and properly incidental to the completion of all interior marble work throughout the building, as shown on the drawings and herein specified, excepting only work noted as being done by others.

This contractor shall install all hardware as hereinafter specified which is directly connected to the marble work. Hardware shall be furnished by Finished Hardware Contractor.

Distribution—All marble as shown on drawings shall be Ozark (specify variety) marble.

Marbles—All marble used shall be sound and free from spalls, shakes, sand holes or other defects that would impair its strength, durability or appearance. Natural variations in color, texture or markings that do not impair the strength or durability, will be permissible. Any marble that is cracked or broken either before or after delivery at the building will be rejected.

Special care shall be taken in matching the color and figures throughout the entire installation.

Drawings—Complete cutting and setting drawings shall be furnished by the Interior Marble Contractor showing the jointing, as well as the size of all pieces and other necessary information. All dimensions must be verified at the building.

Installation—This Contractor shall set all marble work in the best possible manner. Only experienced and competent setters shall be employed and this Contractor shall do any trimming, fitting, etc., to overcome inaccuracies and to make the materials fit and conform to the conditions existing at the building and so as not to delay the work.

All vertical marble shall be securely anchored in place with copper or soft brass wire and bedded in plaster of paris.

The backs of all mullions for toilets and showers shall be slotted to receive the division and the end of the division shall be let into the recesses formed in the wainscoting for back lining.

All cutting shall be uniform, the edges being ground so that all joints can be brought as close as practical, and there shall be no change in the sections of offsets and similar details. All work shall be carefully fitted in the shop and precautions taken to prevent snipping or chipping of edges.

Finishing—All exposed surfaces of marble shall be highly polished.

Hardware—Finished Hardware Contractor will furnish hinges, strikes, etc., but Marble Contractor shall drill holes for same. Marble Contractor shall furnish all angles, anchors, etc., necessary for the installation of the work in connection with toilet stalls.

ESTABLISHED 1919

REES-VOLCKMANN CO., INC.

Wholesale Dealers, Importers, Quarry Agents of Foreign, Vermont and Tennessee Marbles, Pennsylvania and Vermont Slate

TELEPHONE
LUdlow 4-0981-2

344 Walnut Avenue
NEW YORK, N. Y.

Our purpose is to maintain and have available at all times large stocks of the best quality and choicest staple Foreign, Tennessee and Vermont Marbles. Our facilities, together with the well-known producers here and abroad for whom we distribute and whom we represent, place us in an unexcelled position to execute requirements promptly and efficiently.

Genuine CH Hauteville

We are the sole representatives for the United States, Canada and Cuba for this celebrated close-grained, buff colored marble. The quarry is producing large quantities

Section of CH Hauteville Quarry, France

of blocks of unsurpassed quality, large sizes and uniform color. Reasonable requirements can be supplied from fresh shipments in New York, while large inventories are carried at the quarries abroad. This is again becoming a popular marble and is winning approval of the leading architects. CH Hauteville is, and always has been, a dependable decorative marble for all purposes.

Foreign Marbles

All our imported marbles are selected and carefully inspected by our foreign representative, and our policy has always been *"quality first."*

Among the marbles we import and distribute are: *Genuine CH Hauteville, Belgian Black, Blue Belge, Botticino, Red Levanto, Roman Travertine, Alps Green, Black and Gold, Rosato, Red and Yellow Verona, Forest Green, Rouge Royal, Breche Violette, Statuary and English Veined Italian, Ordinary Italian.*

Domestic Marbles

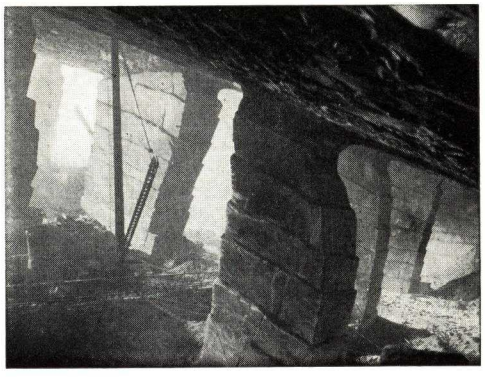
Tennessee, John J. Craig Company, Knoxville, Tenn.—We are the sole representatives in the New York District and New England Territory for the products of the John J. Craig Company, Knoxville, Tenn., producers of many well-known varieties of Tennessee—*Diamond C Craig Pink, Marmor Pink, Royal Rouge, Hamil Pink, Hamil Gray, Victoria Pink, Campania Light Rose, Campania Deep Rose, Monte Neva, Baker Dark, Henderson Dark, Craig Edward, Hamil Edward, Morrocco Black.*

Several of the above marbles are highly colored and decorative.

Laboratory tests verify that Tennessee marbles are superior for many uses. Absorption, freezing and crushing—strength tests prove them unsurpassed where these factors are essential.

The above Tennessee products, together with all other foreign and domestic marbles, are fabricated and erected by the *Candoro Marble Company, Knoxville, Tenn.,* in their large finishing mill.

Vermont—We are wholesale dealers and distributors



Section of a Vermont Quarry

in the New York Metropolitan District for the many well-known marbles produced by the *Vermont Marble Company, Proctor, Vermont.*

Slate

Bolger-Heller Slate Co., Bangor Pa.—"Paramount" Albion-Bangor Pennsylvania Slate — Slate for roofing, structural use, blackboards, etc. We represent the Bolger-Heller Slate Co., Bangor, Pa., quarriers and manufacturers, and are prepared to furnish quotations for any purpose. This company is equipped with a modern plant and machinery for executing orders promptly and efficiently.

Vermont Colored Slates—We also represent the *Vermont Slate Flooring Corp., Poultney, Vt.,* producers and manufacturers of Vermont colored slate for structural use, roofing and flagstones.

We invite Inquiries from Architects and Owners and should be pleased to forward Samples and Further Information

VERMONT MARBLE COMPANY

Producers and Manufacturers of Exterior and Interior Marbles
Finishers of Foreign Marbles for Interior Purposes

PROCTOR, VT.

BRANCHES AND SALES OFFICES

ALBANY, N. Y., 805 State Bank Building
BOSTON, MASS., 44 School Street
CHICAGO, ILL., 228 No. LaSalle Street
CLEVELAND, OHIO, 4300 Euclid Avenue
DALLAS, TEX., Vermont Marble Company of Texas, 1513 Wall Street
HOUSTON, TEX., Vermont Marble Company of Texas, 310 Bringhurst Street
LOS ANGELES, CAL., 727 West 7th Street, Suite 857
NEW YORK, N. Y., 101 Park Avenue
PHILADELPHIA, PA., 22nd and Westmoreland Streets
SAN FRANCISCO, CAL., 525 Market Street
TACOMA, WASH., East End 11th Street Bridge
TORONTO, ONT., Ontario Marble Co., Ltd., 403 Manning Chambers Building
WASHINGTON, D. C., Southern Building, 15th and H Streets, N. W.

Facilities

The company has large sawing mills and finishing plants in Vermont; also finishing plants in Philadelphia, Houston, Chicago, Dallas, San Francisco, Tacoma, and Peterboro, Ontario. (Ontario Marble Co., Ltd.)

At Tacoma is the storage yard for the Alaska marble for shipment in rough or finished state. It can also be supplied from any of the other plants.

Varieties

Vermont Marble—Over 40 varieties, including white, lightly clouded and veined; gray, light green and dark green; red and black.

Alaska Marble—Several kinds, pearl white veined with gray or black predominating.

Colorado Marble—The VERMONT MARBLE COMPANY now owns and operates the well-known quarries at Marble, Colo.

Foreign Marble

The VERMONT MARBLE COMPANY is ready at all times to provide, finish and install marble from European and other foreign quarries.

Interior Marble Service

We contract either for interior marble work installed or to finish and furnish it to local interior marble dealers, following whichever method will give best service to architects, contractors and owners.

Classes of Work Supplied—Wainscot and interior decorative treatment generally: floor tile, stair treads, bank screens, counter tops, soda counters, electric switchboards, scale tops, lamp bases, and many other purposes.

Marble Exhibit in New York City

There is an exhibit of large-sized samples of our marbles at our New York office in the Architects' Building, 101 Park Avenue, to which architects, engineers, contractors and owners are cordially invited.

Larger Display at Proctor

The *new marble exhibit* at Proctor includes more than 50 varieties of marble from our quarries in Vermont, Colorado, Montana and Alaska—wainscot and base, set in spacious booths in varied arrangements of color and veining. Visitors are welcome.

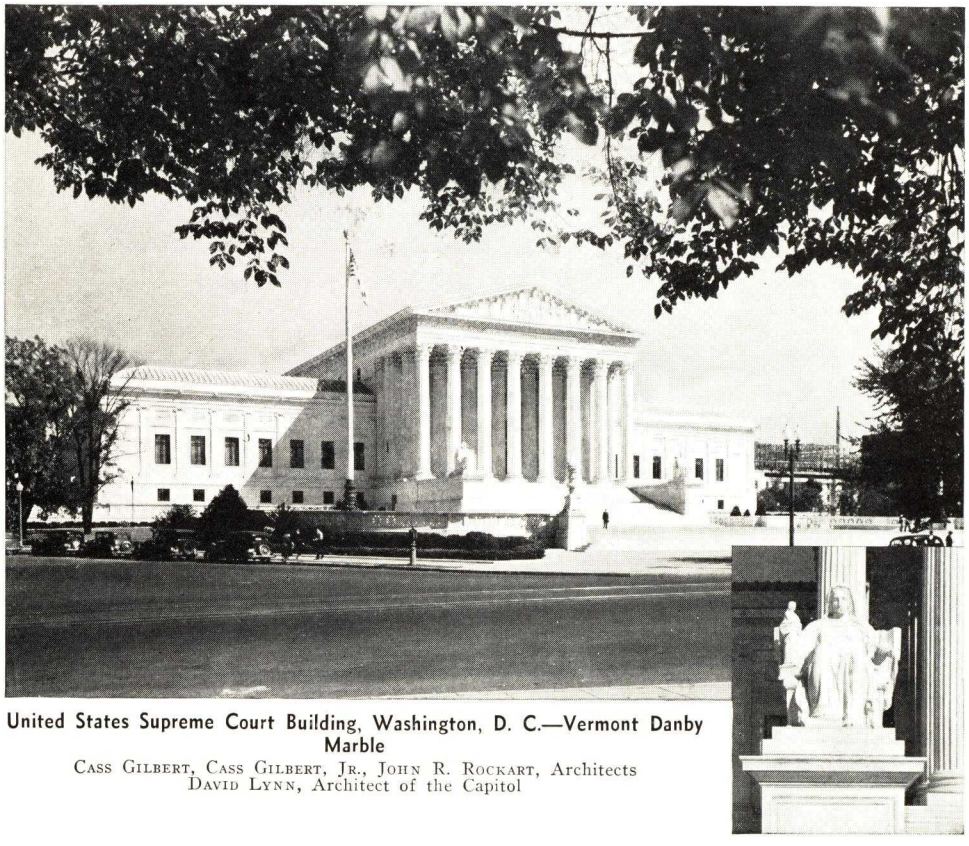
"The Book of Vermont Marble"

A book of standard filing size giving condensed information relative to the quarrying, finishing, setting and detailing of marble. Furnished without charge to any architect on request.

Adaptability

Innumerable are the ways in which Vermont marble may be applied to building construction. Nor is it merely a beautiful product. It is thoroughly sanitary as well as fireproof, though it may be readily cleaned.

Although initial cost of marble may be slightly in excess of certain other materials, in the end it is no more expensive.



United States Supreme Court Building, Washington, D. C.—Vermont Danby Marble

CASS GILBERT, CASS GILBERT, JR., JOHN R. ROCKART, Architects
DAVID LYNN, Architect of the Capitol

Inset:

One of the Figures of Danby Marble at Main Entrance to Supreme Court Building

JAMES FRASER, Sculptor

Care and Cleaning of Marble

Marble is entitled at all times to the treatment which is given to any other fine product. It should be kept free from dirt and sources of stain, not alone while the building is in progress, but throughout its long and serviceable life.

Marble needs no redecorating or refinishing but does need occasional cleaning, and that work should be intelligently done.

A little book issued by the VERMONT MARBLE COMPANY, contains all the necessary instructions. This book will be sent to any one who will take the trouble to write for it.

Internal Structure

All Vermont Marbles are made up of tightly interlocked crystals. This not only gives them strength and durability, but adapts them to sculptural and other intricate forms where fineness of detail is essential.

Composition

The composition of marble is less complex than almost any other stone. It is almost pure carbonate of lime, 98% or over in the form of the mineral calcite ($CaCO_3$).

A typical white calcite Vermont marble slightly mottled with gray, according to Geological Survey Bulletin 521, gives the following analysis:

Carbonates	99.174
Manganese and aluminum oxide	.005
Insolubles	.63
Organic matter	.08
	99.889

Compressive Strength

The importance of crushing strength is greatly overestimated. Most stones on the market will support ten times as much weight as is ever required of them.

It means little to the average person to say that a stone will stand so many thousand pounds to the square inch. It is much simpler to say that the marbles we recommend for exterior building work could be used in the base of a tower 2½ to 3 miles high before failure from compression alone would result.

Marble is unusually flexible. Blocks of stone used in a building are often subjected to a bending strain due to improper setting. The movement necessary to relieve the strain may be imperceptible but it is enough to crack the average stone. Most marbles are flexible enough to allow readjustments to take place instead of fracture.

The weight of marble is approximately 170 lbs. to a cubic foot.

Hardness

Hardness in a stone simply means that it will resist abrasion, not exposure to the weather.

The rock in which diamonds (the hardest known substance) occur is made of two minerals—one having a hardness of 6 to 7 Moh's Scale and the other a hardness of 5. The surrounding rock is made up largely of a mineral having a hardness of 2½. The diamond-bearing rock is much harder—yet it weathers and disintegrates so much more rapidly than the soft surrounding rock that circular depressions mark the place where it is found.

Absorption

The freezing of moisture, completely filling open spaces in a rock, is the most severe test to which that rock can be subjected. No stone has been found which is unaffected by this test. It follows, therefore, that other factors being the same, the best stone is one which will exclude moisture most completely.

Water expands when it freezes and forces the containing walls farther apart. Fracturing due to this cause increases greatly with the increase in absorption. Other things being equal the stones which absorb the most water will be least likely to endure.

The following statement was made by Dr. Hiram A. Cutting, the eminent geologist:

"I have no doubt that the capacity of a stone to absorb moisture is against its durability even in the warm climates, and vastly more so in a changeable and wintry climate where it is often frozen before any considerable part of the moisture from autumn rains can be evaporated."

In addition to the exceptionally low absorption of Vermont marble, all the pore space is not filled upon immersion.

The air that is locked in the micro-crevices is compressed under freezing conditions and acts as a cushion, saving the stone from the rupturing action of freezing.

In the flood of 1913 the Vermont marble interior of the City National Bank, Dayton, Ohio, was subjected to an unusual water test. Although it was submerged for three days, all that was needed to restore it to its original condition was a little cleaning.

Percentage of Absorption

The marbles which we recommend for exterior purposes have an absorption of approximately one-tenth of one per cent by weight. This absorption is less than that of any other masonry material.

Weathering

Marble is the result of a sedimentary formation that has been metamorphosed by heat and pressure to a crystalline product. In this process any unstable constituents have been reduced to their ultimate condition and cannot decay further from atmospheric agencies alone.

The CO^2 fumes in the atmosphere of the modern city, when combined with rain water, have a solvent effect on natural building stones. The effect is in proportion to the freedom with which the acid may move through a rock. Marble is so impervious to moisture that the action is limited to the exposed surfaces of the stone.

In the process of weathering there is formed a protective coating which is nature's own best preservative. That is one reason why we do not recommend the sandblast for cleaning.

Fire Resistance

Vermont marble will stand a heat of 1200° F. without injury.

The Security Savings Bank, San Francisco, a Vermont marble structure, was in the path of the great fire. Adjoining buildings of brick and stone were ruined by the intense heat, but the Security Bank remained intact. Several other cases of this kind might be cited.

VERMONT MARBLE COMPANY

LUMAR—A NEW VERMONT MARBLE PRODUCT

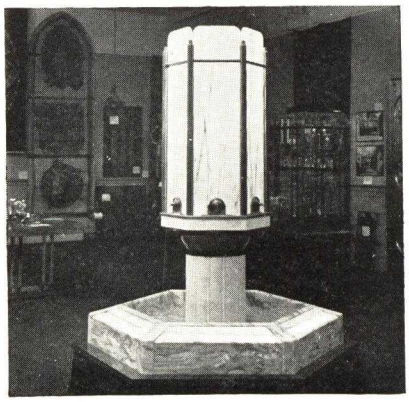
For Unusual Surface and Light Diffusion Effects

A Thin Translucent Marble Slab

Lumar is a genuine marble—not an imitation or a substitute—cut in panels that have the quality of efficient transmission of light, making possible new and distinctive light and color effects. The natural surface beauty of real marble is further enhanced by having sub-surface crystalline structure and hidden color and markings made apparent.

Lumar adds distinction, sales appeal and an aesthetic quality wherever the addition of light and color can bring new interest and beauty to marble. The addition of transmitted light transforms the marble so that two distinctly different decorative treatments are possible—unilluminated and illuminated. It is an integral part of the design in either case.

Lumar fills the need of a decorative material, incorporating all the inimitable beauty of a natural product.



Lumar Fountain

Designed by VAHAN HAGOPIAN for the Exhibit of the Architectural League of New York and now on display at the Chicago Lighting Institute.

Used For

Pilasters
Columns
Posts
Spandrels
Frieze Courses
Pylons
Wall Panels
Ceiling Panels
Screens
Counters
Showcases
Table Tops
Lettered Panels
Coves
Cornices

LIGHTING AND TRANSMISSION OF LIGHT

Ordinary electric bulbs of gaseous tubing are used. Colors and textures never before apparent on the surface under ordinary reflected light are made visible by transmitted light. The beauty of Lumar may be brought out in every degree from a dull warm glow to a brilliant radiance. High illumination is not necessary.

Colored bulbs and combinations of colored and white lights and flashing lights, all offer wide variations in effect and a warmth and beauty that is quite indescribable.

"Lumar Yule"—Eypel Store Front—Brooklyn, N. Y.
Installed by JAFF BROS., Long Island City, N. Y.

Lumar is not intended as a covering for light in the way in which illuminating glasses are used where high transmitting efficiency is required. A natural product of this kind, used in applications where pleasing effects and aesthetic beauty are more important than illuminating qualities, does not lend itself to a simple tabulation of lighting efficiencies and engineering data.

The architect must bear in mind that the efficiencies of light transmission used as standards for glass cannot be a guide with Lumar. The result secured with any given wattage with Lumar is an aesthetic appeal—a point of beauty and interest—an attention-drawing quality. The result should not be judged in the illuminating efficiency of the light transmitted.

These variables should be considered: (1) Extent of illumination that the purchaser or designer considers pleasing and adequate. (2) Amount of adjacent illumination. (3) Position and efficiency of lighting units and reflectors. (4) Color of lights. (5) Natural variations in color and markings of Lumar.

The co-operative advice of an illuminating engineer, or the local lighting company, will be found helpful. Ventilation for concealed lights and accessibility for replacements are essential. In general, metal mouldings are necessary for installation. The same type of construction used for glass panels is satisfactory.

Lumar can be set directly into the masonry. Narrow piers or mouldings of brick or marble may be introduced as supports when necessary. Single Lumar panels easily fit into a rabbet cut in the adjacent marble.

GENERAL COLOR OF LUMAR MARBLES

"Lumar Yule"—Finely lined striations, golden brown markings.

"Lumar Pavonazzo"—Green clouds floating in a field of deep creamy yellow.

"Lumar Green Vein"—Sunset colors, crossed by bands of soft green.

"Lumar Brocadillo"—Bands and bars of alternating green and yellow.

"Lumar Antique"—Golden—combination of light and dark wavy effects with crystal clear areas of quartz.

MARKWA—A NEW MEMBER OF THE TILE FAMILY

Through the introduction of special equipment the VERMONT MARBLE COMPANY is offering genuine marble in tile form, ½-in. thick, cut to standard sizes and grooved on the back like glazed tile. This is known as "Markwa" and is specified as tile. It will appeal particularly to those who appreciate marble's individuality in color and veining and wish to avoid monotony in wall treatment.

Markwa is provided in one grade only. The substitution of second for first quality may be permissible in other materials, but is not possible in Markwa. A single grade assures architects, contractors and owners of the best material with no substitution.

Markwa may be used alone or combined with other kinds of tiling, contributing richly to the decorative effect. Being a natural product of the quarry, it is subject to variations in color and veining.

No selection of pattern or marking can be made nor is any matching possible, but a random assembly in setting will produce a beauty not obtainable in man-made products.

Markwa No. 52—Dining Porch of "Tomorrow's Home"
Designed by HARRISON and FOUILHOUX

Finishes

The standard finish of Markwa is Bright (gloss), and is intended primarily for interior walls. Matt finish (dull, with little or no reflective quality) and Flemish Non-slip finish can be substituted without extra cost. These last two finishes are adapted for floors.

Bonding Surfaces

The back of Markwa has two parallel bonding grooves approximately ¼-in. wide and from $\frac{1}{16}$ to ⅛-in. deep. The surface of the back is rough, and this, with the grooves, insures a tight bond in erection.

Durability

The finished surface of Markwa is an integral part of the structure and will not crack, chip or craze. Any superficial damage to the finish can be corrected by refinishing in place. Markwa is fireproof. It is free from imperfections, such as pinholes and warped faces. It is fast in color and will not fade.

Varieties

The delicate tones and markings of Markwa cannot be exactly described but bulletins are available from the Company which describe the general veining characteristics and a number system to be used in specifying.

Sizes

Standard sizes are 6x12, 9x9 and 12x12 in. Other sizes, over 6 in. square, can be considered as "special standard" if ordered in lots of 100 or more, but both dimensions (length and height) must be in full inches (no fractions).

Markwa No. 52 Installed in Bath in Private Office of a Noted Executive, Chanin Building, New York

Markwa is not more than ½-in. thick or less than $\frac{7}{16}$-in. The toleration in the fabrication length or width may be $\frac{1}{32}$-in.

Sizes less than 6x12 or 9x9 in. are not recommended.

Special pieces and moulds, such as bullnose cap, corner trim, cove and capping will be manufactured on order.

Weight

The weight of Markwa, unboxed, is about 7 lbs. a sq. ft. See Producers' Council Bulletin No. 22 for further information.

Specify Markwa as Tile

ALBERENE STONE CORPORATION OF VIRGINIA

419 Fourth Avenue, NEW YORK, N. Y.

ATLANTA, GA.
BOSTON, MASS.
CHICAGO, ILL.
CLEVELAND, OHIO
FORT WORTH, TEX.
LOS ANGELES, CAL.
NEWARK, N. J.
NEW ORLEANS, LA.
PHILADELPHIA, PA.
PITTSBURGH, PA.
RICHMOND, VA.
ROCHESTER, N. Y.
WASHINGTON, D. C.

QUARRIES AND MILLS AT SCHUYLER, VA.

Alberene Soapstone

Alberene Soapstone, natural quarried stone of medium hardness, blue-gray in color, produced and fabricated for Exterior Trim of all kinds, including Spandrels, Sills and Stools, Base, Plinths and other Interior Trim; Fireplace Linings, Hearths and Facing; Chemical Laboratory Work; Toilet and Shower Compartments.

Virginia Alberene Stone

Alberene Stone, selected stone of extreme hardness, reserved exclusively for Stair Treads, Landings, Platforms, Borders and Flooring. Its rubbed-finish, highly-toothed surface remains non-slip whether wet or dry. Abrasive tests of Alberene Stone show the highest durability factor on the U. S. Bureau of Standards scale of any natural stone commercially used for these purposes.

Virginia Black Serpentine

A natural stone of the serpentine family. Becoming extremely popular because its polished black surface affords excellent contrasts for modern design. Use of thin sections (⅞ in.) makes for economy, and affords greater depth of reveal. Its high resistance to weather-action makes it desirable for Exterior as well as Interior use. When sand-blasted, the fine tracery of the designs stands out against the polished black surface.

Virginia Tremolite Green

An interesting addition to the line. In honed finish, shows clear white markings. Polishes to a dark green.

Physical Properties of Alberene

All Alberene Stone is homogeneous and finely granular in all directions, dense and non-stratified, free from cleavage lines, easily cleaned and kept clean. Use of thin sections (⅞ in.) makes for economy. Alberene Soapstone is easily machined—bored, slotted, grooved, tongued, turned—without splitting or chipping.

Color Value of Alberene Shown by Samples

There is a wide variety of tones and textures in these natural stones and we suggest that you send for a copy of "Architectural Alberene," which contains plates in full color. Set of samples, conveniently boxed, showing range of stones, including mottled dark blues and greens, from the Alberene Quarries, will be sent gladly on application.

Manufacturing Facilities

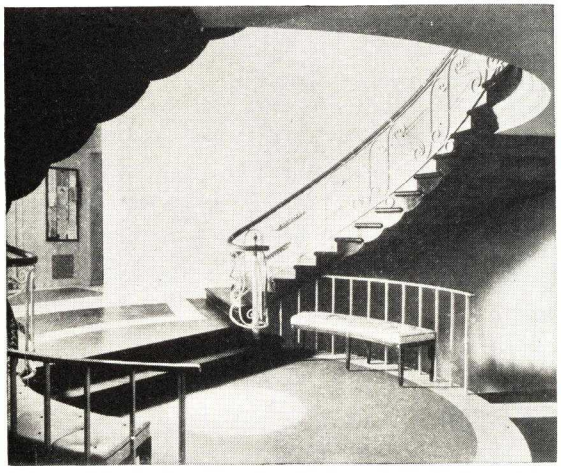
Quarries and Mills at Schuyler, Va., are largest in the world devoted exclusively to production and fabrication of special purpose stone. Private railway connects with main lines of C. & O. and Southern Systems. Prompt delivery, uniformity of workmanship and finish assured.

Typical Spandrel Installations of Alberene Soapstone

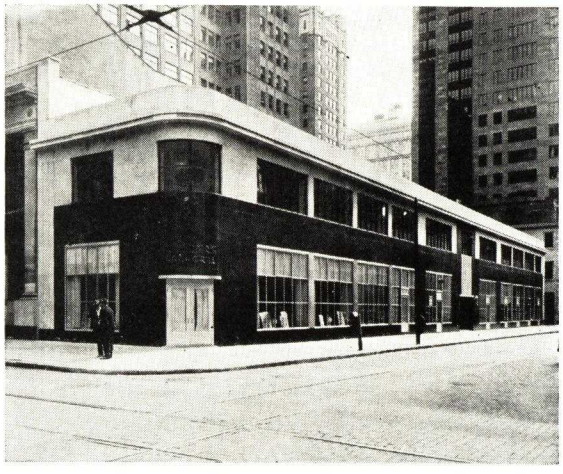
School of Education, New York University, New York, N. Y.; James Gamble Rogers, Architect
Buffalo City Hall, Buffalo, N. Y.; Dietel & Wade and Sullivan W. Jones, associated Architects
Huron and Erie Bldg., London, Ont.; Watt and Blackwell, Architects
Westchester County Office Bldg., White Plains, N. Y.; Morris & O'Connor, Architects
Stumpp and Walter Bldg., New York, N. Y.; Starrett & Van Vleck, Architects
Shillito Store, Cincinnati, Ohio; Potter, Tyler & Martin, Architects

Typical Exterior Installations of Virginia Black Serpentine and Virginia Tremolite Green

Rundell Memorial Library, Rochester, N. Y.; Gordon & Kaelber, Architects
Miltenberger Memorial Home, New Orleans, La.; Weiss, Dreyfous & Seiferth, Architects
Federal Reserve Bank, Washington, D. C.; P. P. Cret, Architect
Orange County Courthouse, Orange, Tex.; William Page, Architect
280 Madison Ave., New York, N. Y.; Walker & Gillette, Architects
Central Bank of Grand Rapids, Grand Rapids, Mich.; Knecht, McCarty & Thebaud, Architects
Barnard Hall, Hofstra College, Hempstead, N. Y.; Aymar Embury II, Architect
Senior High School, Norristown, Pa.; Davis & Dunlap, Architects



Solid Serpentine Cantilever Treads, Cosmopolitan Club, New York, Thomas Harlan Ellett, Architect. Medal of Honor in Architecture, Architectural League, N. Y.



Tilden, Register & Pepper, Architects, used a veneer of Virginia Black Serpentine for this building in Philadelphia's business center

CUT STONE ASSOCIATION OF INDIANA

AN ASSOCIATION OF

Producers and Fabricators of Indiana Limestone

P. O. Box 57, BLOOMINGTON, IND.

MEMBER FIRMS

Bedford Cut Stone Company, Bedford, Indiana.
Bloomington Limestone Corporation, Bloomington, Indiana.
Bowman & Schwab Stone Company, Bloomington, Indiana.
Fagan Stone Company, Inc., Bloomington, Indiana.
The Carl Furst Company, Bedford, Indiana.
Monon Stone Company, Bloomington, Indiana.
Shawnee Stone Company, Bloomington, Indiana.
Swenson Stone Company, Bloomington, Indiana.
Woolery Stone Company, Bloomington, Indiana.

INDIANA Oolitic LIMESTONE

The Product

Indiana Limestone is nationally known. Its permanence, durability and general utility have been firmly established by its use over a period of more than three-quarters of a century in many of this country's most architecturally prominent buildings and it enjoys the distinction of being the most used building stone in America.

Its good structural and pleasing color tone characteristics, together with its excellent working qualities, render Indiana Limestone particularly adaptable to the economical interpretation of all types of architectural design.

Classifications—Regular Grades

Select Buff
Standard Buff
Rustic Buff
Select Gray
Standard Gray
Old Gothic

Variegated (a promiscuous combination of Buff and Gray).

Description of the various grades of stone will be furnished on request. The Quarry and Mill capacity of member firms exceeds any probable demand.

INDIANA LIMESTONE

THE NATION'S BUILDING STONE

The U. S. Bureau of Mines, in their report on the Indiana Oolitic Limestone Industry in 1936, states: "The district surrounding Bedford and Bloomington furnishes between 85 and 90 per cent of the total building limestone produced in the United States."

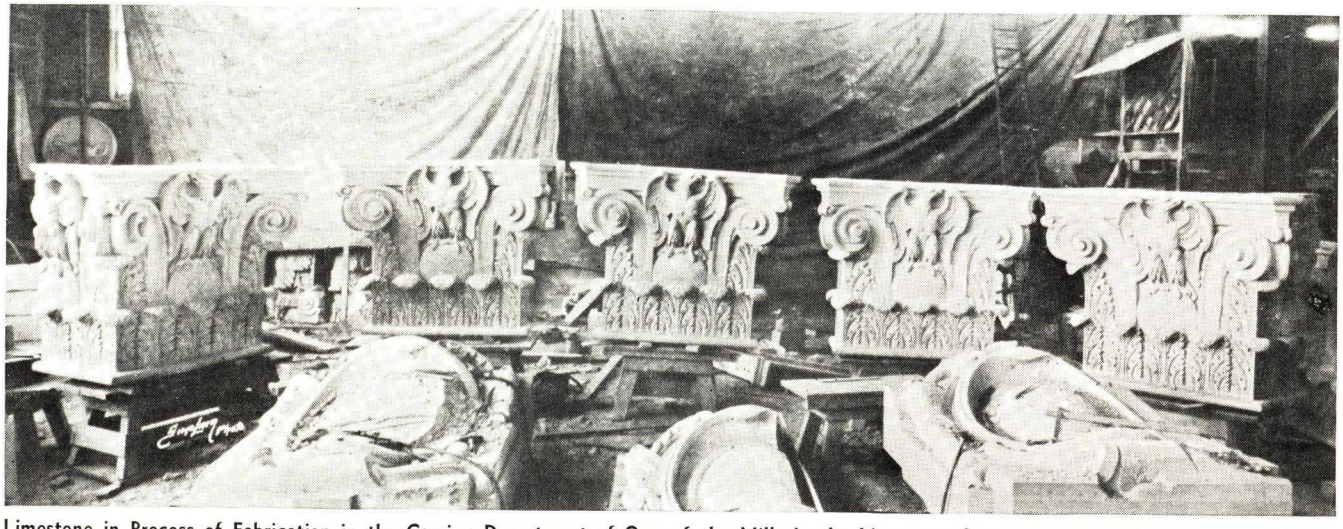
Service Available

The Cut Stone Association of Indiana is a service organization only—of long standing.

A Plan Bureau is maintained to facilitate estimating and bidding on Indiana Limestone. Through this association Architects may obtain preliminary estimates, and suggested form of specifications on Indiana Limestone.

Architects and Contractors are requested to make use of our plan bureau. By so doing it assures a number of fair competitive bids. Plans should be sent to this Association as soon as possible in order that each member firm may have sufficient time to make individual estimates.

For all ordinary projects, it is necessary for the Architect or Contractor to send only one set of blue prints and specifications to this Association to secure the desired number of competitive bids, as such plans, when received, are at once circulated to the firms listed above; all of whom have established reputations for skillful work and fair dealings with leading Architects throughout the country.



Limestone in Process of Fabrication in the Carving Department of One of the Mills in the Limestone Quarry District of Lawrence and Monroe Counties, Indiana

INDIANA LIMESTONE CORPORATION

Producers and Fabricators of ILCO Indiana Limestone

GENERAL OFFICES

BEDFORD, INDIANA

SALES OFFICES

CHICAGO, ILL., Tribune Tower
CLEVELAND, OHIO, Hippodrome Building
DALLAS, TEX., 5219 Maple Avenue
KANSAS CITY, KANS., Fifth and Cheyenne Streets
ST. LOUIS, MO., Railway Exchange
SAN FRANCISCO, CALIF., 130 Lunado Way
WASHINGTON, D. C., Colorado Building

CANADIAN REPRESENTATIVE: Walter J. Skelly, 6 Garfield Avenue, TORONTO, ONT.
INDIANA LIMESTONE COMPANY OF NEW YORK, INC., 40 East 41st Street, NEW YORK, N. Y.

Listed below are a few of the many outstanding structures, the stone for which was quarried and fabricated by the Indiana Limestone Corporation and predecessor companies:

State Capitol, Charleston, W. Va.
State Capitol, Lincoln, Nebr.
North and South State Office Buildings, Harrisburg, Pa.
Soldiers and Sailors Memorial Bridge, Harrisburg, Pa.
U. S. Post Office, Pittsburgh, Pa.
U. S. Post Office, Kansas City, Mo.
Milwaukee County Courthouse, Milwaukee, Wis.
Davidson County Courthouse and Jail, Nashville, Tenn.
Criminal Courts Building, Chicago, Ill.
Criminal Courts Building, New Orleans, La.
Mellon Institute of Industrial Research, Pittsburgh, Pa.
Civil Courts Building, St. Louis, Mo.
Indiana World War Memorial, Indianapolis, Ind.
Cathedral of Learning, University of Pittsburgh, Pittsburgh, Pa.
Rockefeller Chapel, University of Chicago, Chicago, Ill.
Massachusetts Institute of Technology, Cambridge, Mass.
Duke University Buildings, Durham, N. C.
Horace H. Rackham School of Graduate Studies, University of Michigan, Ann Arbor, Mich.
Liberty Mutual Life Insurance Co. Building, Boston, Mass.
Christian Science Publishing Co. Building, Boston, Mass.
Southern New England Telephone Co. Building, New Haven, Conn.
Acacia Mutual Life Insurance Co. Building, Washington, D. C.
Chicago Daily News Building, Chicago, Ill.
Merchandise Mart, Chicago, Ill.
Tribune Tower, Chicago, Ill.
Palmolive Building, Chicago, Ill.
Fidelity Philadelphia Trust Co. Building, Philadelphia, Pa.
Koppers Building, Pittsburgh, Pa.
R. J. Reynolds Tobacco Co. Building, Winston-Salem, N. C.
Cleveland Terminal Group, Cleveland, Ohio
Los Angeles Times-Mirror Building, Los Angeles, Calif.
Rand Tower, Minneapolis, Minn.
First National Bank, Detroit, Mich.
Illinois Merchants Bank, Chicago, Ill.
Foreman National Bank, Chicago, Ill.
American Exchange Bank, Dallas, Tex.
Hibernia Bank & Trust Co. Building, New Orleans, La.
Canal Bank & Trust Co. Building, New Orleans, La.
Federal Reserve Bank, Chicago, Ill.
Federal Reserve Bank, St. Louis, Mo.
Federal Reserve Bank, Kansas City, Mo.
Federal Reserve Bank, Richmond, Va.

Stone from ILCO *quarries, fabricated by others, has been used in many buildings, a few of which are as follows:*

Rockefeller Center, New York, N. Y.
New York Life Insurance Co. Building, New York, N. Y.
Cunard Building, New York, N. Y.
Standard Oil Co. Building, New York, N. Y.
Empire State Building, New York, N. Y.
Bronx County Courthouse, New York, N. Y.
Riverside Church, New York, N. Y.
Cathedral of St. John the Divine, New York, N. Y.
Mt. St. Alban's Cathedral, Washington, D. C.
Royal York Hotel, Toronto, Ont., Canada
Metropolitan Life Insurance Co. Building, Ottawa, Ont., Canada

BUILD THE NATION SECURELY WITH
INDIANA LIMESTONE
THE NATION'S BUILDING STONE

ILCO INDIANA OOLITIC LIMESTONE IN FEDERAL BUILDINGS

The INDIANA LIMESTONE CORPORATION has had the distinct honor of furnishing stone for a majority of the new Federal Buildings in Washington, as well as for many of the outstanding structures found throughout the United States and Canada.

Federal Triangle Group **Washington, D. C.**

Reading from left to right—Department of Commerce Building, Department of Labor and Interstate Commerce Building, Bureau of Internal Revenue Building, Department of Justice Building, and the Archives Building—all constructed of ILCO Indiana Limestone from the quarries and mills of the INDIANA LIMESTONE CORPORATION.

With more than a score of quarries and mills located in Lawrence and Monroe counties, Indiana, the INDIANA LIMESTONE CORPORATION *is equipped to supply any grade or classification of Indiana Limestone in any quantities required.*

BUILD THE NATION SECURELY WITH
INDIANA LIMESTONE
The NATION'S BUILDING STONE

AMERICAN BLUE STONE COMPANY

PRODUCERS OF THE ONLY GENUINE *GENESEE VALLEY BLUE STONE; THE OLD DARK "NORTH RIVER" BLUE STONE AND *NATURCLEFT FLAGGING

SALES OFFICES
101 Park Avenue, NEW YORK, N. Y.
QUARRIES AND MILLS: AMBLUCO, WYOMING CO., N. Y. and SOUTH UNADILLA, DELAWARE CO., N. Y.

Products

*Genesee Valley Blue Stone, a New York State light blue stone from deep hard deposits for architectural exterior and interior building construction.

"North River" Blue Stone, an Eastern New York State dark, hard blue stone for exterior building work.

*Naturcleft Flagging for Garden Walks, etc.

For *Ambluco Non-slip Treads, Landings, Flooring, Thresholds and Wall Base for interior and semi-interior uses, see File Index.

Facilities

This company was organized and opened its first quarry in 1899. Later it purchased the Genesee Valley Blue Stone Company's property of about 200 acres and extensively developed the quarries which had been in operation since about 1870 at what is now Ambluco, Wyoming County, N. Y. Later, "North River" Blue Stone quarries were purchased and also worked on a substantial basis in the foothills of the Catskill mountains.

At both quarries, mills and yards are equipped with modern machinery. Large volumes of business can be shipped without delay. Sawed stock can be easily finished up by local cut stone contractors.

*Genesee Valley Blue Stone

Color and Texture—A distinctive uniform shade of light blue, blending well with adjacent light colored surfaces, or giving a sharp clean contrast with dark materials. It is of a fine grain and even texture, being made up mostly of pure hard quartz as shown below.

Mineralogically Considered

Fine hard sand, mostly quartz	70%
Clay, as binding material	28%
Water	2%

In this blue stone, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface, which makes the stone slip-proof and very durable.

Strength, Weight and Fire Resistance—Few, if any, stones have a greater crushing and transverse strength than this blue stone. Likewise, the stone has high tensile and shearing strengths. The following table gives its crushing strength, as compiled from tests made by the United States Ordnance Department:

Crushing Strength

Rockport granite (Kidder's Hand Book)	17,750 lb. per sq. in.
Vermont marble	Average 13,500 lb. per sq. in.
Genesee Valley blue stone	19,970 lb. per sq. in.

Although of great density, it weighs only approximately 150 lb. per cu. ft. when cut ready to set. It offers great resistance to extreme heat, and the dielectric strength test is among the highest of all natural stones.

Durability—Specimens of this blue stone have been critically and carefully analyzed by eminent mineralogists and pronounced one of the most durable of all stones. In abrasive tests it excels most other stones. Like all stones, it should be cut to set on its natural bed.

It is said by one who has been in the business all of his life and who has made careful study of the stone edifices in Europe, that this Genesee Valley Blue Stone is very much the same as the stone in the famous stairway of the court in Bargello Palace, Florence, Italy.

Chemical Analysis

Silica	76.50%
Alumina	14.75%
Oxide of iron	6.35%
Water	2.00%
	99.60%

Adaptability—Genesee Valley Blue Stone is a liver rock and does not produce natural split flagging and curbing. It can be fabricated and carved for practically any architectural work. The sheets of stone in these Ambluco quarries, being of unusually low levels, represent early deposits and are, therefore, much harder and more compact than stone quarried from higher levels.

Cutter and Sawed Face Ashlar

Even more artistically effective than seam face granite, cutter face (vertical seam face) blue stone ashlar has been worked into buildings of the early American farm house and English Tudor styles. These cutter faces are permanently and beautifully stained many colors and soft shades, producing an old tapestry design when laid random. Also the combination of sand sawed and shot sawed faces furnishes a pleasing relief from the smooth planed and rubbed finishes.

"North River" Blue Stone

Color, Texture, Etc.—Although nearly uniform in color, slight variations in shades from dark gray blue through blue to purplish dark blue breaks the monotony of a stone of uniform color and eliminates artificial imitations. "North River" Blue Stone is of fine grain and even texture, containing about 78% silica, making the stone non-slip at all times.

Durability—The record of nearly a century of use of "North River" Blue Stone speaks for itself. Authentic knowledge of this blue stone places it ahead of all stones for hardness, enduring and non-slip qualities for use as exterior door sills, steps, platforms, etc.

Specification Suggestions for Exterior Use

Genesee Valley or "North River" Blue Stone should be specified, and to guard against substitution of inferior blue stones, mention this company's name and address as producers.

Specifications should require all blue stone (as well as most other stones) to be thoroughly seasoned and to be cut so as to set on its natural bed, especially when used for grade courses.

The practical finishes, in order of their costs are: Sand sawed; shot sawed; rock face; wet sand rubbed; fine axed (6-cut); horizontally (machine) tooled; and vertically (hand) tooled. These blue stones also take most any finish applied to a natural stone. The sand sawed finish, showing no saw marks, is very uniform and brings out the character of the stones. This is produced by a slow process and does not burn and bruise the surface of a stone as does planing and axing.

*Naturcleft Flagging

A natural split flagstone of definitely known qualities from the finest quarries in New York. Its many soft mellow color tones are unequalled by any other similar material. Specify Naturcleft Flagging as furnished by the American Blue Stone Company, New York, N. Y., and be sure to get the genuine.

Co-operative Service

Our organization, through its members' lifelong experience with blue stone, offers its knowledge in an impartial manner, unbiased by thought of personal profit.

*Registered U. S. Patent Office.

THE BRIAR HILL STONE CO.

Golden Buff and Variegated Sandstone; Golden Tone Ashlar Wall Facing

GLENMONT, OHIO

Briar Hill Golden Tone BRIAR HILL GOLDEN TONE SANDSTONE Sandstone—rough blocks, semi-finished, ashlar, stone-brick, or cut and carved ready to set in accordance with plans and specifications.

Varieties—Golden buff, variegated in either light or dark shades, and "run of quarry" which comprises all colors. Each hue is tinged with an exquisite, subdued golden tone. Variegations consist of banded, mottled, speckled and clouded markings in an infinite variety of patterns and combinations. For this reason it is practical to select for color only in a very general way.

Adaptability—Suitable for all classes of buildings, both for interiors and exteriors; effective as trim for seam face granite, field stone, brick or stucco, and especially adapted to gothic architecture, because of its easy working qualities.

Durability—Briar Hill Sandstone is permanent in texture and color. Many old stone buildings in the vicinity of Glenmont are approaching the century mark and are as colorful and sound today as when first built. Age merely mellows the beauty of this colorful stone.

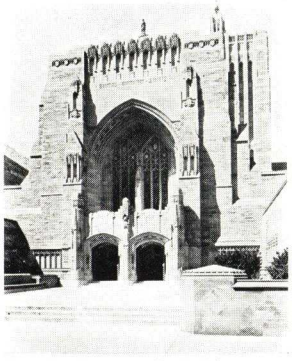
Physical and Chemical Properties—Results of physical and chemical analyses, compression, freezing and absorption tests gladly furnished on request.

Quarry—Our extensive quarries insure a practically unlimited supply of this stone.

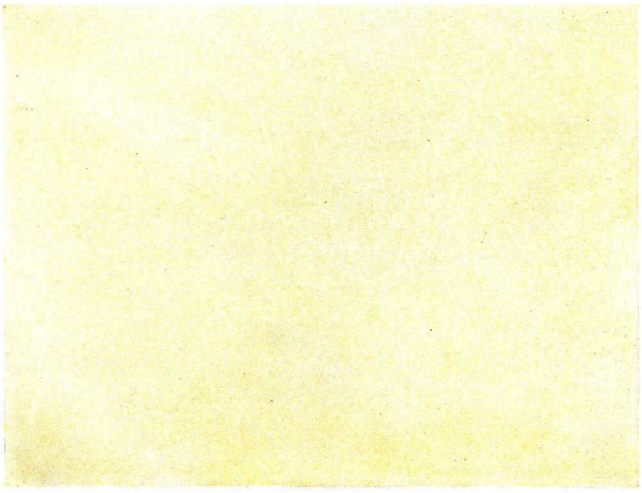
Facilities—Both quarries and mill are thoroughly equipped with modern machinery, capable of handling any size project. Prompt, efficient execution of contracts assured at all times.

Price—Although distinctive and yielding infinite color resources to the architect's skill, Briar Hill Stone is reasonable in cost. It is, therefore, economically available for all classes of buildings.

San Diego Trust & Savings Bank, San Diego, Calif.
WM. TEMPLETON JOHNSON, ARCHITECT



Entrance Detail—Sterling Memorial Library Yale University
JAMES GAMBLE ROGERS, ARCHITECT



Briar Hill Golden Buff

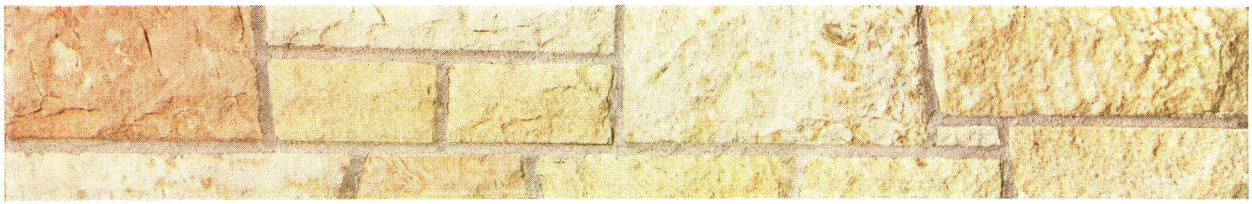
Briar Hill Variegated (lighter shades)

Briar Hill Variegated (darker shades)

Color Illustrations about ⅙ actual size.

THE BRIAR HILL STONE CO.

Briar Hill Ashlar Adds Charming Individuality to Every Home

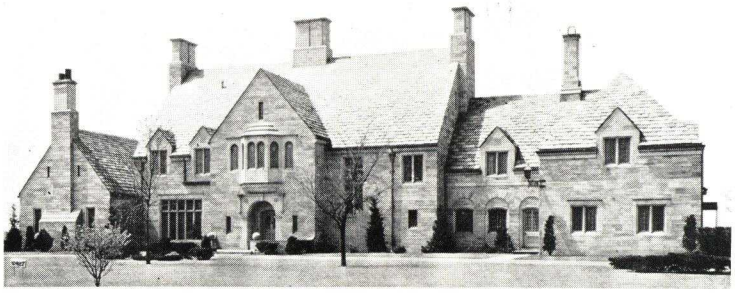


BRIAR HILL STONE is extensively used as ashlar veneer or wall facing for many types of buildings at surprisingly low cost. This material is furnished in random length strips, usually four inches thick, with sawed beds, and in course heights to produce random ashlar walls with a minimum of labor required on the job. It is set by stone masons or bricklayers as rapidly and economically as face brick. Surface finishes or textures are either "Split Face" or "Shot-Sawed."

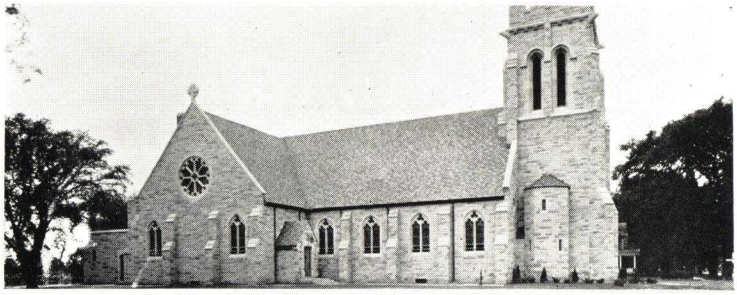
OLD BUILDINGS CAN BE MODERNIZED WITH COLORFUL NATURAL STONE —AT MODERATE COST

Old buildings may be renewed in appearance, at moderate cost, simply by covering the old exterior with Briar Hill Golden Tone Ashlar Wall Facing four inches thick.

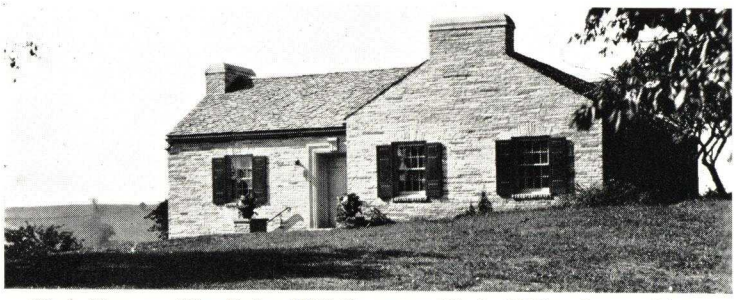
Write for a copy of the Briar Hill Ashlar Wall Facing Booklet. It contains much interesting information and is free for the asking. We are always glad to submit estimates of cost for either ashlar or cut stone trim if plans are mailed to us.



Residence for Col. Geo. L. Chennell, Columbus, Ohio
THOMAS J. TULLY, ARCHITECT
(Faced with Shot-Sawed Ashlar)

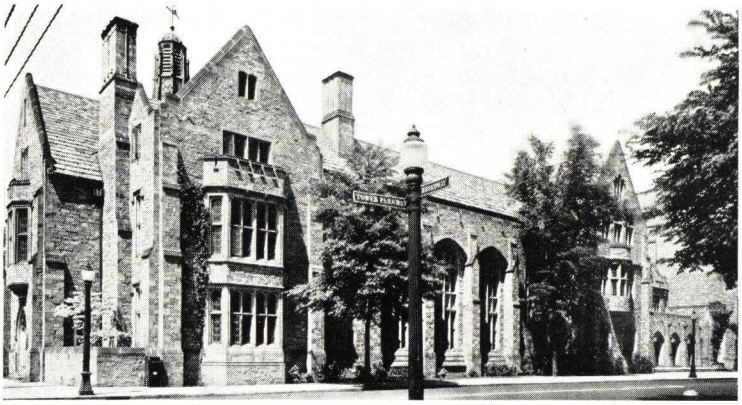


St. Patrick's Church, Seneca Falls, N. Y.
JOSEPH P. FLYNN, ARCHITECT
(Faced with Split Face Ashlar)



Club House—The Briar Hill Country Club, Millersburg, Ohio
CHARLES E. FIRESTONE, ARCHITECT
(Faced with Split Face Random Length Strips, 2¼" high)

Residence for J. D. Roller
Youngstown, Ohio
COOK & CANFIELD, ARCHITECTS
(Faced with Split Face Ashlar)



Ray Tompkins House, Yale University, New Haven
JOHN RUSSELL POPE, ARCHITECT
(Faced with Split Face and Shot-Sawed Ashlar)

McCORMICK LONGMEADOW BROWNSTONE CO., INC.

Producers of Longmeadow Brown Sandstone

QUARRIES AND MILL

EAST LONGMEADOW, MASS.

NEW YORK AGENT: Jerome A. Jackson, Sanford Street and East River, LONG ISLAND CITY, N. Y.

The Product

LONGMEADOW BROWNSTONE is a Sandstone which has long been recognized by architects and builders as a most suitable and substantial stone for use in all kinds of buildings, such as churches, schools, libraries, residences, gateways, etc.

Quality and Color

It is a close-grained stone (sometimes called a "liver" rock) which makes it free from scaling or chipping. It carries a warmth of color which adds life and spirit to any type of structure. Quoting from a letter by a prominent firm of architects, "In the meantime let us tell you how much we appreciate the character and practicability of the East Longmeadow brownstone that you furnished. We like it better because it is not too red. It has a very agreeable warmth and is a stone that will take any texturing and still retain its superior color."

Speaking of the Mt. Holyoke Library and Campus one author writes: "One knew with one's mind that the 'Longmeadow' stone of the library was as old as the dinosaurs and more substantial, but in this light its dim rose-color looked more transitory and more dream like than the hawthorn flowers."

This same stone was used on the impressive Romanesque entrance to Trinity Church, Boston, known as the Galilee porch. It is covered with fine filigree work and detail illustrated below. Although this was erected 60 years ago it still retains its original delicacy and beauty. Such resistance to the elements makes the superiority of Longmeadow brownstone outstanding.

Facilities

Our quarries have been in operation for the past 70 years. Longmeadow stone has an absorption of 4.2%, with 83% silica content. Crushing strength is 10,000 lbs. per sq. in. The mill is equipped with gang saws, circular saws, planers, etc., which enable us to furnish work ready to set, or furnish the trade with mill blocks or sawed slabs.

Information and Samples

We are glad at all times to furnish estimates for architects or contractors, and to give any information or suggestions which might be helpful in the preparation of designs or plans.

Samples of the stone will be forwarded upon request.

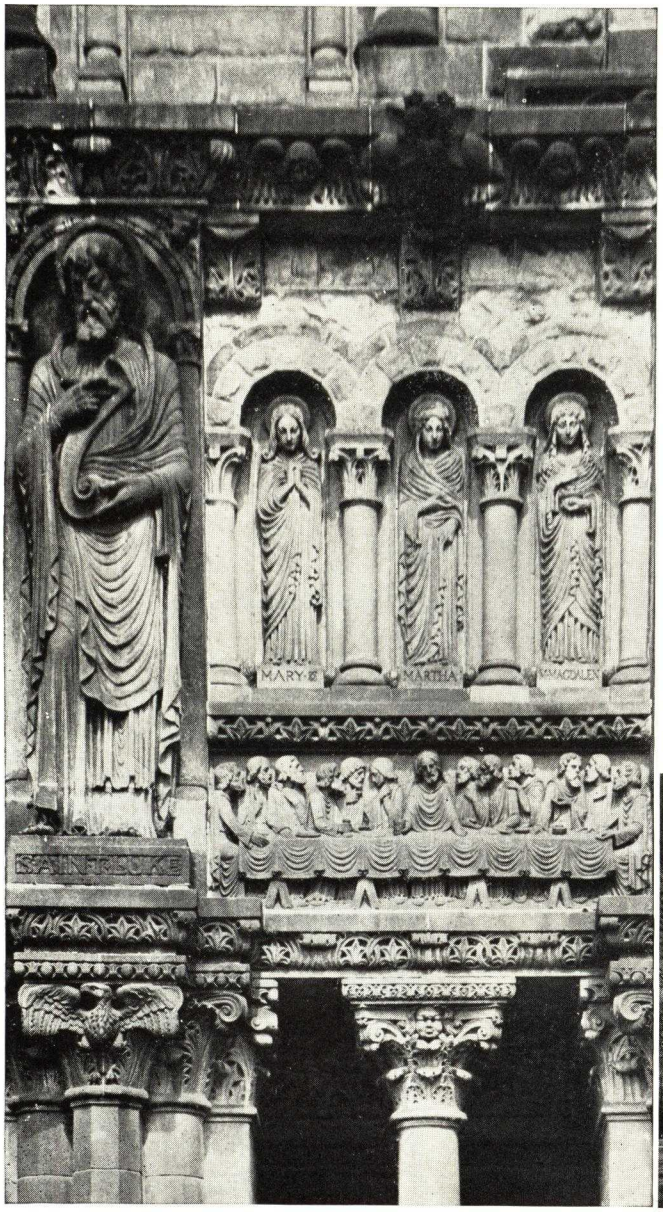
Representative Buildings

Some of our recent contracts have been:

Library at Mt. Holyoke College, South Hadley, Mass.
Library at Smith College, Northampton, Mass.
Dining Hall, State Institution, Northampton, Mass.
Post Office, New Brunswick, N. J.
Post Office, Perth Amboy, N. J.
Chapel at Mt. Holyoke College, South Hadley, Mass.
Chapman Memorial Building, Downer College, Milwaukee, Wis.

Other well-known structures include:

Second Chemical Laboratory, Yale University, New Haven, Conn.
Library and Stack Building, Princeton University, Princeton, N. J.
Marshall Field Building, Chicago, Ill.
New England Building, Cleveland, Ohio.
New York Life Insurance Building, Omaha, Neb.



The Proof of Weathering Qualities

Photograph taken in July 1937 of carvings on Trinity Church, Boston. Note the present clean edges and crispness of the carving done in 1887.
H. H. RICHARDSON, Architect

McCormick Brownstone College Building Library at Mt. Holyoke College, South Hadley, Mass.

ALLEN, COLLENS & WILLIS, Architects

MEMORANDA

VIRGINIA GREENSTONE COMPANY, INC.

Quarriers and Finishers of Virginia Greenstone

LYNCHBURG, VIRGINIA

A BEAUTIFUL PERMANENT STONE—NON-FADING FOR EXTERIOR USES—NON-SLIP FOR TREADS AND FLOORS

Description

A natural gray-green serpentine stone. No artificial treatment or coloring is used. The natural soft green color of the stone remains throughout the years. Contains no talc or calcite spots or soft veins, is uniform in color and texture.

Properties

Absorption unusually low, averaging less than 0/2 percent after 14-day immersion. Tests for compressive strength average 8010 pounds per square inch, for transverse strength 1350 pounds per square inch.

Exterior Uses

Spandrels, base course, sills, steps, coping, and store fronts.

Interior Uses

Having a natural non-slip surface, wet or dry, Virginia Greenstone is an ideal floor and step material. No artificial treatment or toothing is required. The surface remains non-slippery throughout the life of the stone. Floors and treads are usually sawed on the edge grain.

Ideal for library stack floors. Other uses include interior wainscoting, base, borders and trim, fireplace facings and hearths. Acid resistant for laboratory uses.

Quarry and Facilities

Unlimited supply of stone. Quarry and finishing plant located at Lynchburg, Va., are served by the Norfolk & Western, Southern, and Chesapeake & Ohio Railways.

A sizable stock of blocks and slabs carried.

Acacia Mutual Life Insurance Company Building, Washington, D. C.

Shreve, Lamb & Harmon, Architects
5,000 Feet of Floors and Treads Used

Spandrel Installations

Swann & Co. Building, Birmingham, Ala.
Appraisers' Stores, Baltimore, Md.
Allied Arts Building, Lynchburg, Va.
Mitchell County Courthouse, Camilla, Ga.
U. S. Post Office, Columbus, Ohio
U. S. Post Office, Wilkes-Barre, Pa.

Other Exterior Installations

Police Headquarters Building, Buffalo, N. Y.
Armory & Market Building, Lynchburg, Va.
Medical Arts Building, Charleston, W. Va.
Stoneleigh Court Apartments, Washington, D. C.
Swimming Pool, Elon, Va.

Holy Cross Catholic Church, Lynchburg, Va.

Steps at entrance of above church show no signs of wear after 50 years of daily use. The Greenstone still has a non-slip surface. Average traffic 2000 persons per week

Interior Installation

Library Stacks, Washington, D. C.
Police Headquarters Building, Buffalo, N. Y.
Kennedy-Warren Apartments, Washington, D. C.
Allied Arts Building, Lynchburg, Va.
Archives Building, Washington, D. C.
U. S. Department of Justice Building, Washington, D. C.
White House, Washington, D. C. Fireplace facings.
U. S. Post Office, Dubuque, Iowa
U. S. Post Office, Greensboro, N. C.
U. S. Post Office, Mt. Airy, N. C.
U. S. Post Office, Lynchburg, Va.
U. S. Post Office, Danville, Va.
U. S. Post Office, Culpeper, Va.
U. S. Post Office, Urbana, Ohio
U. S. Post Office, Erie, Pa.

Laboratory Equipment

National Institute of Health, Washington, D. C.
Veterans Hospital, Canandaigua, N. Y.
Veterans Hospital, Indianapolis, Ind.
Naval Academy, Annapolis, Md.
Howard University, Washington, D. C.

Allied Arts Building, Lynchburg, Va.

Johnson & Brannan, Architects
C. W. Hancock & Sons, Contractors

CAST STONE INSTITUTE

"Devoted to Improving the Quality and Usefulness of Cast Stone"

33 West Grand Avenue

CHICAGO, ILL.

Quality Made to Order

Physical properties and appearance of cast stone may be varied at will. Cast stone can be strictly utilitarian or it can give expression to the finest of architectural feeling. It is the privilege and also the responsibility of architects to specify the physical properties of cast stone according to nature and requirements of each job. It is the responsibility of conscientious manufacturers, individually and collectively, to see that cast stone of the desired quality is delivered.

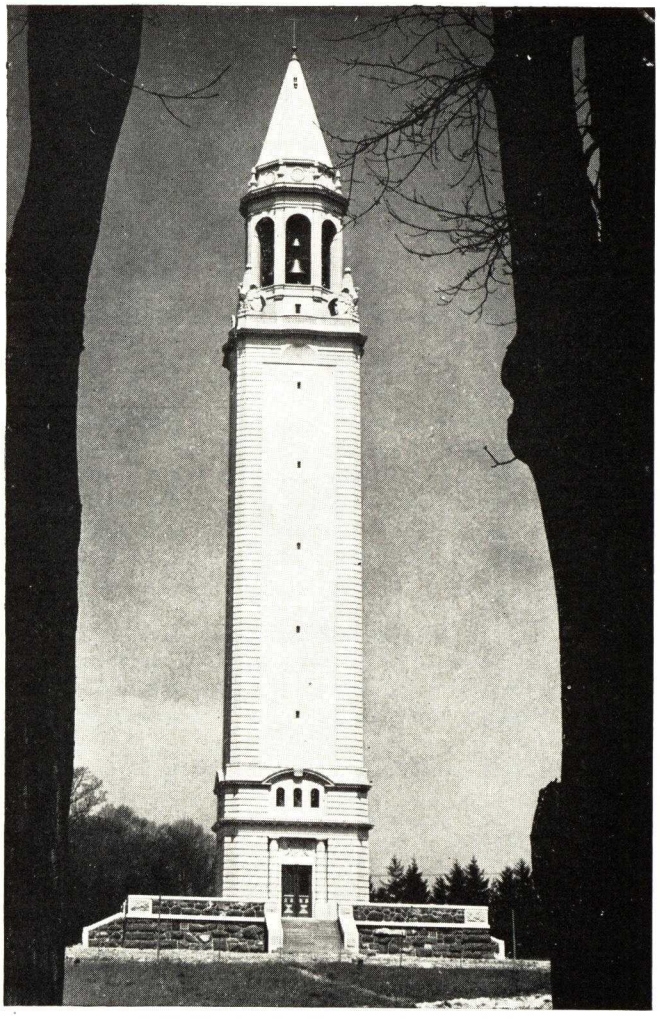
Recent developments in manufacture and use of cast stone emphasize its own distinctive character as a refined form of architectural concrete. As such, it offers freedom of design which challenges the skill and imagination of all architectural designers.

To produce cast stone of quality and distinction requires a high degree of knowledge, experience and most of all the craftsmanship of real artisans. Such work should be entrusted only to manufacturers of demonstrated ability. Information on the factors which determine excellence of cast stone is given in Cast Stone Service Bulletin CS18A. Other bulletins, available on request, furnish impartial information on its nature, uses and proper treatment. On the following page is given a brief specification which sets forth the basic requirements for getting a good job of cast stone.

Plaque from the Music and Dramatic Arts Building Louisiana State University

Weiss, Dreyfous & Seiferth, Architects

An effect that is exclusively cast stone's is obtained through careful selection and grading of aggregate that is subsequently exposed simply by brushing off the surface cement. The rather rough texture, in which the uniformly sized aggregate particles protrude slightly, gives life and character to the surface. This finish is shown above.



Nemours Carillon Tower, Wilmington, Del.

Massena & Du Pont, Architects

The use of cast stone as forming for structural concrete is a recent development. By this method, concrete is literally moulded or cast into its own skin. Such construction is particularly applicable when it is desired to give special decorative treatments to architectural concrete structures. It was used with signal success on the above.

New Colors in Cast Stone

Colors with all the brilliance and permanence of those of colored ceramics are now available in cast stone through the use of manufactured colored aggregate. Polychrome designs from the simplest of running ornament to the complexity of murals are readily executed in this new kind of mosaic cast stone. Suitable for either interior or exterior usage, it adds still more to the freedom of design offered by this form of architectural concrete.

BASIC SPECIFICATION FOR CAST STONE

This specification has been expressly prepared as a means by which cast stone can be specified in open competition with maximum assurance of good results regardless of who furnishes the material. As briefly as possible, it sets up requirements by which the qualifications of cast stone manufacturers to deliver satisfactory and dependable stone can be readily judged. Since cast stone is by no means all alike, the suggested requirement for the submission of samples and test reports at time of bidding is the surest way for a purchaser to know in advance what the various bidders on cast stone propose to furnish. Additional requirements on architectural or construction details should be included as necessary.

Manufacturer

Cast stone shall be the product of an established manufacturer whose material has previously been used in similar work with satisfactory results. Cast stone on which all the requirements of this specification are not fully met will not be considered.

Physical Quality

Cast stone shall have a compressive strength of..... *(see note a)* lb. per sq. in. and an absorption not greater than..... *(see note a)* per cent when tested in accordance with the requirements of the American Concrete Institute Tentative Specification P-3-A-29T. The cast stone shall contain not less than three parts of aggregate to each part of cement by volume.

Color and Finish

Unless otherwise shown on the drawings, the color of the cast stone shall be .....*(see note b)* and all exposed surfaces shall have a.....*(see note b)* finish.

Workmanship

All pieces shall be true to dimensions and profiles with sharp, straight edges. Mouldings and arrises shall be sharp, true and continuous at the joints. All ornamenation shall faithfully reproduce approved models or details.

Curing

All cast stone shall be properly cured and seasoned and shall possess the specified physical properties when delivered to the building site. *(See note c.)*

Samples

Each cast stone manufacturer bidding on this work shall submit to the architect for inspection before general bids are due a sample of the cast stone which he proposes to furnish, together with report of tests on cast stone certified to be of similar quality and a list of at least three representative jobs comparable to the work covered by this specification.

Tests

The architect may select or cause to be selected at random from the job representative pieces of cast stone for testing. Tests shall be made at the manufacturer's expense and pieces of cast stone taken for testing shall be replaced by the manufacturer without charge. *(See note d.)*

NOTES

(a) Since there are different grades of quality in cast stone, its physical properties should be specified according to requirements of the job. In no event should compressive strength be less than 5000 lbs. per sq. in. nor absorption more than 7%. Cast stone having a compressive strength of 10,000 lbs. or more per sq. in. and an absortpion of 6% or less is commercially available. Compressive strength is important not only as an indication of density, but also as a measure of the study, experience and care applied to the production of the material. For a discussion of the relationship between details of manufacture and the general excellence of cast stone, architects are referred to Cast Stone Service Bulletin No. CS18A.

(b) Color and finish should be specified clearly, and if possible, on the basis of an actual sample. Members of the Institute will be glad to submit samples for consideration when designs requiring special colors or finishes are being developed.

(c) Curing and seasoning are an important part of the manufacturing process. All possible time should be made available for these through early award of the sub-contract and prompt return of shop drawings.

(d) Members of the Cast Stone Institute are required to maintain an average compressive strength of at least 5000 lbs. per sq. in. in their product. Periodic tests are required on specimens truly representative of each member's cast stone taken from actual jobs. As a service to its members, the Institute maintains facilities for doing the required testing, and furnishes reports to them as a matter of record and as a source of up-to-date information on the quality of their material. Architects may arrange with a member of the Institute to have these requirements on periodic tests applied to cast stone which is furnished for a specific job.

CAST STONE SERVICE BULLETINS

CS1A —COPINGS AND COPING JOINTS PREVENTION OF LEAKAGE THROUGH COPINGS
CS3A —SPANDRELS—WINDOW AND PARAPET
CS12A—STAIRWAYS
CS13D—DETAILS—KNICKERBOCKER LAUNDRY
CS13E—DETAILS—WICHITA ART INSTITUTE
CS13F—DETAILS—ROCHESTER BREWING COMPANY
CS13G—DETAILS—OCEANSIDE HIGH SCHOOL
CS14A—REMODELING (STORE FRONTS)
CS15B—CAST STONE MADE WITH MANUFACTURED COLORED AGGREGATE
CS17B—BRIEF FORM OF SPECIFICATION (REVISED)
CS17C—TENTATIVE SPECIFICATION FOR COLORED CERAMIC AGGREGATE
CS18A—FACTORS DETERMINING QUALITY IN CAST STONE
CS19A—CAST STONE AS FORMING
CS19B—CAST STONE AS FORMING—NEMOURS CARILLON TOWER—SANTA ANA CITY HALL

GRANIDUR PRODUCTS CO.

Manufactured Granite of Proven Merit

343 South Dearborn Street, CHICAGO, ILL.

REPRESENTATIVES

DETROIT, MICH., Maul Macotta Corp., 1640 E. Hancock Ave.

ST. LOUIS, MO., Rockhill Precast Concrete Corp., 1200 No. Rockhill Road

GRANIDUR

28 Years Experience in Manufactured Granite

GRANIDUR offers the architect the brilliance and lustre of granite, together with economy. Its acceptance and use by architects for important projects is evidence that it fulfills a real need. GRANIDUR further offers advantages of construction and design peculiar to itself. GRANIDUR is a manufactured, structural masonry material created primarily for permanent, exterior facing of all types of fine buildings. As such, GRANIDUR retains its high polish and color when exposed to the rigors of the elements. This highly polished finish is derived from the granite aggregate of which it is principally composed. Because of the granite aggregates utilized in its fabrication, it is available in practically all colors and textures of granite, as well as many distinctive colors of its own. By means of a special process of manufacture, great density and strength is obtained. Units are fabricated to the size and shape required by the approved GRANIDUR shop drawings. Under normal conditions fabrication requires from two to three weeks.

GRANIDUR is not available in less than 2-in. thickness. Deeper bonds or sections are optional. There are comparatively few restrictions as to size of the units to be furnished, the large, streamlined type of unit being available. Whenever necessary or desirable, GRANIDUR units may be reinforced with steel to serve as structural members e.g. entrance soffits. Lugs, check outs, bolts incorporated in the back face of units, are readily provided, adding little if any to the cost. This is a decided advantage in the alteration and modernization type of job, as well as for new types of construction now being developed in many localities.

In order to clearly identify and distinguish our product, it is now sold under the trademark GRANIDUR. GRANIDUR applies to the superior type of manufactured granite, sometimes called cast granite, which we have been fabricating for many years. Specialized knowledge and experience insure its proven soundness and high standard of execution.

GRANIDUR is erected by stone or granite setters. Cost of erection is practically the same as for stone or granite.

List of installations will be provided upon request.

Base Course and Spandrels of Light Green Granidur, 334 Madison Avenue, New York, N. Y.

Specifications

The manufactured granite as shown or called for on drawings and/or as specified herein shall be "GRANIDUR" as furnished by the GRANIDUR PRODUCTS CO., 343 South Dearborn Street, Chicago, Ill.

The GRANIDUR shall conform to submitted samples. It shall have a highly polished finish on all exposed surfaces. The GRANIDUR contractor shall submit samples for the Architect's approval of color and texture.

Thickness of the GRANIDUR units shall be as indicated on Architect's drawings and approved GRANIDUR shop drawings.

The GRANIDUR contractor shall prepare and submit for the Architect"s approval, complete shop drawings, showing sizes of units, sections and dimensions, jointing, bonding, anchoring and all other necessary details. Each GRANIDUR unit shall be clearly identified by a setting number painted thereon; corresponding setting numbers shall be shown on the GRANIDUR erection drawings.

Proper provision for anchoring and hoisting shall be made in the GRANIDUR units.

The GRANIDUR shall be properly reinforced with steel bars or steel mesh when such reinforcement is necessary. GRANIDUR units shall be true to dimensions, in wind, and have clean true edges or arrises.

The erecting contractor shall unload, receipt for, store and erect all of the GRANIDUR covered by this specification, and shall provide and install all anchors. GRANIDUR shall be carefully handled and by such methods as will guard against damage.

All GRANIDUR shall be set in mortar composed of one part portland cement, one part lime, and five parts fine torpedo sand. This mortar shall not be used for tuckpointing. Said units shall be set in strict accordance with the requirements of the GRANIDUR drawings, as approved by the Architect.

Mortar surfaces of each unit shall be sponged with clean water just before setting. Each unit shall be set accurately, true to line, level and plumb, by competent stone setters, with full flushed joints, all anchors properly inserted and all anchor holes filled. Joints shall be raked out ¾ in. for tuckpointing with Kuhl's Pointing Up Composition, obtainable from H. B. Fred Kuhls, Third Avenue and 65th Street, Borough of Brooklyn, N. Y., or with "Pecora" Caulking Compound. Joints shall be slightly concave and shall be brought to a neat smooth appearance by slicking with jointer.

When ready for tuckpointing, face of the GRANIDUR shall be washed with water and soap powder, using a fiber brush. The use of an acid or salt solution is prohibited. Consult GRANIDUR contractor before proceeding with cleaning and pointing.

All GRANIDUR shall be properly protected against damage until completion of the entire work.

"Specify Granidur to be Sure"

PERMA-STONE COMPANY

A Beautiful Permanent Facing for Any Type of Wall

MAIN OFFICE
144-148 West Wood Street
YOUNGSTOWN, OHIO
REPRESENTATIVES IN PRINCIPAL CITIES

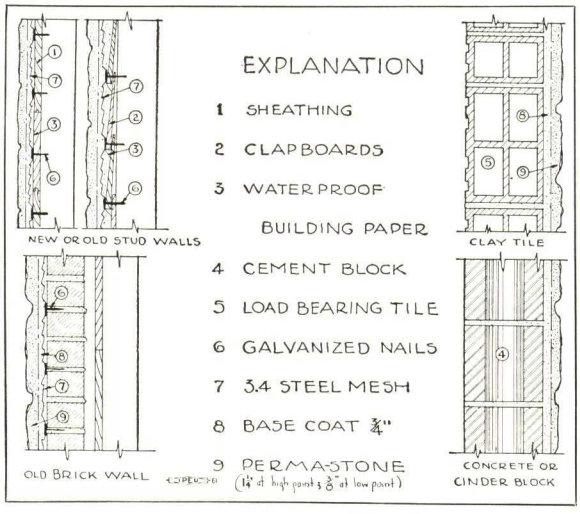
PERMA-STONE
TRADE MARK REGISTERED

Product

PERMA-STONE—a patented process for casting a stonelike facing directly on a prepared wall by means of hand moulds.

Appearance

Effects obtained are comparable to natural stone in texture and color and may be varied to simulate the native stone of almost any locality. Perma-Stone may be laid in random, broken or coursed ashlar design. The surface may represent split face, shot-sawed face or other finishes in varied shades of color.



Only permanent, time tested, fireproof materials such as portland cement, chemically pure mineral colors, quartz aggregate, waterproofers and metallic hardeners are used and the many Perma-Stone jobs in various parts of the country, subjected to varied climatic conditions, have demonstrated their permanence and beauty. The finished wall surface is durable, inexpensive and popular for all types of residences and smaller commercial buildings. The cost of application is generally below that of face brick construction.

Wall Preparation

Tile, cement or cinder block are given a ¾-in. base coat consisting of 1:3 mix portland cement and sand plus 7% hydrated lime and allowed to cure. Frame buildings are covered with waterproof building paper plus 3.4 self-furring diamond mesh steel nailed 6-in. o.c. with 1½-in. galvanized nails and then base coated as above.

Method of Application

In application, the mould is first lined with a wax paper membrane and the colored quartz and cement surfacing material is sifted thereon to obtain varied colored, veined and mottled effects. The mould is then filled with 1:3 mix waterproof portland cement and sand and pressed firmly onto the wall surface. The mould is manipulated to effect a uniform bond and is removed at once, leaving the wax paper to aid in the curing and to keep off any mortar which might be spattered on it by the next cast. The wax paper is later stripped off, leaving the stone clean and finished.

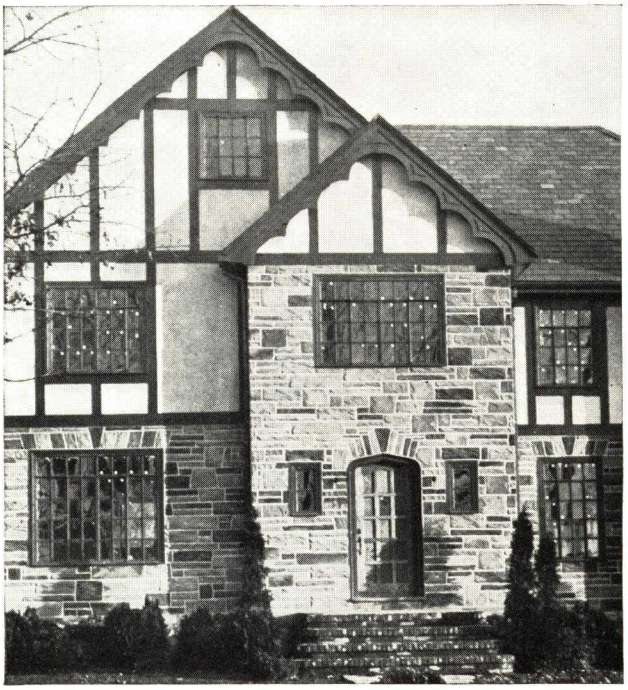
The Perma-Stone being of similar character to the base coat thus provides a durable and strong bond. The squeeze from the mould may be pointed to obtain a natural cement joint, or the joints may be pointed or beaded with colored mortar.

Mould Sizes

Standard lengths: 8, 16, 24, 32 in. Standard widths: 4, 8, 12 in. Jack arch moulds, Keystones, angles for various pitched roofs and corner moulds with attachments to make returns up to 8 in. in 1-in. steps at any angle. Odd sizes can be cut after casting.

Distribution

In marketing the process, the PERMA-STONE COMPANY has placed the equipment and surfacing colors with building supply dealers and Perma-Stone dealers well distributed throughout the country. The dealer in turn rents the equipment and sells the coloring material to local contractors who have been chosen for reliable workmanship and are trained in the use of the moulds.



Permastone in Rockface Random Ashlar Variegated Colors

In territories where there is not yet an authorized representative communicate directly with Main Office

AMERICAN TERRA COTTA CORPORATION

Builders Building, CHICAGO, ILL.

TELEPHONE
FRAnklin 1467

FOUNDED 1881

AGENCIES IN PRINCIPAL CITIES

Indianapolis Terra Cotta Company, Inc.

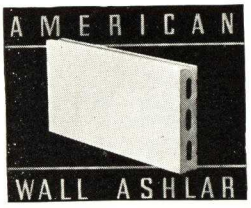
2228 North Olney Street, INDIANAPOLIS, IND.

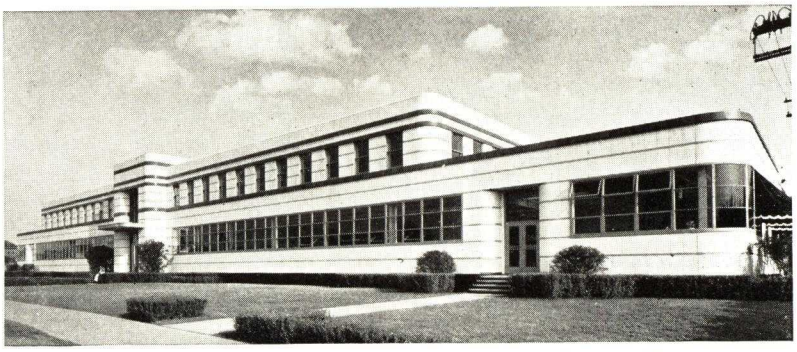
Architectural Terra Cotta

American Terra Cotta is available in any variety of shapes and designs, plain and decorative with the added advantage of unlimited choice in permanent ceramic colors and finishes. Through its use the architect can give the most diversified expression to his conceptions of both form and color. All American Terra Cotta Products can be furnished in unglazed, non-reflecting glaze or bright glazed ceramic finishes in plain, mottled or polychrome effects. Two-burn colors, such as Brilliant Red, Ceramic Gold and Ceramic Silver are also available.

American Terra Cotta Wall Ashlar

American Terra Cotta Wall Ashlar is extruded from dies in standard shapes and offers a distinct price advantage where plain wall surfaces predominate. It can be furnished in the same wide range of ceramic colors, and is suitable for both exterior and interior walls either as a veneer or a load-bearing wall. Each unit is ground on all edges to assure uniform joining. Standard units are 8 x 16¼ in., 12 x 20 in. and 18 x 24 or 36 in. and 2, 4 or 6 in. in thickness, with solid back, scored for plaster or for bonding with brick or tile. Cove base, cap mouldings, mitres and special shapes are furnished as required.





Motorola Auto Radio Manufacturing Company, Chicago, Ill.
VICTOR L. CHARN, Architect — ROBERT G. REGAN CO., Contractor
One of several industrial buildings for which American Wall Ashlar was used for entire facing and facades. The ceramic finish is matt glaze with the main field in white with gray bands, base in black, and coping and cornice bands in blue

Kedzie-Grace Postal Station, Chicago, Ill.
L. A. SIMON, Supervising Architect
HENKE CONSTRUCTION CO., Contractor
Effective treatment of vestibule and lobby using American Wall Ashlar of large scale 18x36-in. units. Color, warm French gray in matt finish. Wainscot in workroom is in smaller units in a tan mottled finish

American Wall Ashlar is particularly well adapted for store fronts, service stations, lobbies, stair halls, corridors, laboratories, etc., where appearance, permanence and sanitation are essential.

Other Products

Swim Pool Rails, and Pool Lining; Fireplaces; Garden Pottery; Decorative Pottery; Chimney Pots.

Information, Prices and Literature

Technical information about our products will be furnished upon request; for prices, send us plans and specifications; write for catalogues of American Wall Ashlar, Garden Pottery and Chimney Pots.

Representative Installations of American Wall Ashlar

NAME AND LOCATION	ARCHITECT
Rufus King High School, Milwaukee, Wis.	Guy E. Wiley
Manteno State Hospital, Manteno, Ill. (Diagnostic Building)	{Granger & Bollenbacher {C. Herrick Hammond
John Gaston Hospital, Memphis, Tenn.	Walter F. Schulz
Rosemont Jr. High School, Fort Worth, Tex.	Elmer G. Withers Co., Inc.
Wyandotte High School, Kansas City, Kan.	Hamilton, Fellows & Nedved
Fire Stations (Fourteen), Chicago, Ill.	Paul Gerhardt, Jr.
New Trier Tp. High School, Winnetka, Ill.	Armstrong, Furst & Tilton
Morton and Edison Schools, Hammond, Ind.	W. S. Hutton
Water Purification Plant, Milwaukee, Wis.	Walter W. Judell
Armory and Office Building, Springfield, Ill.	{Hubert Burnham {C. Herrick Hammond
Pickett School, Toledo, Ohio	E. M. Gee
Civic Auditorium, Hammond, Ind.	L. Cosby Bernard
U. S. Post Office, Gary, Ind.	L. A. Simon, Supv. Archt.
Goldenrod Ice Cream Co., Chicago, Ill.	Casriel Halperin & Assoc.
Lever Brothers Co. (Soapery), Hammond, Ind.	Stone & Webster Eng. Corp.
Benson & Rixon Co., Inc., Chicago, Ill.	Alfred S. Alschuler, Inc.
U. S. Narcotic Farm, Fort Worth, Tex.	Wyatt C. Hedrick
Fiske St. Station, Commonwealth Edison Co., Chicago, Ill.	Graham, Anderson, Probst & White

ATLANTIC TERRA COTTA COMPANY

101 Park Avenue, NEW YORK, N. Y.

PLANTS: PERTH AMBOY, N. J.; TOTTENVILLE, S. I., N. Y.; ROCKY HILL, N. J.

REPRESENTATIVES IN MOST PRINCIPAL CITIES

ATLANTA TERRA COTTA CO., East Point, Ga.

SOUTHWESTERN DISTRICT OFFICE: 720 No. Bishop Ave., Dallas, Tex.

Atlantic Architectural Terra Cotta

A building material for exterior and interior construction and decoration, made in ashlar and any form of modeled and sculptured ornament and in any color or combination of colors.

Atlantic Terra Cotta is permanent, fire resistant, light in weight, economical in cost and possesses great insulation value against heat, cold and sound. It is used for the complete exterior of a building or for the spandrels, entrances, parapets, copings, cornices, decorative inserts—wherever permanence, and beauty of color is wanted.

Established 1846

Interior Machine Made Units of Atlantic Terra Cotta

Mechanically made de-aired terra cotta units used for the construction and facing of interior walls and partitions. Obtainable in 5x8, 5x12, 6x9, 8x16, 9x14 in. and larger sizes in thicknesses of 1, 2, 3, 4 and 6 in. Necessary base, cap, mitres, jamb, sill and lintel units are available. Made with closed backs either scored to take plaster or with a smooth surface. Each unit ground to size and squared, assuring perfect jointing and economical erection.

Machine Made Closed Back Wall Ashlar for Exteriors

Mechanically made de-aired terra cotta ashlar for exterior facings obtainable in sizes 12x24, 15x15, 18x36, 20x40, 22x44, 24x24 and 24x48 in. These machine made units, together with necessary hand-made moulded and ornamental features working with them, are made with closed back requiring no filling with brickwork, grout or mortar. All units are face planed before firing, producing even surfaces in true plane. Each unit ground to size and squared before shipment, assuring perfect jointing.

Colors

The use of color is one of the tenets of modern architecture and Atlantic Terra Cotta can be obtained in any color that may be desired—pastel shades, brilliant faience and rich mottled abbochromes.

Chimney Pots of Atlantic Terra Cotta

Reproductions of Tudor, Elizabethan and Georgian models, unique in the fact that they are obtainable in any desired color. There are 31 standard designs in a complete range of flue sizes. Special designs made to order.

Atlantic Roof Tile

Classic pan and cover glazed roof tile in color of suitable scale for monumental buildings, as used on the Pennsylvania Museum of Art, Philadelphia, Pa.; the State Capitol at Charleston, W. Va.; the new United States Supreme Court, Washington, D. C., and the gold pyramid roof of the new United States Courthouse, New York, N. Y.

Garden Pottery of Atlantic Terra Cotta

Reproductions of rare and artistic urns, jars, pedestals, fountains, etc. Available in all Atlantic colors and finishes. Atlantic Pottery is used not only in gardens but also as decorative furnishings for lobbies, lobbias, etc. Special designs made to order.

Literature

Illustrated booklets and folders for every building requirement can be furnished by the ATLANTIC TERRA COTTA COMPANY. Issued at intervals is our magazine Atlantic Terra Cotta, containing illustrations of the finest Atlantic installations in contemporary architecture.

Any of the above as well as Catalog of Chimney Pots, Garden Pottery, Roof Tile and other specialties will be furnished on request.

A PARTIAL LIST OF BUILDINGS RECENTLY COMPLETED OR NOW BEING ERECTED USING ATLANTIC TERRA COTTA

Exterior Installations

F. W. Woolworth, Fifth Ave. and 39th St., New York, N. Y.
Starrett & Van Vleck, Architects.

F. W. Woolworth, 60 Water St., Newburgh, N. Y.
Company's Architects.

S. S. Kresge, No. Pearl and James Sts., Albany, N. Y.
Company's Architects and J. H. Barry.

S. H. Kress, 604 Main St., Fort Worth, Tex.
E. F. Sibbert, Architect.

S. H. Kress, Third Ave. and No. 19th St., Birmingham, Ala.
E. F. Sibbert, Architect.

S. H. Kress, 58 E. Flagler St., Miami, Fla.
E. F. Sibbert, Architect.

S. H. Kress, Oregon and Mesa Sts., El Paso, Tex.

McCrory Store, 314 So. Fifth Ave., Pittsburgh, Pa.
Wm. Simpson, Architect.

Gulf Oil Corporation Stations:
Company's Architects.
Forbes and Murray St., Pittsburgh, Pa.
Albany and Ventnor Aves., Atlantic City, N. J.
13th and N Sts., Washington, D. C.
York Road and Woodbourne Ave., Baltimore, Md., and many other locations.

Coca Cola Bottling Plant, Syracuse, N. Y.
M. L. and H. A. King, Architects.

Coca Cola Bottling Plant, Hickory, N. C.
Henry I. Gaines, Architect.

Medical & Clinical Bldgs., Medical Centre, Jersey City, N. J.
John T. Rowland, Architect.

U. S. Post Office, New Rochelle, N. Y. (and many others).
Fred'k. G. Frost, Hart & Shape, Architects.

Interior Wall Unit Installations

Cathedral of Learning, University of Pittsburgh.
Charles Z. Klauder, Architect.

Public Schools, City of New York.
W. C. Martin, Architect.

Trinity College, Hartford, Conn.
McKim, Mead & White, Architects.

Junior High School, East Orange, N. J.
Kramer & Behee, Architects.

University of Texas Library, Austin, Tex.
Paul P. Cret, Architect.

Columbia University Library, New York, N. Y.
James Gamble Rogers, Architect.

Laboratories, E. R. Squibb & Sons, New Brunswick, N. J.
Sherley W. Morgan, Architect.

Ice Arena, Hershey, Pa.
Hershey Lumber Products Co., Architects.

Jacob Riis Park Bathhouses, Queens, L. I., N. Y. (and many others).
New York City Dept. of Parks, Architects.

CONKLING ARMSTRONG TERRA COTTA CO.

SALES OFFICE AND FACTORY

Wissahickon Avenue and Juniata Street

PHILADELPHIA, PA.

AGENCIES IN PRINCIPAL CITIES

ARCHITECTURAL TERRA COTTA — MACHINE-MADE TILE WALL UNITS — GARDEN POTTERY

The illustration to the right shows the front of the new Broad Theatre, Philadelphia.

This entire front and the lobby are faced with our Tile Wall Units in sizes approximately 15 x 24 in.

The field is in a tan color with vertical stripes of black and horizontal bands of cream and black.

The whole treatment provides a very pleasing and attractive front.

For surfacing a new building or resurfacing an old front, these Wall Units provide a very economical solution to the problem of color and modern architectural design.

Our machine-made units, comprising Cove Base, Ashlar Blocks with bullnosed returns for jambs and external corners, are especially adaptable for interior or exterior facing where the lines and surfaces are mechanical, rather than ornamental.

Broad Theatre, Philadelphia, Pa.
SUPOWITZ & BERGER, Architects

Ornamental Panel
WILLIAM H. TIMM, Architect

The ornamental panel to the left is typical of the spandrel panels on the Abbotts Dairies, 31st and Chestnut Streets, Philadelphia.

Ornament of this character, reproduced by a plastic process such as this, lends itself admirably to polychrome treatment.

We have practically an unlimited choice of colors, which are produced by heat and are therefore absolutely durable in every respect.

Estimates furnished from Architect's plans and specifications or from graphic sketches, without obligation

EASTERN TERRA COTTA COMPANY

TELEPHONE
STillwell 4-7400

401 Vernon Avenue
LONG ISLAND CITY, N. Y.

PLANTS: OLD BRIDGE, N. J. and LONG ISLAND CITY, N. Y.

Being formerly the plants of NEW YORK ARCHITECTURAL TERRA COTTA COMPANY

Products

Architectural Terra Cotta: Hand made, for both exteriors and interiors.

Machine Made Terra Cotta Ashlar, Sills, Copings, Mouldings, etc.

Terra Cotta Wall-Tile.

Bas-reliefs and Sculptured Terra Cottas in polychrome or monotone colors.

Also Vases, Garden Ware and Chimney Pots.

Quality

For more than fifty years the Eastern Terra Cotta Company personnel has manufactured terra cotta of the highest quality only. Its product meets the most exacting requirements of architect and owner.

Service

Eastern Terra Cotta Company has at its command most complete facilities for the rendering of steady and dependable service to its customers.

Color

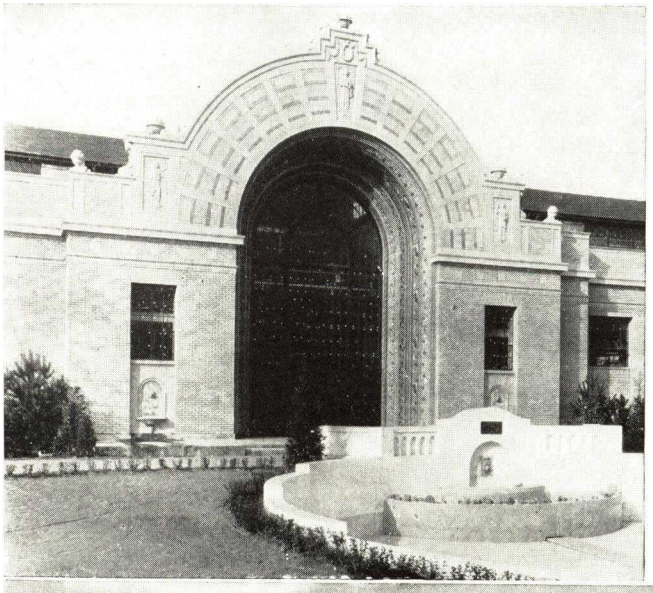
Ceramic colors and finishes of proved merit cover such a wide range that the variety of selection presented to architect and owner is almost limitless. Eastern Terra Cotta Company presents the results of more than fifty years of constant research in this department. Eastern Terra Cotta Company applies these ceramic finishes to terra cotta which has been fabricated to outlast the building of which it will form a part.

Fundamentals

Only the highest grade of selected clays, scientifically mixed and thoroughly pugged, tempered and aged, enter into the construction of Eastern Terra Cotta. With solidly pressed faces, sides and ends, all of honest thickness, and with heavy struts adequately placed, each piece of Eastern Terra Cotta has fabricated into it the guarantee of permanence.

Specifications

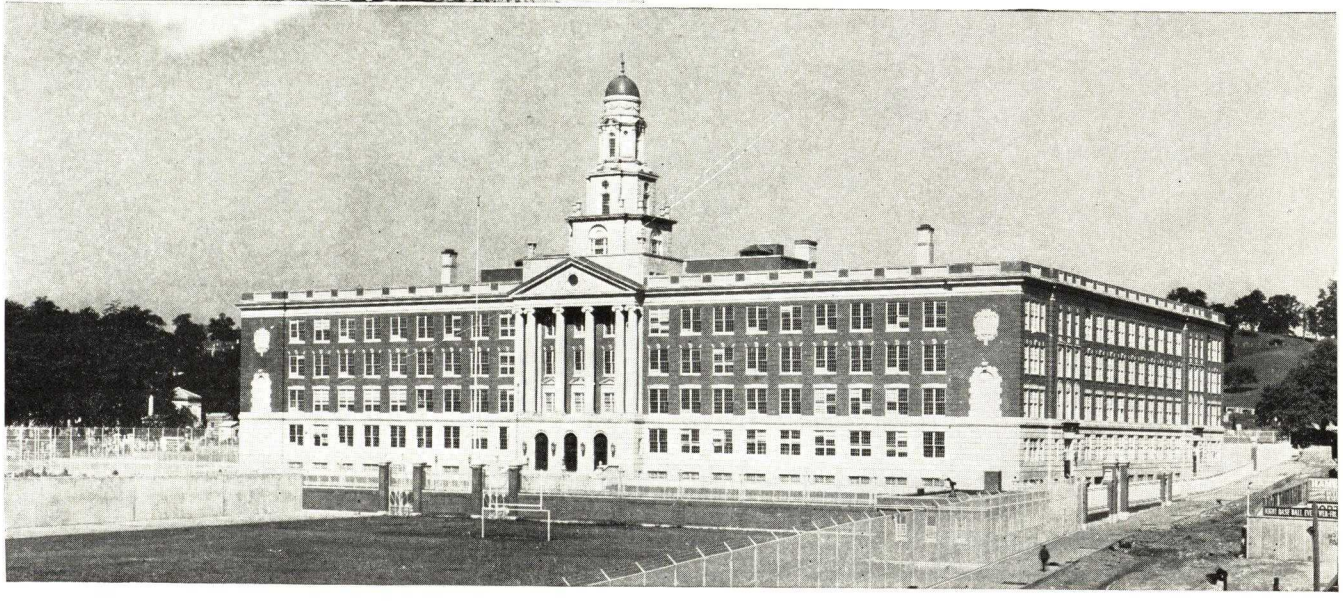
Detailed specifications furnished upon request.



This Main Entrance of the Horticultural Building, New York State Fair Grounds, N. Y., could not have been achieved in any material other than Architectural Terra Cotta.

There are thirteen separate and distinct ceramic colors in the main entrance alone,—all blending harmoniously, and fittingly framed by the distinctive main color in cornice, pediment, ornamental panels, and finials.

Willard H. Bennett, *Architect*
Millimet Construction Co., *Building Contractors*
Terra Cotta by Eastern Terra Cotta Company



Franklin Lane High School—the Largest School Building Ever Erected by the City of New York
Within its walls, the miles of corridor facings are all of Glazed Architectural Terra Cotta

Walter C. Martin, *Architect* Terra Cotta by Eastern Terra Cotta Company Wilaka Construction Company, *Contractors*

MEMORANDA

FEDERAL SEABOARD

4
26

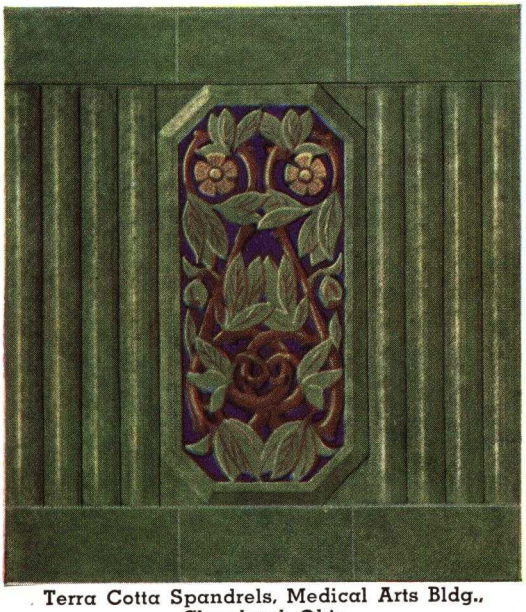
ARCHITECTURAL TERRA COTTA AND WALL ASHLAR

F S T C

FEDERAL SEABOARD TERRA COTTA CORPORATION
10 EAST 40TH STREET · NEW YORK, N.Y.

FACTORIES

PERTH AMBOY, N.J. ~ WOODBRIDGE, N.J. ~ SOUTH AMBOY, N.J.



Terra Cotta Spandrels, Medical Arts Bldg., Cleveland, Ohio

Terra Cotta Spandrels, Bronx Co. Jail, N. Y.

FEDERAL SEABOARD ARCHITECTURAL TERRA COTTA

The Federal Seaboard Terra Cotta Corporation has manufacturing experience of almost half a century, with three large factories favorably located, properly organized and equipt with the most modern machinery for the economic production of Architectural Terra Cotta in the form now demanded by modern architecture.

A research department fully abreast of the requirements of the times is maintained. New and important developments are constantly under way.

Federal Seaboard Terra Cotta products are necessarily briefly described in the following pages. Full information, color samples, and specifications covering the various products will be promptly sent upon request.

The aesthetic and functional qualities required by modern architecture demand:

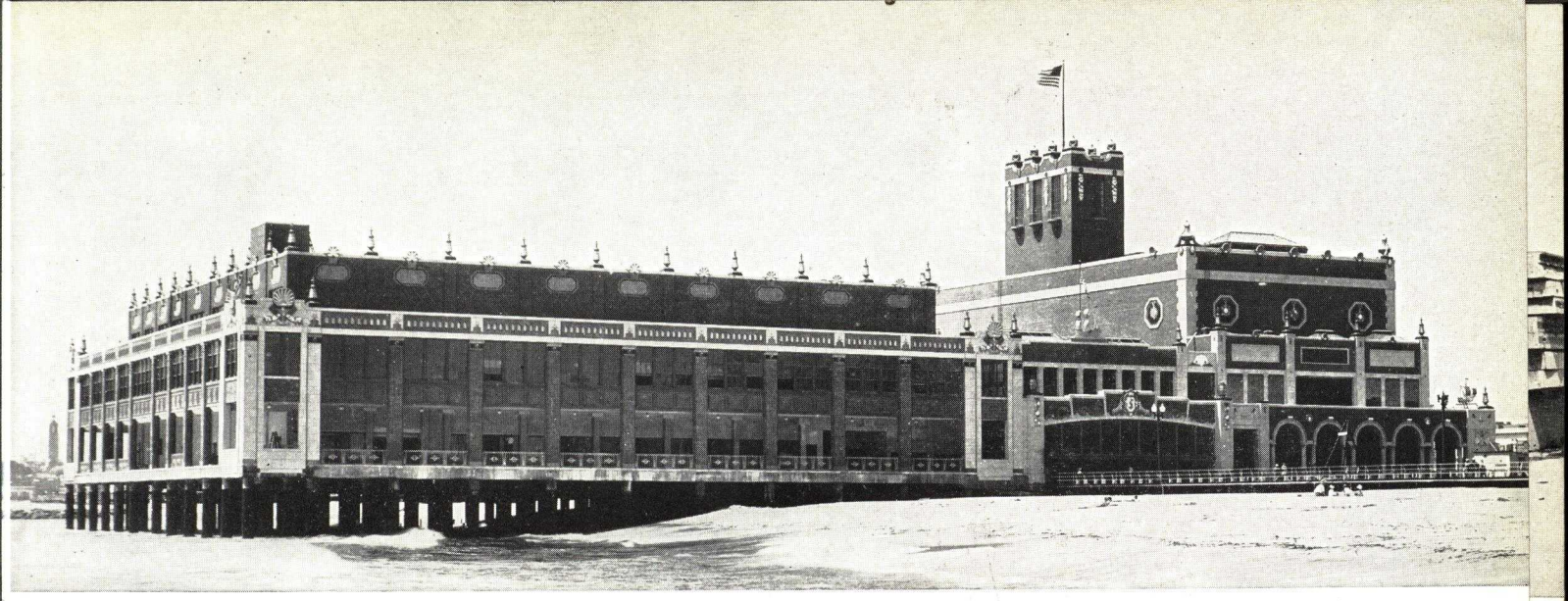
FORM ***COLOR*** ***TEXTURE***

FORM Architectural feature or decoration is produced in plaster of Paris or clay models made by our Staff Artists or furnished by the purchaser. Photographs of decorative models are submitted to the Architect for approval or the models may be inspected at our factory. The reproductions are pressed in plaster of Paris moulds economically, particularly so when there is a substantial repetition of units.

COLOR An almost unlimited range of permanent, brilliantly lustrous or matt glazed and unglazed colors are available, fired to 2,250° F or more. They are permanent to the utmost degree, acid resisting, impervious to moisture, and will not fade or discolor.

POLYCHROME Decorations in relief may be further emphasized by hand application of polychrome in glazed colors or, where absolute flatness is desired, colored decorations in polychrome are economically and artistically applied by the use of stencils.

NOBLE METAL FINISHES Gold, silver, and brilliant red surface finishes are produced by a second firing of the terra cotta at a temperature governed by the melting heat of the metals employed, usually 1,200 to 1,300° F.



Convention Hall — Asbury Park, New Jersey

APPLIED METALS Metals such as aluminum, tin, bronze, lead etc., are fused on the surface of the terra cotta at extreme heat by the oxy-acetylene process. The surface so produced has all the qualities of the metal employed plus the advantage of being fused on a substantial, non-corroding terra cotta base.

TEXTURE It is possible and economical to produce practically any desired surface texture on the plastic clay. Further, glazes applied by the multichrome process, mingling two or three different glaze colors or different shades of the same color, produce an interesting surface color texture.

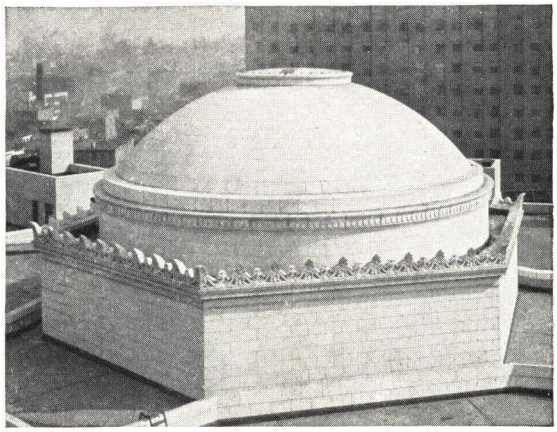
PERMANENCE Architectural Terra Cotta is the one outstanding, permanent, first grade building facing material,—created at a heat which would destroy most materials, it is fire resisting to the highest possible degree and an occasional washing with soap and water brings it back to its original freshness of color.

USE Terra Cotta may be used as a facing for the entire facade or for architectural trim,—for new buildings or for modernizations. In new work, terra cotta may be bonded to the brick or applied, in thickness of 1¼" upward, as a permanent veneer over concrete or masonry.
Terra Cotta is used to provide architectural or color interest in conjunction with other facing materials such as granite, stone, glass, brick, or like mediums. Where carving costs, for instance in granite, are found prohibitive, terra cotta, harmonizing closely in color, texture, and carving technique, is often used with great economy.

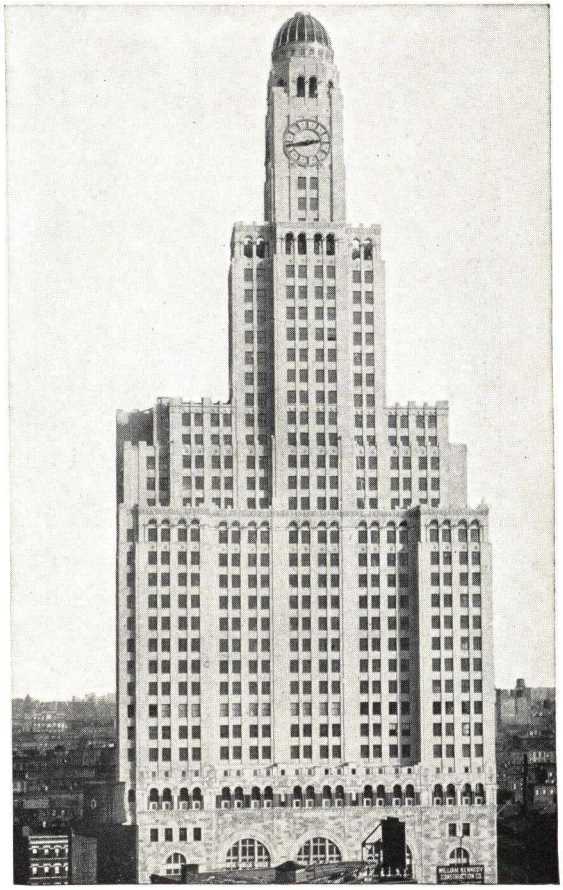
REMODELLING Due to improved manufacturing processes, it is now possible to economically reface an existing building over brick or concrete with a thin terra cotta slab, from 1¼" thickness upward, providing a permanent, modern facade for an outmoded store or a building which has lost its former rental value.

PRODUCTION While architectural terra cotta is largely produced by hand, certain features, such as large ashlars, are extruded through machines under great pressure. Surfaces of such materials are, where desired, machine planed before firing, providing large, straight ashlar of interesting texture.

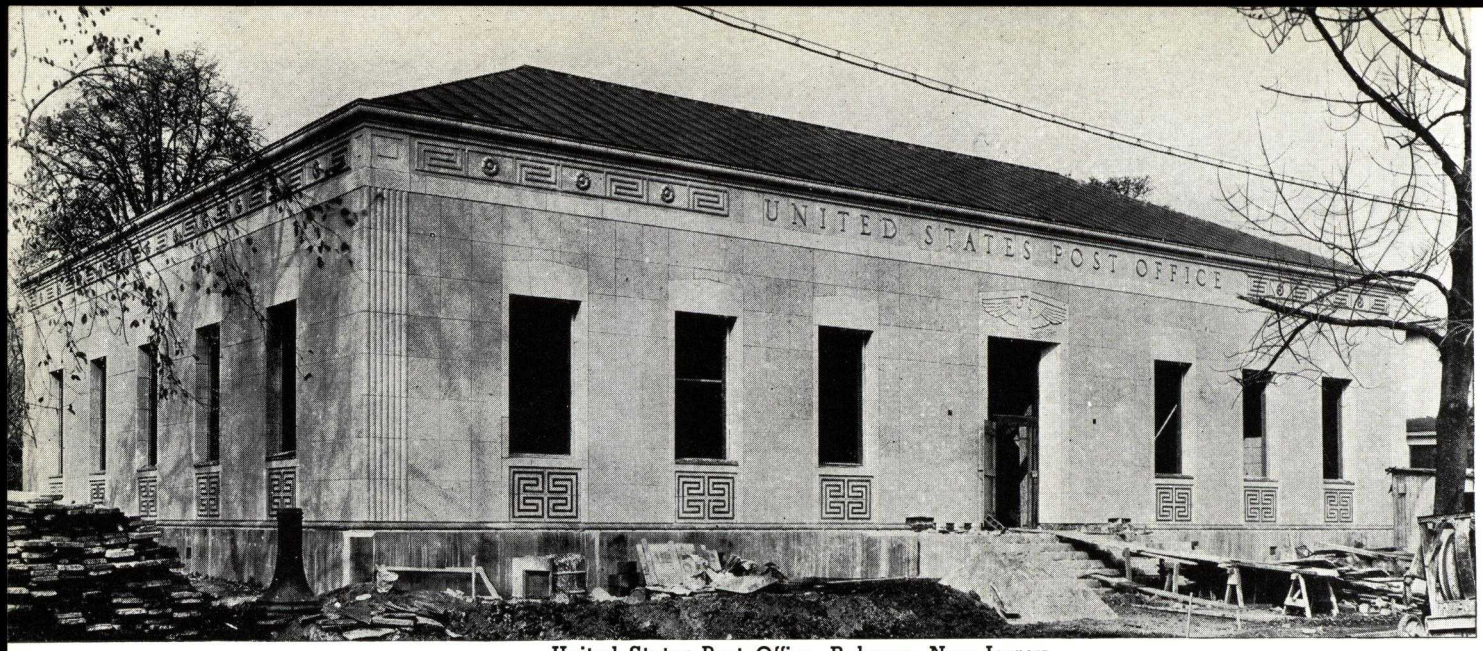
SPECIFICATIONS Write for detailed specifications on architectural terra cotta, architectural terra cotta wall ashlar, swimming pools, remodelling construction, seepage bar, planed surfaces, veneer construction or any other data you may require. This will be furnished you promptly, without charge.



Dime Savings Bank, Brooklyn, N. Y.

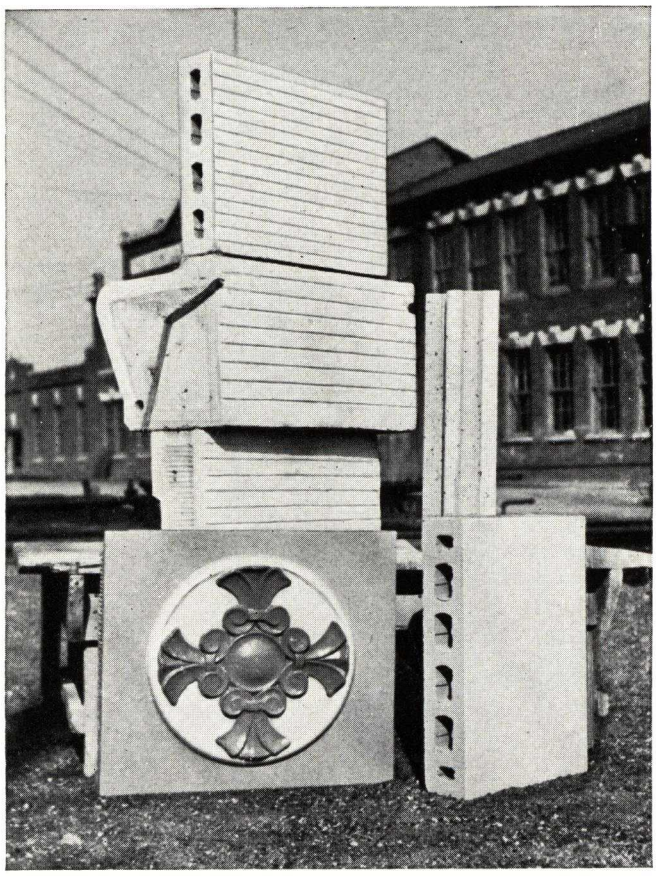


Williamsburg Savings Bank, Brooklyn, N. Y.



United States Post Office, Rahway, New Jersey

LARGE EXTRUDED ARCHITECTURAL TERRA COTTA



Advantages of Solid (Closed) Back
Architectural Terra Cotta

Manufactured in large sizes, it is light and of great strength.

Ashlar is face planed, producing a straight surface free from waviness.

Requires no filling with brick work or grout.

Is produced in bond thicknesses from a veneer of 1¼" to 4" bonded material.

May be had in an unlimited range of colors and textures.

Modern Architecture — large, flat surfaces in color — demanded a new manufacturing technique. We have installed large extrusion machines capable of producing new type Architectural Terra Cotta Wall Ashlar of large dimensions. This terra cotta is extruded with solid back (see cut). Due to back and face being of equal thickness, warpage stresses usually set up in drying are practically avoided.

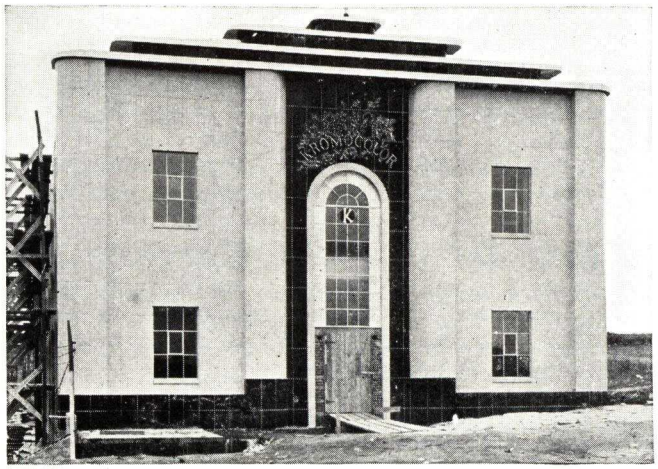
Face is planed true and straight on special machine equipment developed by us for this purpose, producing an interesting, flat, texture-pitted surface.

The sides and ends of each ashlar are accurately ground to the required joint size.

Solid back ashlar does not require brick fill backup,— a very substantial saving in cost and, while it is comparatively light in weight, it is extremely strong.

Solid back terra cotta ashlar may be bonded structurally or used as a veneer. It is produced from 2" thickness upward and in all glazed or unglazed colors.

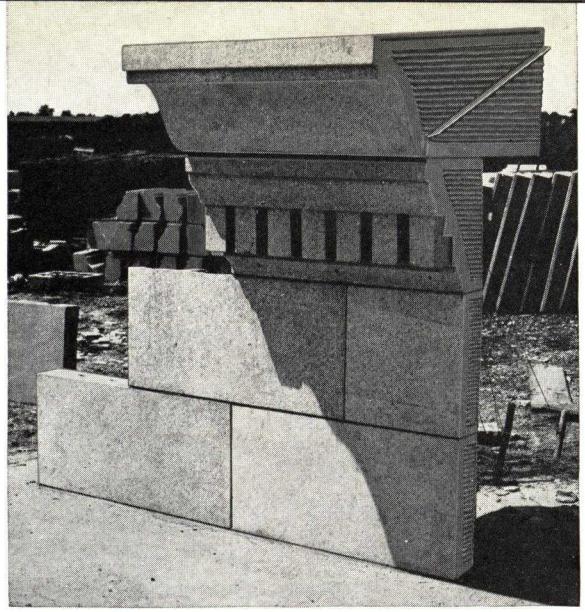
Write for specifications and data covering large solid back extruded Architectural Terra Cotta and specify all extruded Architectural Terra Cotta shall be as produced by Federal Seaboard Terra Cotta Corporation.

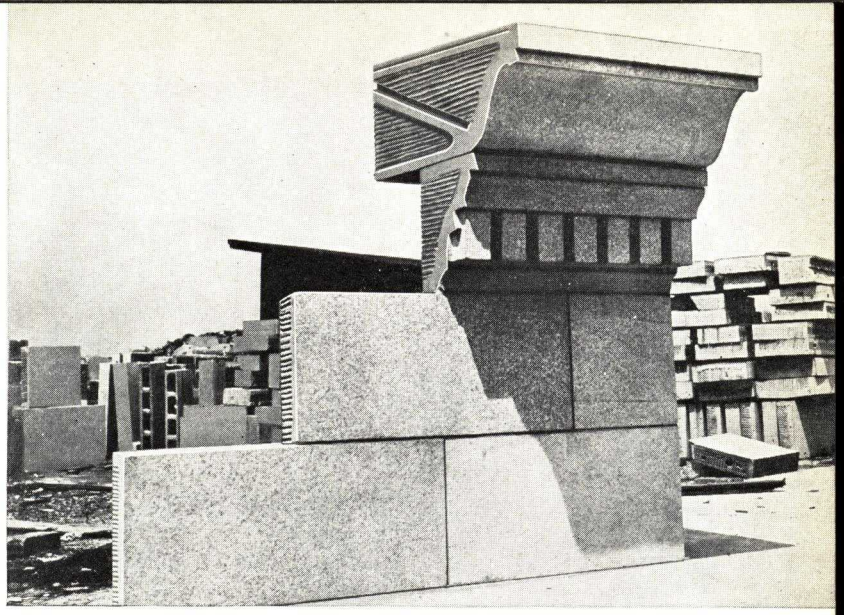


Film Laboratory—Kromocolor Inc., Paramus, New Jersey

F S T C

FEDERAL SEABOARD TERRA COTTA CORPORATION





Terra Cotta construction, showing seepage bar for water seal joint, flush corrugated joint and tuck-pointing lock

SEEPAGE BAR JOINT CONSTRUCTION

Moisture is the greatest enemy of all construction today. The penetration of water into masonry through joints is common to all masonry materials, leading to discoloration, efflorescence, disintegration, interior damage and endless upkeep expense. In FEDERAL SEABOARD terra cotta logical new construction prevents moisture penetration at joints, the terra cotta surface itself being impermeable.

SEEPAGE BAR JOINT The Federal Seaboard metal Seepage Bar is used for horizontal or nearly horizontal wash surfaces, such as parapet copings, sills, or projecting cornice or belt course members, shown in Figure 1.

Entry of water is prevented by interposing in these horizontal joints a strip or bar of non-corroding metal. An undercut groove is formed in both ends of each piece of terra cotta wherever such protection is deemed desirable. In one groove a projecting piece of non-corroding metal is permanently fixed at the factory. When the terra cotta is being set, the entire end and the matching groove in the adjoining piece are solidly filled with mortar, so that when the two pieces are butted, the seepage bar is firmly fixed in both pieces, spanning and sealing the joint.

SPECIFICATIONS Seepage-Bar for Water Seal Joint. All projecting wash courses, sills, cornices and coping courses, shall be provided with a non-corroding metal seepage bar. Seepage bar shall be firmly fixed at the factory to project from one side of each piece of terra cotta and to engage a matching receiving slot in the adjoining piece. The entire joint surface and the receiving slot shall be solidly filled with mortar when piece is being set to lock seepage bar in place and seal joint against leakage.

Write for specifications and data covering Seepage Bar Joint Construction.

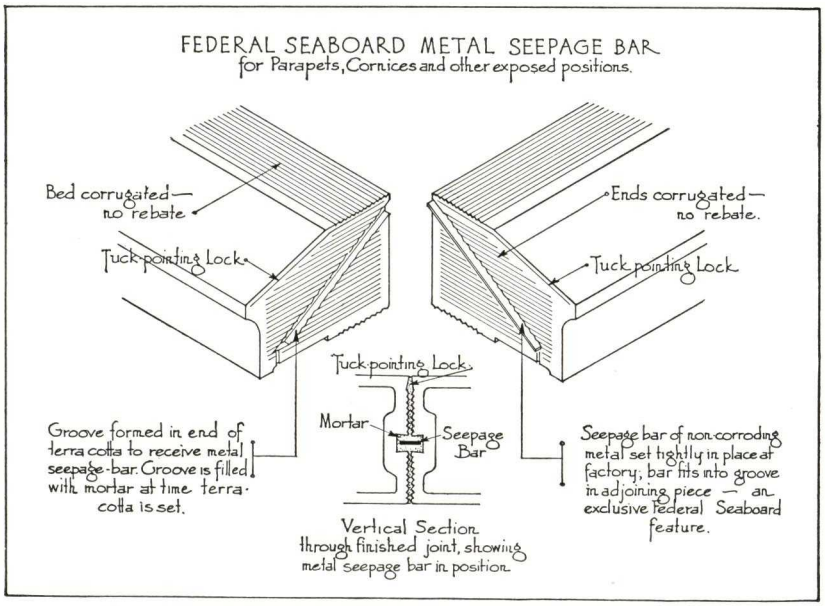
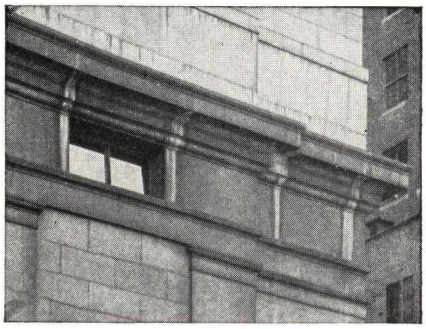
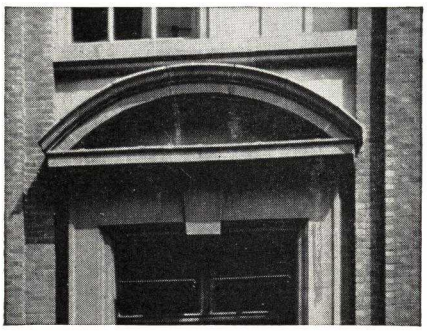
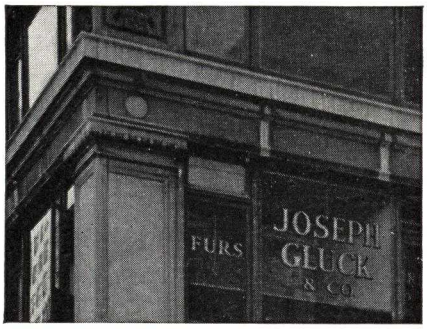


Figure 1 — Federal Seaboard Seepage Bar for Water Seal Joint







Three fine architectural materials defaced by defective joints: in order, above — Granite, Terra Cotta and Limestone.

A. S. Beck Shoe Store, New York City, N. Y.

AMERICA'S GREAT MERCHANDISERS BUILD WITH ARCHITECTURAL TERRA COTTA

Large new Department Stores, small store fronts, gasoline stations, etc., — all of great importance to their owners — designed to attract attention and the resultant business — are built with terra cotta, — truly a versatile, permanent, time-tried material.

Modern, colorful, flat architectural surfaces or the neo-classic style with its low relief, dignified decoration are all executed with equal fidelity in terra cotta, with economy.

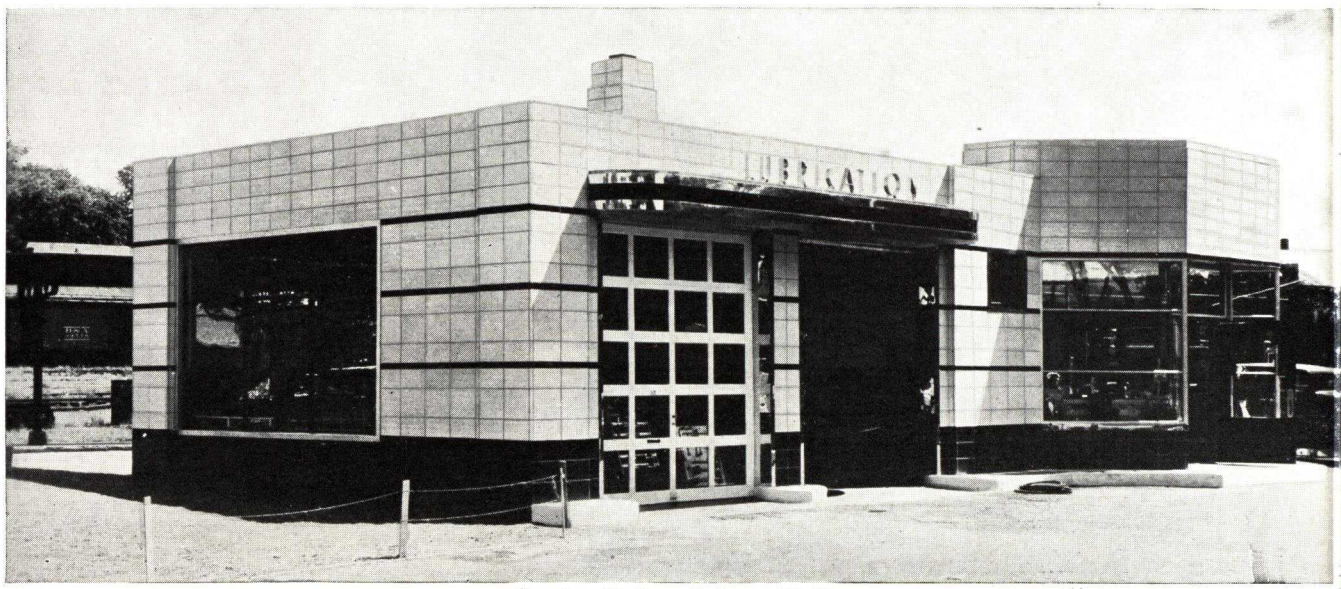
We are currently furnishing terra cotta for the buildings of:

S. H. Kress Co.	J. C. Penney Co.
Gulf Refining Co.	J. J. Newberry Co.
J. G. McCrory Co.	S. S. Kresge Co.
A. S. Beck Shoe Corp.	W. T. Grant Co.
F. W. Woolworth Co.	H. L. Green Co., Inc.

Lerner Stores Corp.

and many other merchandising giants, who appreciate not only the sales producing value of a terra cotta facade, but also its extremely low maintenance costs and the fact that terra cotta is easily kept new by simply washing with soap and water.

Write for specifications and data covering Architectural Terra Cotta and specify all Architectural Terra Cotta shall be as produced by Federal Seaboard Terra Cotta Corporation.



Service Station, Auburn, N. Y.

F S T C

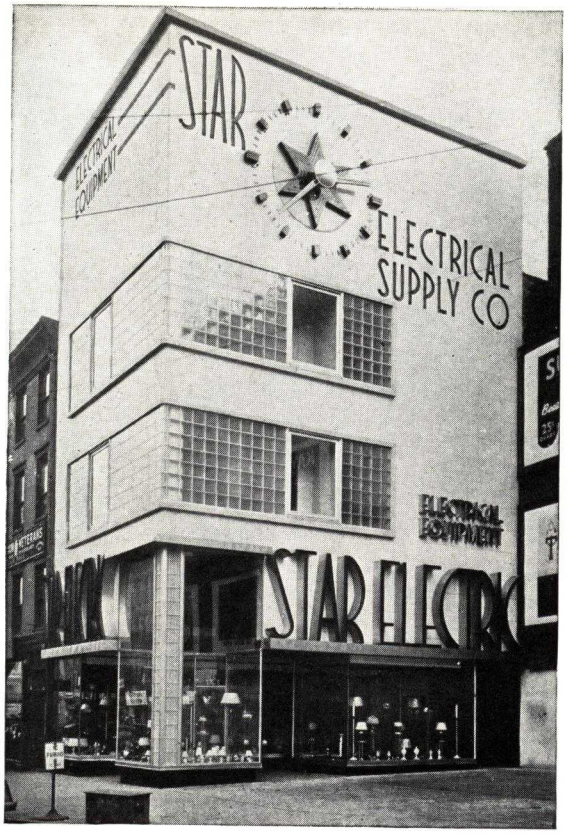
FEDERAL SEABOARD TERRA COTTA CORPORATION

ENDURO ASHLAR
ARCHITECTURAL TERRA COTTA

Something new in permanent store front construction is this colorful Enduro-Ashlar Terra Cotta. Extruded under great pressure and produced in slabs 1¼" thick, it can be erected as a veneer or, when set to our specifications (as explained in booklet), ENDURO-ASHLAR becomes a permanent and integral part of the wall. It gives a smooth, glazed, durable wall surface—and is available in almost any shade of any color.

Construction is substantial, simple, and quick. Here are the three steps in remodelling a brick wall: (1) Attach vertical pencil rods by means of expansion hooks, (2) Attach horizontal loose wire anchors to pencil rods for permanent fastening of each piece of Enduro-Ashlar, (3) Grout with mortar or concrete mixture. Enduro-Ashlar thus becomes an integral part of the wall.

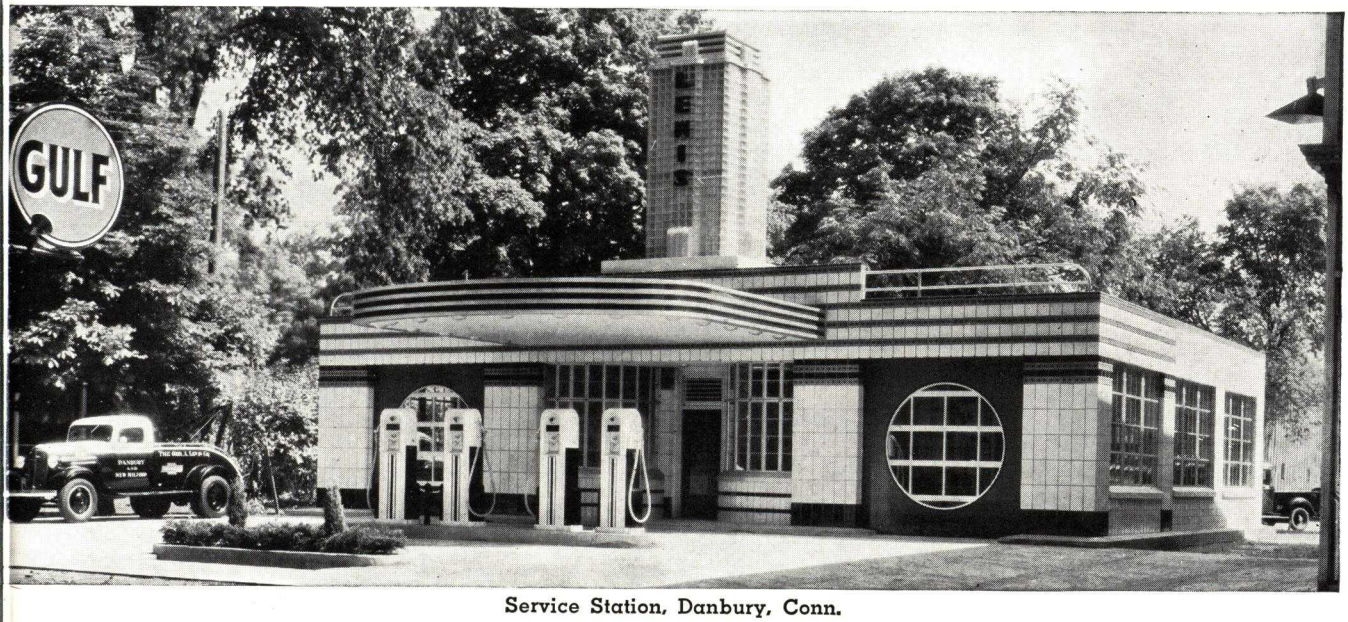
Write for specifications and data covering Enduro-Ashlar for remodelling and specify all Enduro-Ashlar shall be as produced by the Federal Seaboard Terra Cotta Corporation.



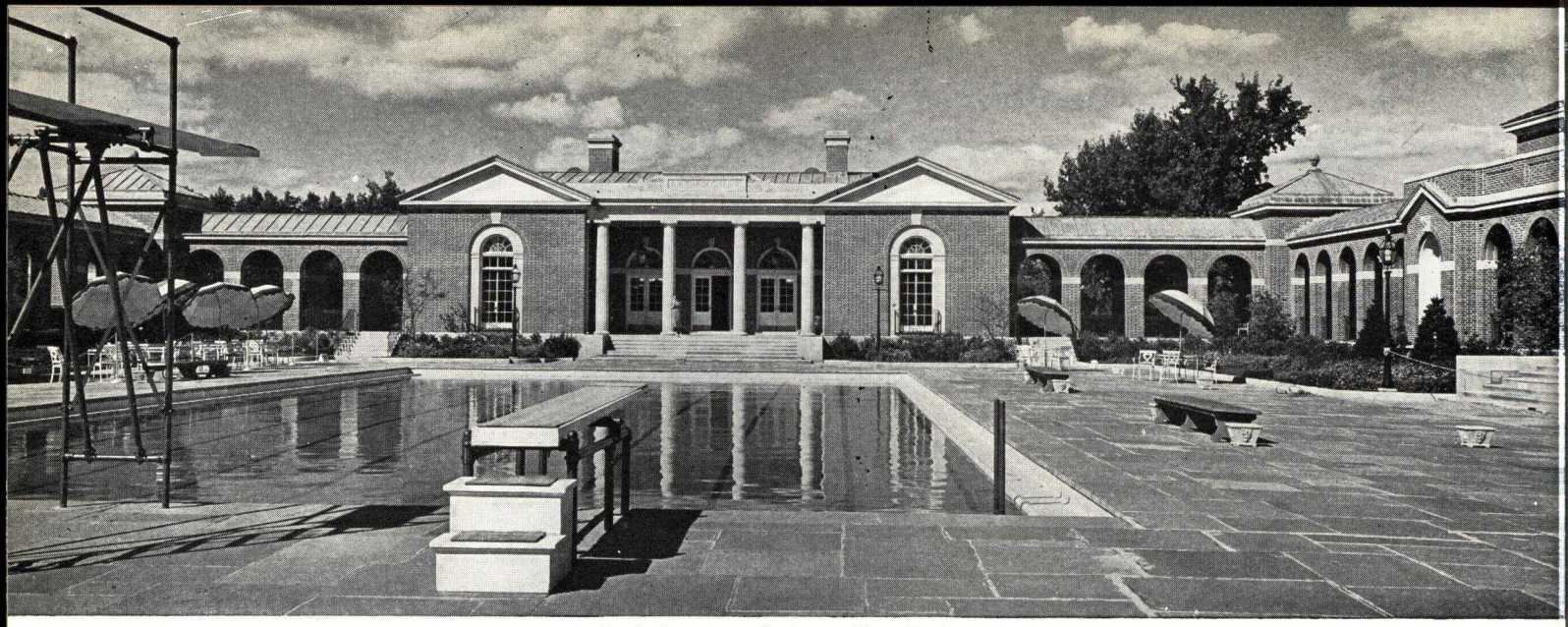
Star Electric Building
Newark,
New Jersey

The entire facade is Federal Seaboard Terra Cotta extruded "ENDURO ASHLAR" jointed vertically in 16" x 22" units.

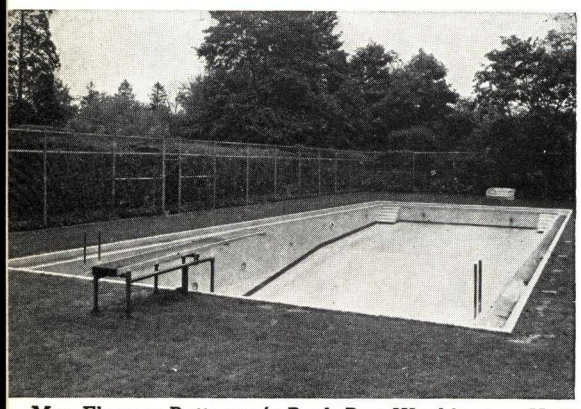
The ashlar field is a pale blue non-reflecting glaze—the trim around the windows is a darker blue glaze. The inscription is incised 2"—a lustrous purple blue glaze serving as a reflecting medium for the Neon tubes.



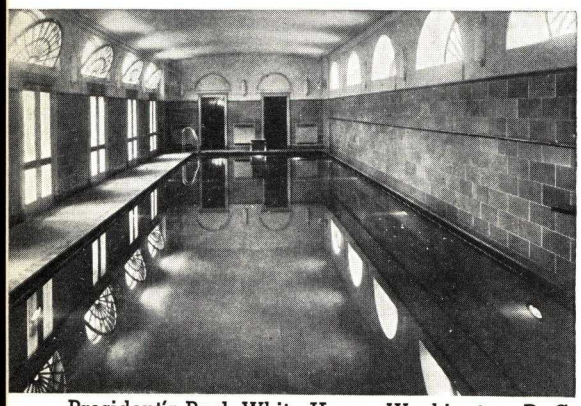
Service Station, Danbury, Conn.



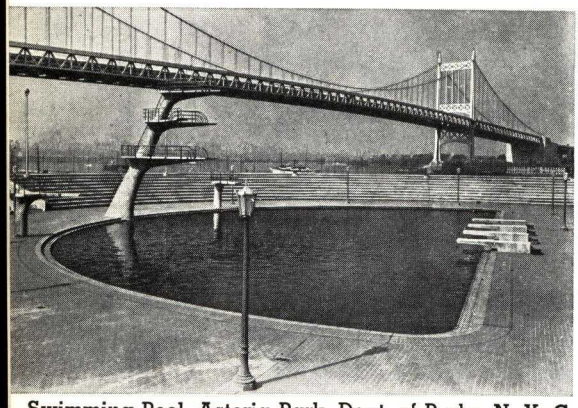
Pool, Saratoga Springs, New York



Mrs. Eleanor Patterson's Pool, Port Washington, N. Y.



President's Pool, White House, Washington, D. C.



Swimming Pool, Astoria Park, Dept. of Parks, N. Y. C.

ARCHITECTURAL TERRA COTTA

for Indoor and Outdoor Swimming Pools

For out and indoor swimming pools, terra cotta body quality, glaze, and scale of jointing are of prime importance. Impressive pools in outdoor setting are constantly being built with Federal Seaboard terra cotta using special deep blue, jade, and green glazes and creating a particularly inviting tropical depth value, properly harmonizing with the landscaping.

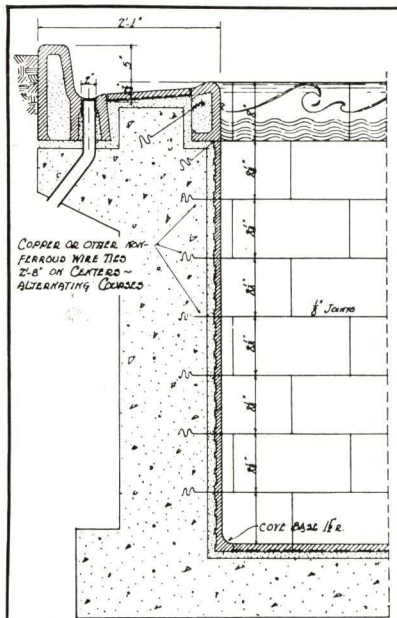
Federal Seaboard glazed terra cotta for swimming or wading pools is specially produced to function properly under prevailing climatic conditions. With its special, scientifically prepared body, fired to a heat of more than 2,250° F., an almost unlimited variety of hard, magnificent glaze colors are produced having maximum efficiency in resisting contamination and **easily kept clean with a minimum of labor and supply costs.**

Swimming lanes, depth and distance numerals, sharply outlined in glazes of strong color, and appropriate polychrome decorations are unlimited, **at reasonable cost.**

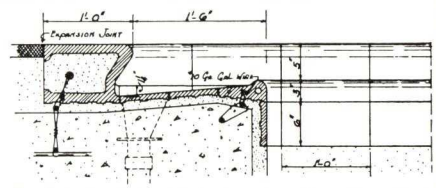
Scum gutters, seat rims, steps and other pool fittings are, when desired, produced in glazes with slip resistant surface.

Terra cotta sand jars, vases, garden seats, etc., also walls for shower and dressing room structures, in Federal Seaboard terra cotta wall ashlar are made to match the glaze colors of the pool.

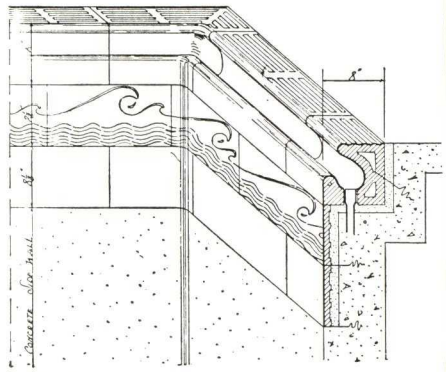
Write for specifications and data covering in and outdoor swimming pools and specify that Architectural Terra Cotta for swimming pools shall be as produced by the Federal Seaboard Terra Cotta Corporation.



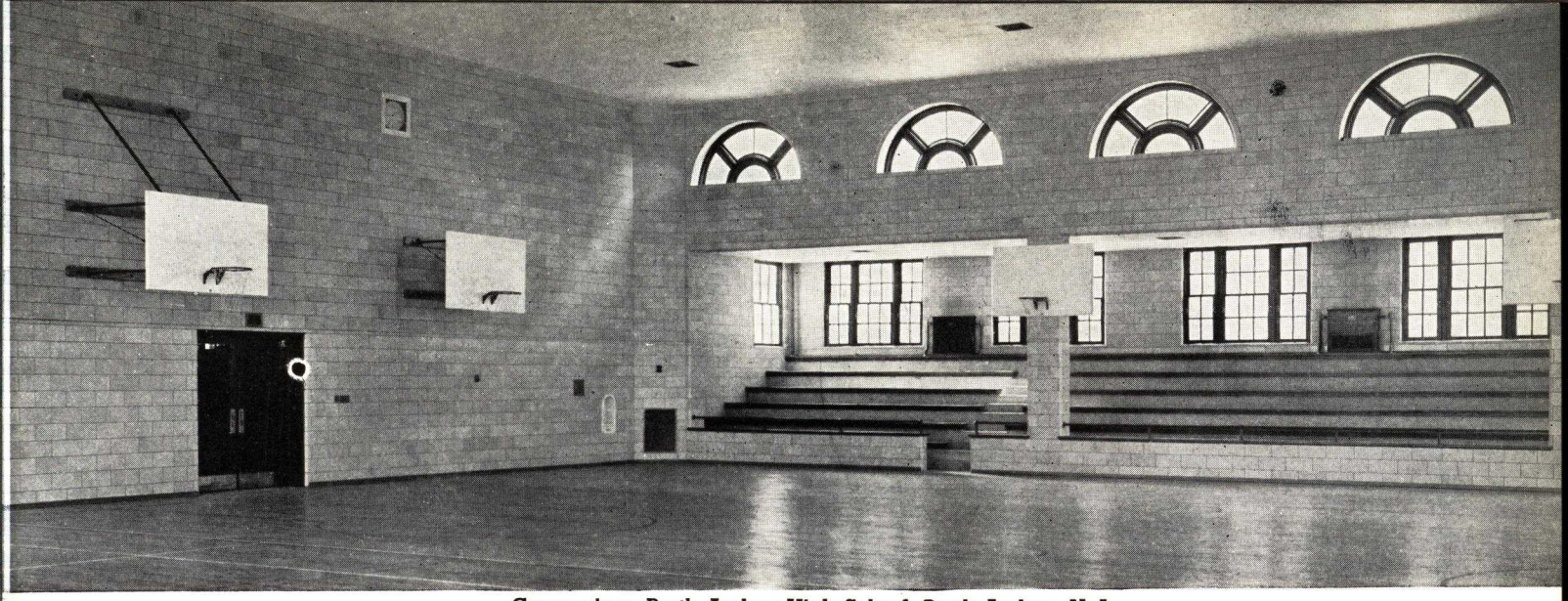
Standard Seat Scum Gutter. Sides and bottom of pool faced with extruded Architectural Terra Cotta scored back Ashlar — units 8" x 16¼" x 1".



Section through standard seat gutter. New York City Park Pools.



Part elevation and section of terra cotta. Scum gutter with polychrome terra cotta fascia courses as applied to concrete swimming pool construction.



Gymnasium, Perth Amboy High School, Perth Amboy, N. J.

ARCHITECTURAL TERRA COTTA WALL ASHLAR

Federal Seaboard Architectural Terra Cotta Wall Ashlar is produced to provide high grade walls, veneer or self-supporting, glazed on both sides, or scored on the back to receive plaster or for the usual bonding with brick or hollow tile.

The universal acceptance of this quality product by architects, engineers, and building owners is shown by their expressions of approval of many completed installations, a typical few of which are depicted in this booklet.

STANDARDS Wall Ashlar is produced mechanically by the vacuum (de-airing) extrusion process. The line of stock models is unusually complete with various designs of bases, mitres, caps, sills, and window trims, etc., so as to produce the proper architectural effect.

COLORS A wide range of beautiful, high-fired, ceramic finishes in multi-chrome and solid glazes is available, and, if desired, our Ceramic Laboratories will produce special effects in glazed colors of rare quality and distinction, which are permanent, impervious, and easily cleaned when desirable.

COST The first cost is the only cost of Federal Seaboard Wall Ashlar, this being a precision product, **ground on sides and ends to exact size and squareness.** Delivered to the scaffold in substantial corrugated containers it is not easily chipped or broken—all **facilitating speed, economy, and accuracy in erection.**

FIRE RESISTANCE The building for which you are responsible may never be swept by flame—but a fire clay product which will resist this terrific test is available to you—Federal Seaboard Terra Cotta Wall Ashlar is produced at a heat of more than 2,250° F. and is fired with your choice of beautifully colored ceramic glazes.

PERMANENCE Time is the ultimate test of quality and worth—Federal Seaboard standard Wall Ashlar never decays or deteriorates, its enduring excellence grows more apparent with the passing of years. To build with less permanence is to invite constant cost of upkeep—FOREVER.

SANITATION The ceramic glazed surface of Federal Seaboard Wall Ashlar wears forever—nothing to decay or absorb odors, is easily washed and cleaned with soap and water.

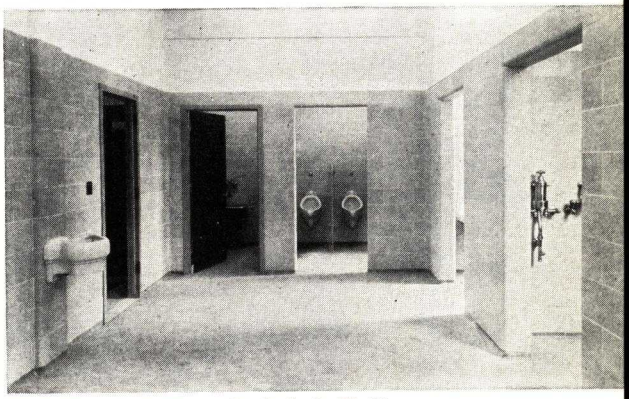
DIMENSIONS Federal Seaboard Standard Wall Ashlar is automatically and **accurately ground to size,** usually 8″ x 1′ 4¼″ or larger, thus providing proper architectural scale, and eliminating the excess of large unsightly joints characteristic of smaller units. Smaller sizes (from 5″ upward) unground are produced for construction where larger and somewhat irregular joints are not considered objectionable.

DRAWINGS As we furnish setting drawings for the ashlar installation (submitted to Architect for approval) it is only necessary for the Architect to indicate where the wall ashlar is to be used,—over all dimensions should be figured.

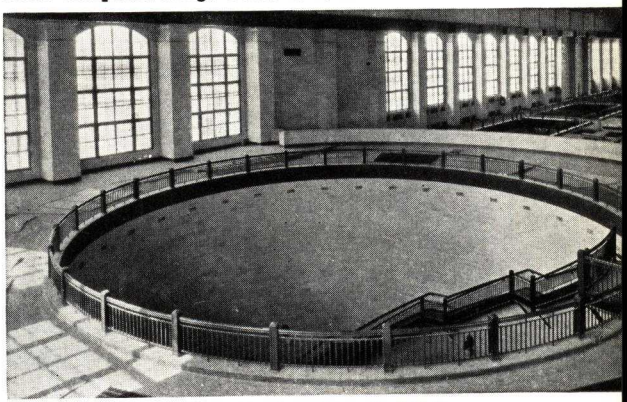
PROPOSALS We furnish lump sum proposals for the terra cotta required based on Architect's scale drawings, sketches, or other information available.

Write for specifications and data covering Architectural Terra Cotta Wall Ashlar and specify that all Architectural Terra Cotta Wall Ashlar shall be as produced by the Federal Seaboard Terra Cotta Corporation.

Albany Avenue School, Freeport, L. I., N. Y.

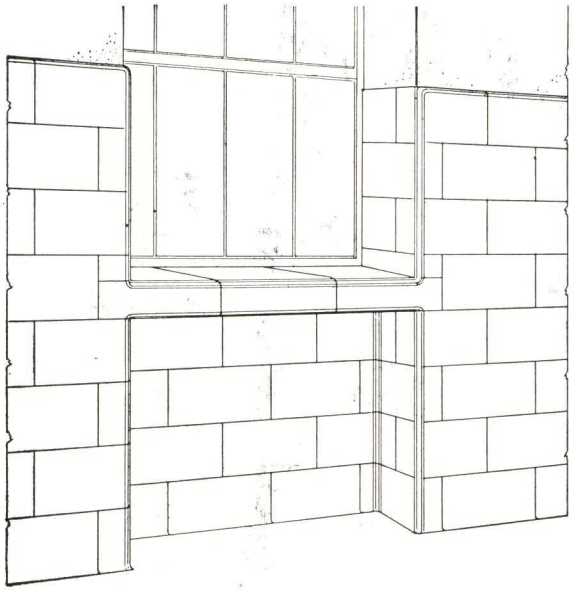


State Hospital, Kings Park, L. I., N. Y.

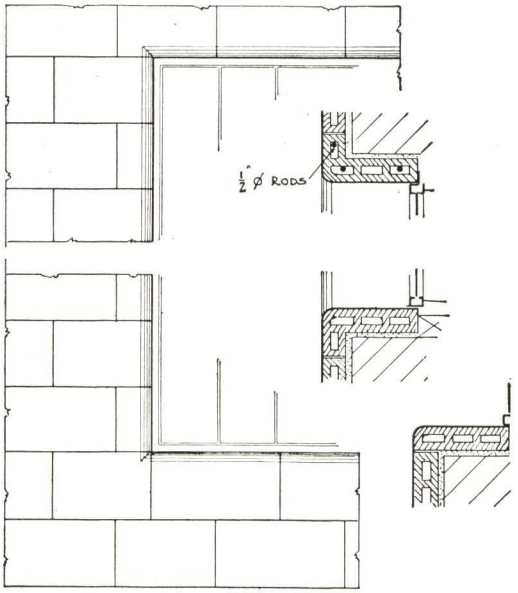


Springwells Pumping Station, Detroit, Mich.

FEDERAL SEABOARD
ARCHITECTURAL TERRA COTTA WALL ASHLAR



RADIATOR RECESS
Terra Cotta Jamb and Sill

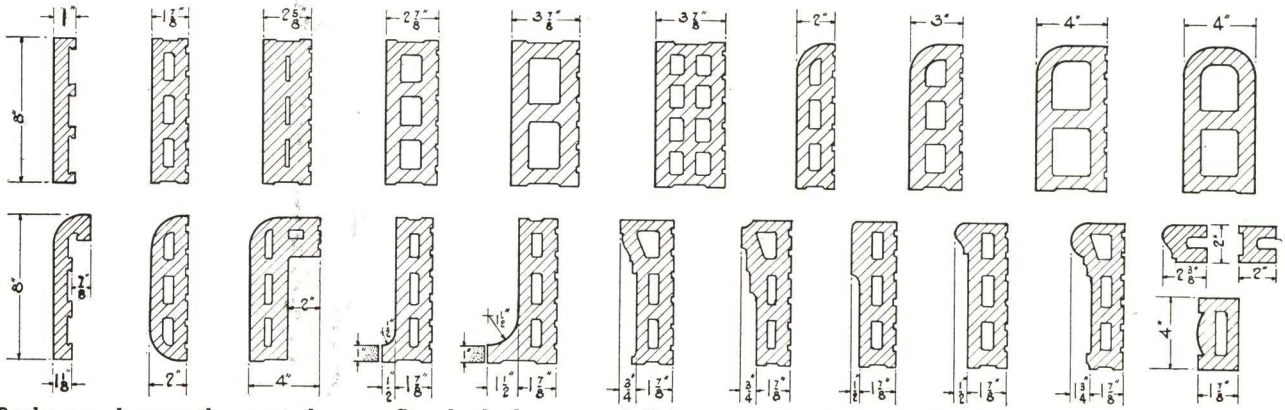


STANDARD WINDOW TRIM
Lintel or alternate sill construction

Extruded Architectural Terra Cotta Wall Ashlar may be had in standard 8" x 16¼" size or in square modules, 8" x 8", 12" x 12", 16" x 16", etc. and in veneer thickness or bonded for load carrying walls, as may be required.

Standard Extruded Architectural Terra Cotta Sections.

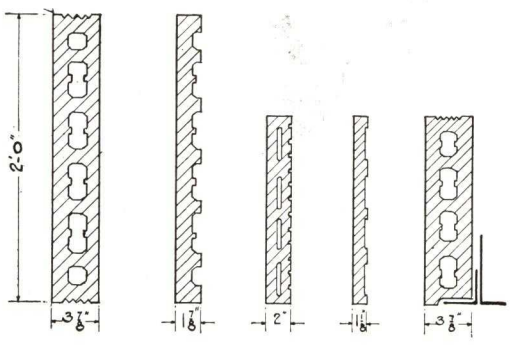
Standard bull nose radii may be ½" or 1½". Square corner reveals may be had.

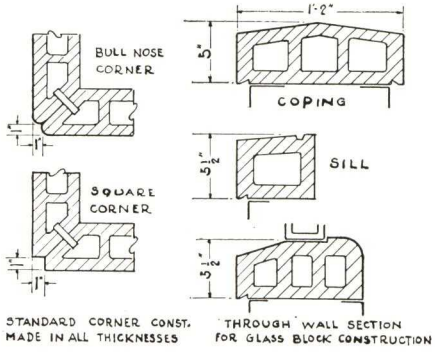


Backs may be smooth or scored for plaster, as desired.

Standard shapes and fittings are made in 1", 1⅞", 2⅞" and 3⅞" thicknesses.

Standard extruded ashlar is made in 1", 1⅞", 2⅞", 3⅞", 4⅞", 5⅞" and 8" thicknesses.



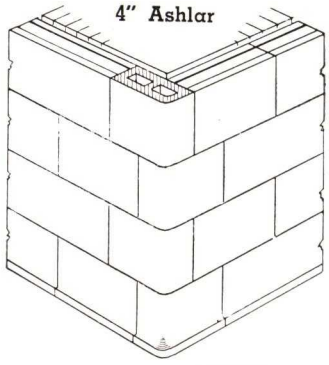


STANDARD CORNER CONST. MADE IN ALL THICKNESSES

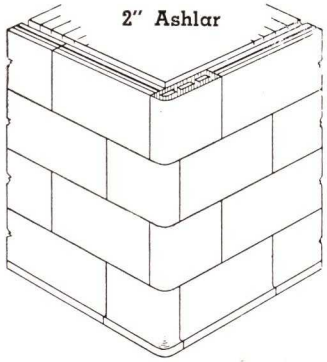
THROUGH WALL SECTION FOR GLASS BLOCK CONSTRUCTION

Heavy Extruded Architectural Terra Cotta Wall Ashlar for facing exterior walls is produced in all widths up to 2'0" and in bond thicknesses from 1¼" to 4". Thickness of face and back is approximately 1⅛". Lengths up to approximately 3'4" are standard. Dies for square reveals, coves, bull nose corners and other special shapes are in stock.

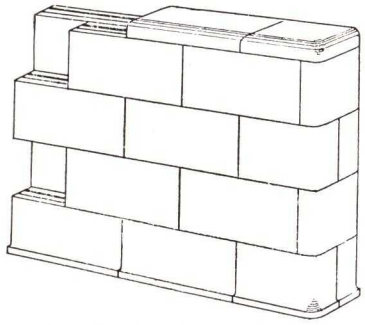
FEDERAL SEABOARD
ARCHITECTURAL TERRA COTTA WALL ASHLAR



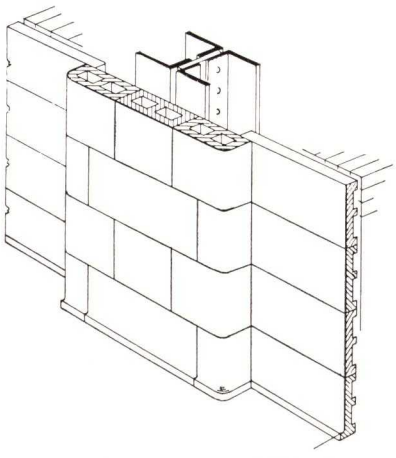
EXTERNAL CORNER
Ashlar Alternatnig 4" & 8"



EXTERNAL CORNER
Ashlar Alternating 2" & 8"

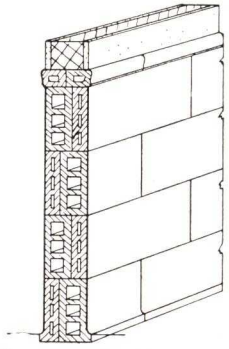


COPED LOW PARTITION WALL

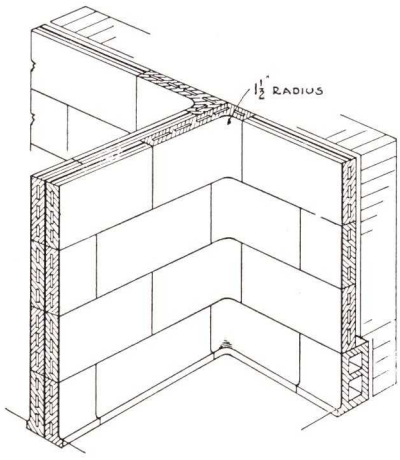


1¼" Veneer

COLUMN FACING
Special sections are made where demanded by Building Code

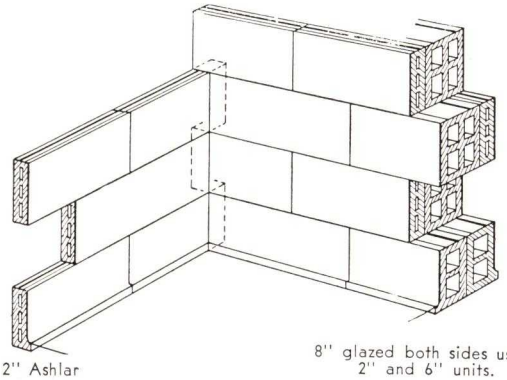


5" wall glazed both sides bonded 2" and 3" units.



4" glazed both sides

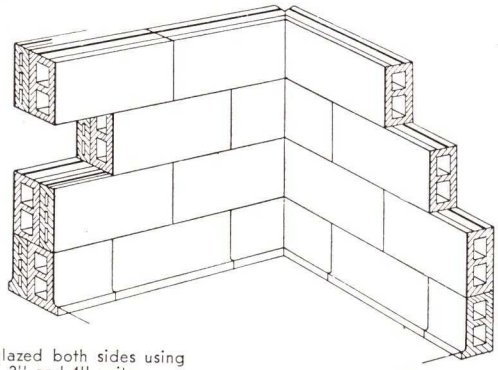
INTERNAL COVE CORNER



2" Ashlar

8" glazed both sides using 2" and 6" units.

INTERNAL SQUARE CORNER
ALTERNATE BONDED CORNER JOINT



6" glazed both sides using 2" and 4" units.

4" Ashlar

INTERNAL SQUARE CORNER
CONTINUOUS MITERED JOINT

Write for specifications and construction data covering Architectural Terra Cotta Wall Ashlar for interiors and specify all Wall Ashlar shall be as produced by Federal Seaboard Terra Cotta Corporation.

State Hospital, Central Islip, L. I., N. Y.

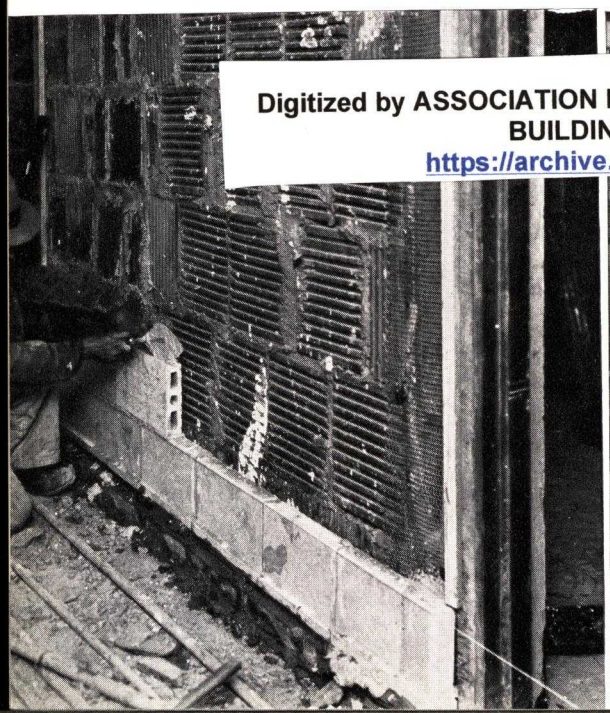
FEDERAL SEABOARD ARCHITECTURAL TERRA COTTA WALL ASHLAR

FEDERAL SEABOARD TERRA COTTA WALL ASHLAR is truly a versatile material. The walls of laboratories such as the Mellon Institute of Industrial Research in Pittsburgh are built with it as is the tremendous expanse of the Springwell Pumping Stations, Detroit. The interior of the Women's Detention Prison in New York City is, for its eleven stories, built with our terra cotta wall ashlar, the other architectural extreme being the magnificent swimming pool room in the Shoreham Hotel in Washington and innumerable diversified installations such as school lobby wainscots, bakeries, dairies, breweries, incinerators, sewage disposal plants, etc.

While in architectural design and color effects these installations are vastly different, the basic quality of the material and the reason for using terra cotta are always the same,—an accurately made quality material, it is permanent, requires no maintenance, it is the extreme in fire resistance.

VARIOUS TYPICAL WALL ASHLAR INSTALLATIONS:

Laboratories at Wilmington and at Various other Cities	E. I. DuPont de Nemours Co., Inc.
High School, Newburgh, N. Y.	Starrett & Van Vleck
Midtown Hudson Tunnel, N. Y.	Port of New York Authority
Statue of Liberty Tunnel, N. Y.	Dept. of Interior, Washington, D. C.
Ruppert's Brewery, New York, N. Y.	Ely J. Kahn
U. S. Post Office, Rahway, N. J. (and many others)	Supervising Architect, U. S. Treasury Dept.
Hospitals, Orangeburg, Brentwood, Central Islip, N. Y., and many others	Dept. of Public Works—Wm. E. Haugaard
Mellon Institute of Industrial Research, Pittsburgh, Pa.	Janssen & Cocken
Pumping Station, City of Cleveland, Ohio	Geo. B. Gascoigne
Filtration Plant, City of Covington, Ky.	Whayne W. Haffler & J. S. Watkins
Western Hill Pumping Station, Cincinnati, Ohio	Jos. G. Steinkamp
Sewage Disposal Plant, Perth Amboy, N. J.	Louis Booz
Incinerators, New York, N. Y.	Frank S. Parker
Various Plants, General Ice Cream Co.	Company's Engineers
Standard Laundry, Jersey City, N. J.	R. G. & W. M. Cory
Sheffield Farms Dairy	Stohldreier & Zetsche
Public Schools, New York, N. Y.	Walter C. Martin
Public Schools, Newark, N. J.	Guilbert & Betelle
Convent & Chapel, Albany, N. Y.	Gander, Gander & Gander
Grit Chambers, New York, N. Y.	Dept. of Sanitation, N. Y.
Women's Detention Prison, New York, N. Y.	Sloan & Robertson
Library of Congress, Washington, D. C.	David Lynn & Assoc.
Vassar College, Poughkeepsie, N. Y.	Allen & Collens
Philips Exeter Academy, Exeter, N. H.	Cram & Ferguson
St. Elizabeth's Veteran Hospital, Washington, D. C.	Vet. Adm. Constr. Service
Westminster Choir School, Princeton, N. J.	Sherley W. Morgan
Springwells Pumping Station, Detroit, Mich.	John C. Thornton



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https://archive.org/details/buildingtechnologyheritagelibrary

ESTABLISHED 1810

GALLOWAY TERRA COTTA COMPANY

3200 Walnut Street
PHILADELPHIA, PA.

GALLOWAY POTTERY

Products

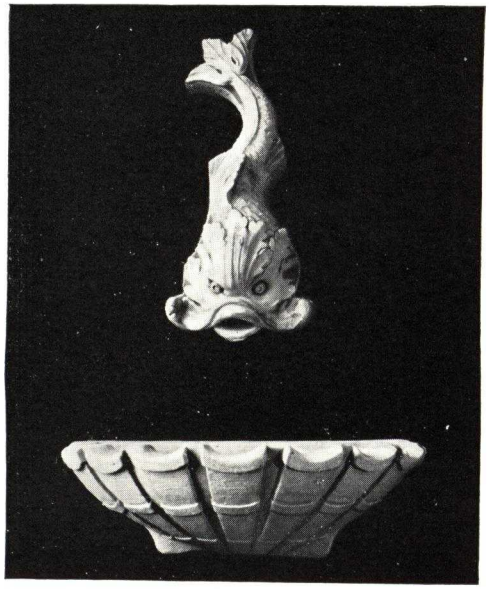
GALLOWAY GARDEN and DECORATIVE POTTERY and TERRA COTTA including: Flower Pots, Boxes, Vases, Bird Baths, Sun Dials, Tables, Benches, Hermes and Statuary. Also Architectural Terra Cotta. Since 1810 our organization has been making Pottery and Terra Cotta of various kinds and is now specializing in Garden and Decorative Wares.

Catalogue of Garden Pottery and schedule of Chimney Pots will be sent upon request.

Finishes

Our high fired strong and durable terra cotta is made unglazed and glazed. The light stony gray is the popular finish in the unglazed, although reds, buffs, etc., are also made. Glazes usually range through the blue-green and turquoise, but almost any shade can be made on order.

Special forms can be turned and quotations will be made upon sketches and details.



Wall Font

No. 369. Dolphin, 19½ in. high, inset 2 in.
No. 455. Bowl, 22 in. wide, inset 3¼ in.
Wall fonts designed to fit individual needs

Typical Selection from Our Sand Jars
No. 88. 19 x 13 in.

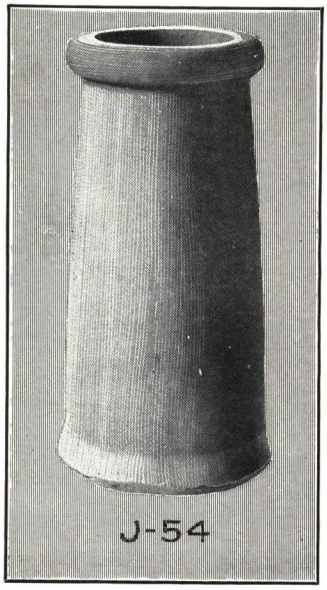
Large Jars in a Garden

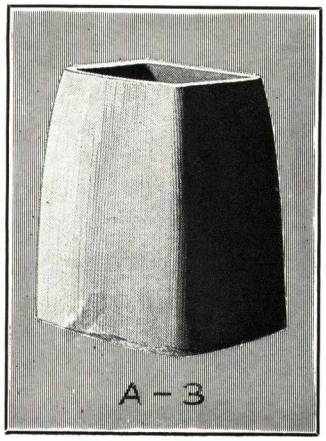
Galloway Handmade Chimney Pots

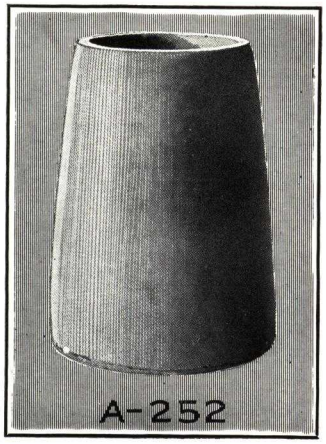
Made to fit standard flue linings. Special sizes and designs will be executed on order.

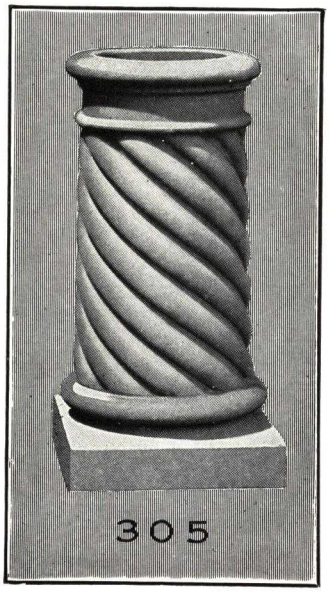
Color—Medium red is the stock finish, but gray, buff, and special colors will be made.

Orders—Stock is maintained in standard sizes but orders placed well in advance of your needs will prevent unnecessary and costly delays.







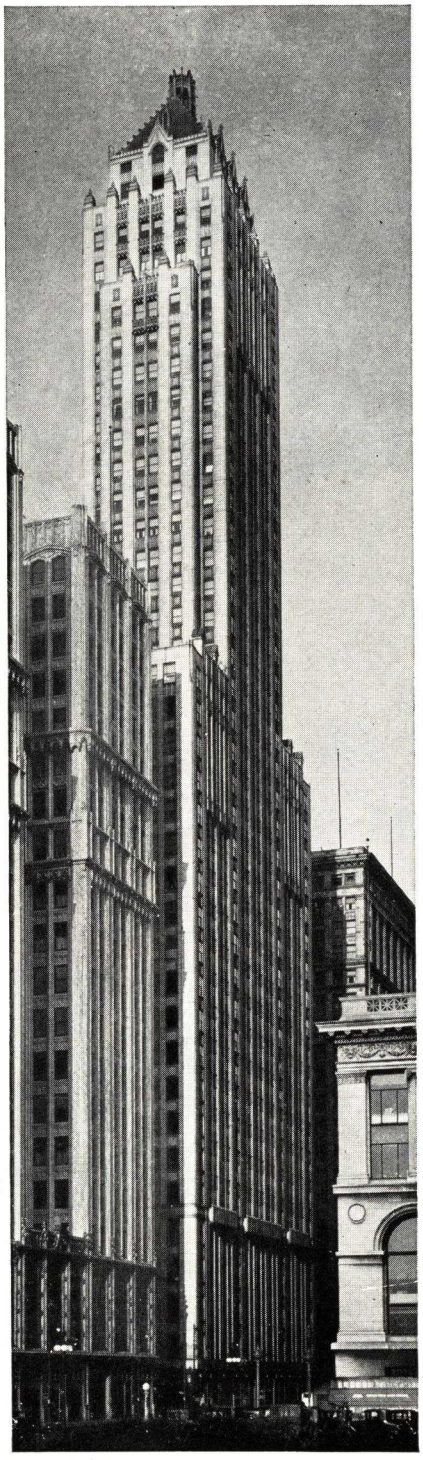


NORTHWESTERN TERRA COTTA CORPORATION

TELEPHONE
Lincoln 7400

1750 Wrightwood Avenue
CHICAGO, ILL.

SOUTHWESTERN PLANT: ST. LOUIS, MO.
WESTERN CONNECTION: Denver Terra Cotta Co., DENVER, COLO.
REPRESENTATIVES IN PRINCIPAL CITIES



Pittsfield Building, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects

ARCHITECTURAL TERRA COTTA

A Reputation Founded on Unvarying Quality Has Made "Northwestern" a Recognized Synonym for Terra Cotta Excellence

No other single architectural material meets so well the varying requirements of both traditional and current design as does modern Terra Cotta, understandingly designed, conscientiously made and properly set. This is true whether the problem is a mighty skyscraper or a modest modern store front.

Only in Terra Cotta are form, ornament, color, glaze and texture all at the designer's command. Perfection of results can best be obtained, however, by collaboration between an architect and a manufacturer of understanding and experience, starting with the very inception of the design. Only so can the elements of beauty and cost be properly balanced in the development of the project.

Architectural Terra Cotta as manufactured by NORTHWESTERN has for nearly half a century been recognized as particularly characterized by that high quality which can come only from the most skilled workmanship, the most careful manufacture and a sincere desire to produce only the best.

WALL ASHLAR

NORTHWESTERN makes an extruded wall ashlar of characteristic excellence, in addition to the hand-pressed Terra Cotta for which it has been famous for sixty years. For economy, the extruded block is standardized, but only within broad limits; many variations in size and contour are possible. The limitless color-range of the hand-pressed ware, and its wide variety of glazes and finishes, are available in the Terra Cotta wall ashlar.

The economy of extruded wall ashlar makes the many desirable features of the Terra Cotta exterior available for the first time for the smaller lower-cost structure without sacrifice of architectural quality.

In addition, a whole new field of attractive and sanitary interior effects is opened up: entire wall surfaces in institutional buildings, to improve sanitation and eliminate costly periodical repainting; corridor, stair, closet, gymnasium and auditorium wainscot in schools, libraries, municipal and other public buildings; complete interiors for laundries, markets, kitchens, restaurants, and food stores of all kinds; pumping stations, sewage disposal and garbage destructor plants; foyers, lobbies, waiting rooms and all places of public assembly; toilet and washrooms; school, office and factory rest rooms and infirmaries, etc.

AN ARCHITECTURAL ELEMENT
NORTHWESTERN
ART-I-SAN
ARTISTIC SANITARY
AN ESSENTIAL PRODUCT
WALL BLOCKS

SPECIAL PRODUCTS

NORTHWESTERN also manufactures Decorative Tile, Plaques, Garden Pottery, Copings, Chimney Pots in many models, etc., all of which combine artistic excellence with highest ceramic quality.

Inquiries are welcome with regard to the manufacture of special clay products, such as Monumental Roof Tile, Name Panels, Trade Marks and other Ceramic Motifs of fine design and superior quality.

SAMPLES, COLORS, GLAZES, TEXTURES

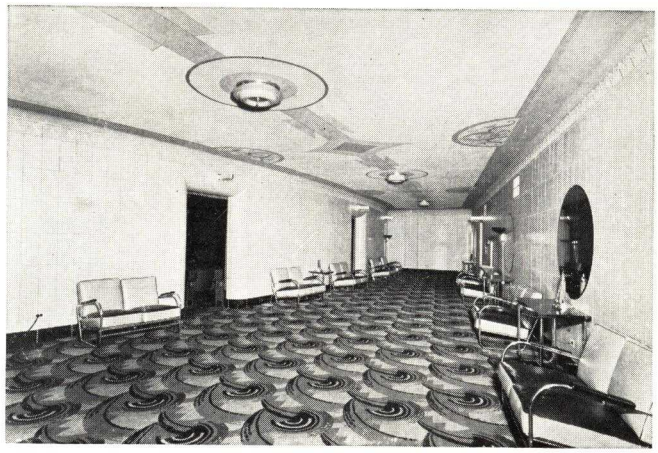
An unusually complete "library" of color and glaze samples, the result of sixty years of ceramic engineering, usually makes it possible to meet the architect's requirements immediately with a choice of samples embodying tried and proven formulæ, avoiding uncertainty and loss of time.

CONSULTATION

Collaboration with NORTHWESTERN puts at the architect's disposal from his very first sketches, the artistic and technical resources of an organization with the accumulated research and production experience of two generations of ceramists, plus the practical knowledge of construction acquired in the execution of thousands of projects involving every conceivable structural problem.

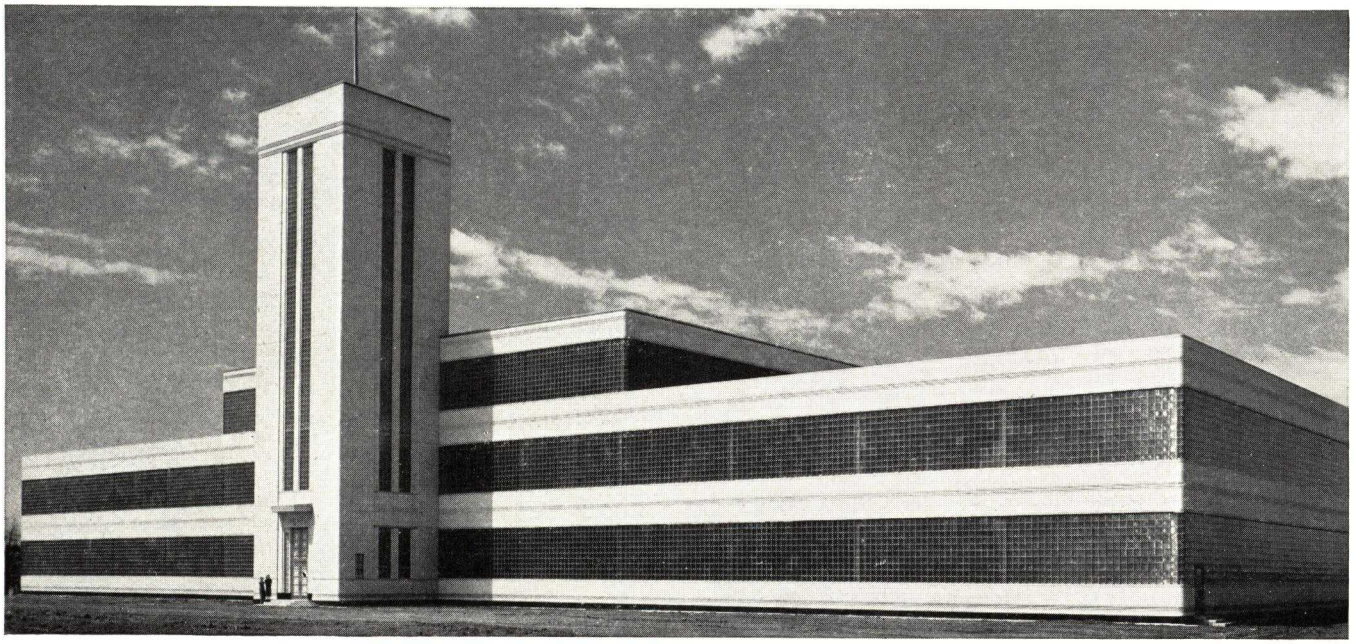
PRICES AND INFORMATION

Information with regard to Architectural Terra Cotta and Terra Cotta Wall Ashlar construction, and preliminary estimates of costs, furnished upon request. As suggested above, for best results, it is strongly recommended that NORTHWESTERN be consulted during the early development of the design.



Elm Theatre, Elmwood Park, Ill.
E. P. RUPERT, Architect

Service Station, Chicago, Ill.



Office and Factory Building—The Campana Company, Batavia, Ill.
FRANK D. CHASE, INC., and CHILDS & SMITH, Associate Architects

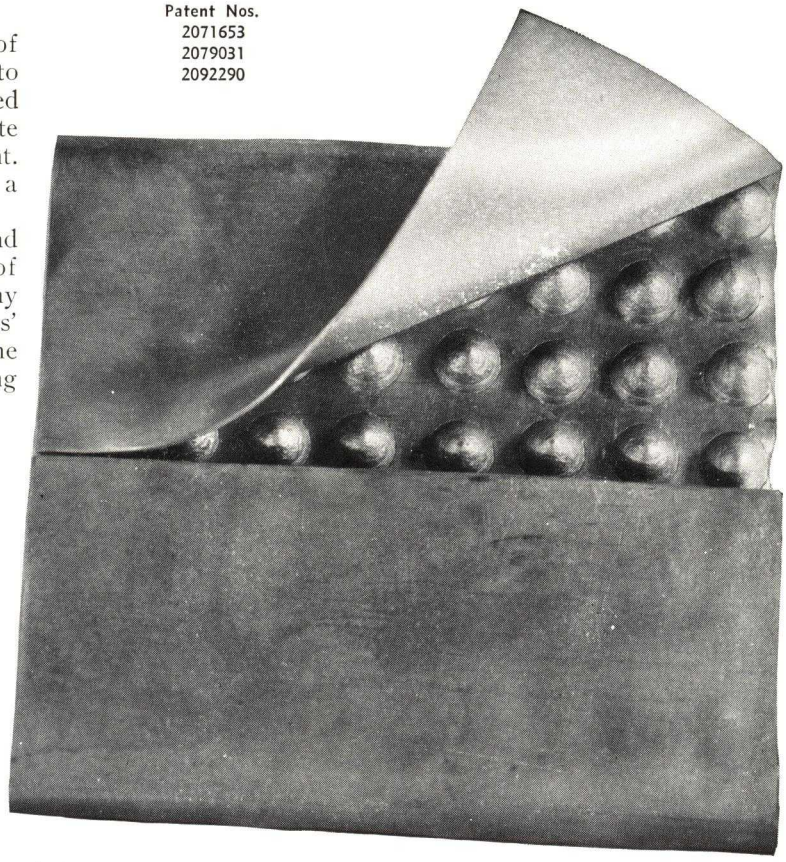
MEMORANDA

BUILDERS' CUSHION JOINT CO.

208 North Wells Street
CHICAGO, ILL.

TELEPHONE
BITTERSWEET 2455

Patent Nos.
2071653
2079031
2092290



Material

A sheet of lead incorporating a plurality of raised portions from that sheet and folded onto itself. The raised portions are of any desired height, generally of sufficient thickness to create a joint of equal thickness to the mortar joint. The purpose of the fold being to produce a watertight course.

This material comes in any desired width, and is delivered on the job cut to fit the profile of each individual pier, thereby eliminating any additional expense in setting. The Builders' Cushion Joint is of sufficient strength to carry the normal weight expected to occur on the facing units.

Purpose

In all buildings of stone, terra cotta, granite or marble facades certain destructive movements occur which cause the facing blocks to crack or spall. These movements include: the compression of steel, the expansion of stone due to temperature change, wind-stress, settlement, and vibration. These conditions are frequently aggravated by faulty setting. To overcome any disastrous results from the above movements the Builders' Cushion Joint has been developed to incorporate a feature of elasticity into the wall which may not be obtained as well in any other manner. When the excessive weight is placed on the facing blocks there is relief provided simply by the raised portions of the Builders' Cushion Joint being forced down, which automatically restores the desired, intended weight to the facing material. With the use of the Builders' Cushion Joint the building is zoned into story heights. Where the stones are bonded onto the floor or in the use of shelf angles, this material permits these types of construction to function as intended by assuring, for the life of the building, that the weight of the facade will rest on either the angle iron or the floor. *Another necessary feature is the elimination of the majority of all future tuckpointing.*

Compression Test

Due to the nature of the Builders' Cushion Joint it is possible to obtain a wide range of strength. However, after much research, the most efficient and practical joint was submitted to the Robert W. Hunt Company for test with the following results:

Report No. 39860

Dimensions under compression. .4 in. x 2¾ in.
Area under compression. . . . . 11.000 sq. in.
Original thickness . . . . . 0.242 in.
After test . . . . . 0.118 in.
Permanent set (after 600 lbs. per sq. in.) 0.124

Total Compression:

At 1100 lbs. or 100 lbs. per sq. in. . . . . 0.061 in.
At 3300 lbs. or 300 lbs. per sq. in. . . . . 0.103 in.
At 6600 lbs. or 600 lbs. per sq. in. . . . . 0.146 in.

The solid material used in the Builders' Cushion Joint consists of two pieces of lead with a total thickness not in excess of 0.068 in. Consequently, in the use of a joint 0.250 in. there is a total possible compressible area of 0.182 in., which is far in excess of the movement obtained from any other product used for this purpose. It is evident that the greatest protection results from the use of the Builders' Cushion Joint.

Specification Notes

The Builders' Cushion Joint, in order to obtain the greatest protection with the least amount of material, should be placed at some point in the piers between the window sill and the lintel above, i. e., at some level in the window opening. The joint should be used the full depth of the thinnest ashlar stone, in the weight-carrying piers. One course for each story height is the general practice for complete protection. In setting, plans will be furnished showing the location of each piece of material. Also, where more than one length of the Builders' Cushion Joint is required in a pier, a pliable mastic will be furnished to be used at the point where the two pieces of Joint meet. This will insure a waterproof job. The material should be set dry, and mortar to be used only when the bed on which the joint is to be placed is uneven. In the event it is desirable to conceal the joint, it may be recessed ¼ in. and pointed with some non-staining mastic pointing compound.

Specify Builders' Cushion Joint and be assured of complete protection. We will gladly assist in laying out the most economical locations for the Builders' Cushion Joint.

ASSOCIATED HARVARD BRICK COMPANIES

BOSTON, MASS.

NEW YORK OFFICE: 501 Fifth Avenue

MANUFACTURING MEMBERS

NEW ENGLAND BRICK CO., 22 Beacon Street, Boston
W. S. GOODRICH INC., Epping, N. H.
SPIERS BRICK CO., 121 Chandler Street, Boston
PARRY BRICK CO., 8 Newberry Street, Boston

FACTORIES AT GONIC AND EPPING, N. H.

GENUINE WATER-STRUCK NEW ENGLAND HARVARDS

General Description of Harvard Brick

Since the days of such famous old Boston buildings as Faneuil Hall, old South Church, the old State House and many others, water-struck handmade brick have played their part in American history. Distinctive in character and beauty, they stand apart carrying with them through the years the same soft tone they had when new.

Genuine Harvard Brick are water-struck facing brick made from clays found only in the vicinity of Gonic and Epping, New Hampshire. The name is derived from brick used in early buildings at Harvard University, and from its use in later Harvard work, notably the Johnston Gate.

Harvard Brick are slightly smaller than standard size. Hand methods used in moulding and burning give characteristics found in no other brick and are impossible to duplicate mechanically. The resulting variations in size, shape and color produce rugged, unevenly textured walls particularly suitable in scale and surface character to period design.

Cost—In some localities the cost of Harvard Brick is no greater than that of face brick. In areas far from the source of supply, costs may be proportionately increased. Use of Harvard Brick does not affect labor cost, except as noted below.

Manufacture—Exact proportions of blue and gray clay are blended with sand and water. Proportion of sand determines, in part, color, structural qualities and warpage or shrinkage.

Operations of forming, drying and burning are performed by hand. Moulds are dipped in water to facilitate removal of formed clay (hence the name "Water-struck"). Firing in hand-built updraft kilns is not mechanically regulated. Fuel is wood only or a mixture of wood and specially analyzed coal.

Range of Color and Texture

Only one grade of genuine Harvard Brick is available. There are no "seconds."

Five standard blends of color and texture are available:

Beacon Hill Range—A narrow range of red stretchers with dark red, ringed hearts predominating. Texture is fairly uniform and moderately smooth.

Cambridge Blend—Includes every color obtainable in Harvard Brick. Stretchers include some soft toned hearts with blue-black edging; headers are green through black. Many brick show several colors, others may be cross-flashed. Texture, particularly of the headers, is characteristically irregular.

Lampoon Range—A dark selection of hard-burned brick containing many purples, blue-blacks, and greens with some dark reds. Texture is rough, twisted and generally irregular.

Rensselaers—A somewhat formal combination of red and red heart stretchers with black and green headers. Texture is comparatively smooth and even. This range was developed for laying in Flemish bond.

Hampton Courts Range—Similar to Cambridge Blend but containing no clear reds or red hearts. The reds tone into purples, greens and blue-blacks which predominate. Texture is rough, but smoother than Lampoon Range.

Special Blends—As desired may be obtained on order.

For further information or assistance in detailing or obtaining special blends or shapes, consult the Associated Harvard Brick Companies, 501 Fifth Ave., New York, N. Y., or any member company.

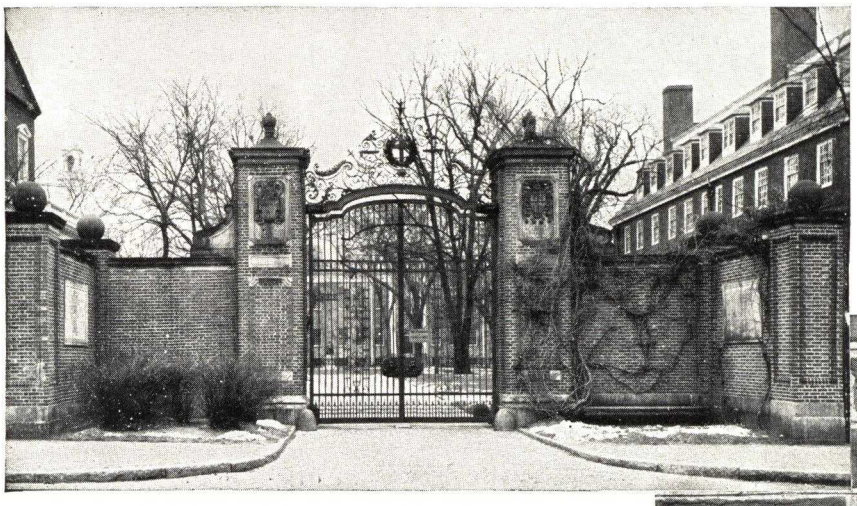
Characteristics and Methods of Laying

Harvard Water-struck Brick can be employed for any size or type of building where beauty and charm are paramount. It can be used with both standard or oversize common brick backers (see drawings).

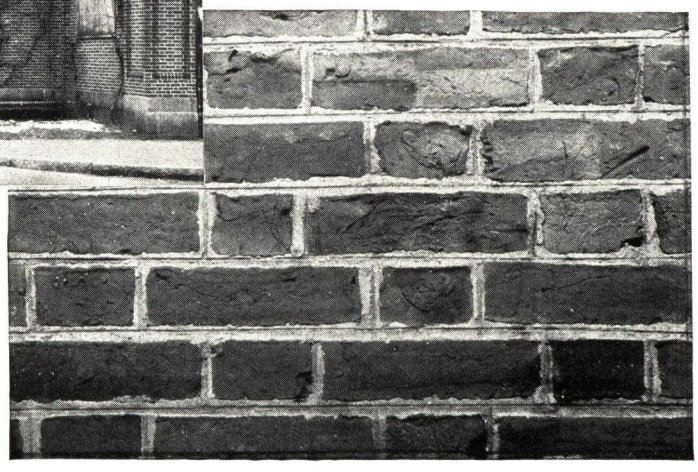
Physical Properties—Harvard Brick meets all specifications of the U. S. Bureau of Standards for "Class A" Brick, the strongest clay brick made. It has excellent abrasive qualities which render it suitable for paving as well as face brick.

Size—Normal size is 7¾x2⅛x3½ ins. Variation can be expected to a greater degree than with other types of brick. Also available in moulded shapes and in Paving Harvards which are in stock.

Joints and Coursing—Recommended size of joint is ⅜ in.—4 courses to 10 in. This is narrow enough to be in scale with size of brick and heavy enough to permit rapid laying. Joint may be decreased to ¼ in.—4 courses to 9½ in., but labor costs will increase as each brick must be pressed in place. Maximum joint width should not exceed ½ in. Joints may be flush, weathered, struck, grooved, beaded or raked.

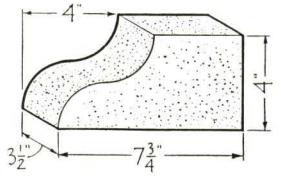


The Johnston Gate at Harvard University
Designed by McKim, Mead & White in 1889
Built of Harvard Brick, similar in color, form and texture to the brick used in old Massachusetts Hall, pictured in the background.



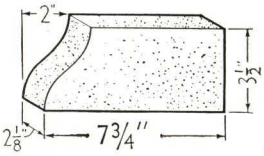
Right: The rugged brick texture that results from hand methods of manufacture. Harvard Water-struck Brick are available in stock moulded shapes (catalog on request) or may be moulded to details submitted. Harvards for paving are available in standard Water-struck size and also brick tile 8 x 8 x 1¾ in.

DETAILS APPLYING TO HARVARD Water-struck BRICK

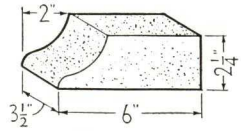


DOUBLE ROWLOCK

Also available as Returns and Inside and Outside Corners



STANDARD ROWLOCK

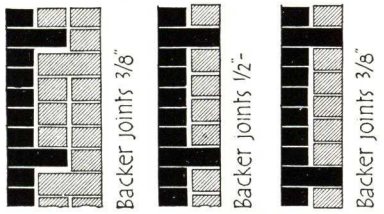


HEADER

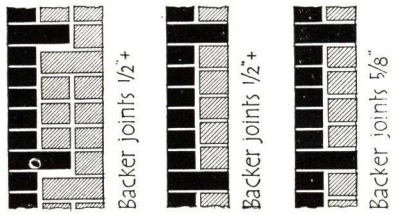
STOCK MOLDED HARVARDS

Scale 1½"=1'-0"

Waterstruck Facing Brick, 2⅛" thick with ⅜" joints, laid 6 courses in 15"

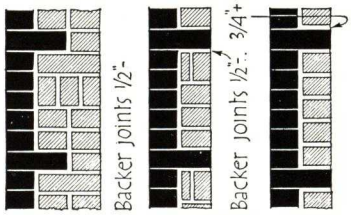


Waterstruck Facing Brick, 2⅛" thick with ½" joints, laid 6 courses in 15¾"

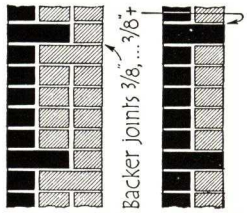


WITH OVERSIZE BACKERS, 2⅝" THICK

Waterstruck Facing Brick, 2⅛" thick with ⅜" joints, laid 6 courses in 15"



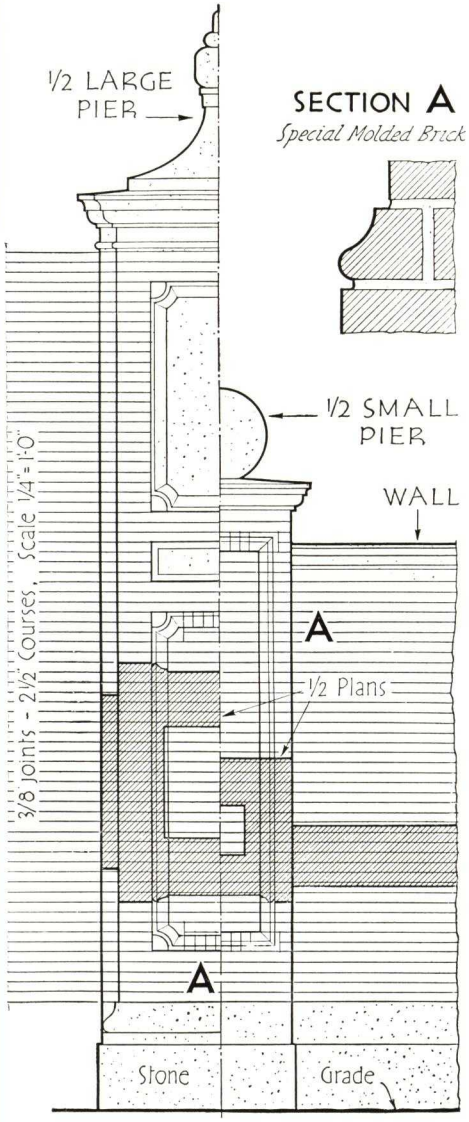
Waterstruck Facing Brick, 2⅛" thick with ½" joints, laid 6 courses in 15¾"



METHODS OF BACKING HARVARD BRICK

Scale ½"=1'-0"

WITH STANDARD BACKERS, 2¼" THICK



SECTION A

Special Molded Brick

THE JOHNSTON GATE

Harvard University

BRICK TABLES

2⅜ in. Course (¼ in. joint)				2½ in. Course (⅜ in. joint)				2⅝ in. Course (½ in. joint)			
No. of Courses	Ft.-in.	No. of Courses	Ft.-in.	No. of Courses	Ft.-in.	No. of Courses	Ft.-in.	No. of Courses	Ft.-in.	No. of Courses	Ft.-in.
1	2-3⅜	46	9- 1¼	1	2-½	51	10- 7½	1	2-5⅛	51	11- 1⅞
2	4-¾	47	9- 3⅝	2	5	52	10-10	2	5-¼	52	11- 4½
3	7-⅛	48	9- 6	3	7-½	53	11- 0½	3	7-⅛	53	11- 7⅛
4	9-½	49	9- 8⅜	4	10	54	11- 3	4	10-½	54	11- 9¾
5	11-⅞	50	9-10¾	5	1- 0½	55	11- 5½	5	1- 1⅛	55	12- 0⅜
6	1- 2¼	51	10- 1⅛	6	1- 3	56	11- 8	6	1- 3¾	56	12- 3
7	1- 4⅝	52	10- 3½	7	1- 5½	57	11-10½	7	1- 6⅜	57	12- 5⅝
8	1- 7	53	10- 5⅞	8	1- 8	58	12- 1	8	1- 9	58	12- 8¼
9	1- 9⅜	54	10- 8¼	9	1-10½	59	12- 3½	9	1-11⅝	59	12-10⅞
10	1-11¾	55	10-10⅝	10	2- 1	60	12- 6	10	2- 2¼	60	13- 1½
11	2- 2⅛	56	11-1	11	2- 3½	61	12- 8½	11	2- 4⅞	61	13- 4⅛
12	2- 4½	57	11- 3⅜	12	2- 6	62	12- 11	12	2- 7½	62	13- 6¾
13	2- 6⅞	58	11- 5¾	13	2- 8½	63	13- 1½	13	2-10⅛	63	13- 9⅜
14	2- 9¼	59	11- 8⅛	14	2-11	64	13- 4	14	3- 0¾	64	14- 0
15	2-11⅝	60	11-10½	15	3- 1½	65	13- 6½	15	3- 3⅜	65	14- 2⅝
16	3- 2	61	12- 0⅞	16	3- 4	66	13- 9	16	3- 6	66	14- 5¼
17	3- 4⅜	62	12- 3¼	17	3- 6½	67	13-11½	17	3- 8⅝	67	14- 7⅞
18	3- 6¾	63	12- 5⅝	18	3- 9	68	14- 2	18	3-11¼	68	14-10½
19	3- 9⅛	64	12- 8	19	3-11½	69	14- 4¼	19	4- 1⅞	69	15- 1⅛
20	3-11½	65	12-10⅜	20	4- 2	70	14- 7	20	4- 4½	70	15- 3¾
21	4- 1⅞	66	13- 0¾	21	4- 4½	71	14- 9½	21	4- 7⅛	71	15- 6⅜
22	4- 4¼	67	13- 3⅛	22	4- 7	72	15- 0	22	4- 9¾	72	15- 9
23	4- 6⅝	68	13- 5½	23	4- 9½	73	15- 2½	23	5- 0⅜	73	15-11⅝
24	4- 9	69	13- 7⅞	24	5- 0	74	15- 5	24	5- 3	74	16- 2¼
25	4-11⅜	70	13-10¼	25	5- 2½	75	15- 7½	25	5- 5⅝	75	16- 4⅞
26	5- 1¾	71	14- 0⅝	26	5- 5	76	15-10	26	5- 8¼	76	16- 7½
27	5- 4⅛	72	14- 3	27	5- 7½	77	16- 0½	27	5-10⅞	77	16-10⅛
28	5- 6½	73	14- 5⅜	28	5-10	78	16- 3	28	6- 1½	78	17- 0¾
29	5- 8⅞	74	14- 7¾	29	6- 0½	79	16- 5½	29	6- 4⅛	79	17- 3⅜
30	5-11¼	75	14-10⅛	30	6- 3	80	16- 8	30	6- 6¾	80	17- 6
31	6- 1⅝	76	15- 0½	31	6- 5½	81	16-10½	31	6- 9⅜	81	17- 8⅝
32	6- 4	77	15- 2⅞	32	6- 8	82	17- 1	32	7- 0	82	17-11¼
33	6- 6⅜	78	15- 5¼	33	6-10½	83	17- 3½	33	7- 2⅝	83	18- 1⅞
34	6- 8¾	79	15- 7⅝	34	7- 1	84	17- 6	34	7- 5¼	84	18- 4½
35	6-11⅛	80	15-10	35	7- 3½	85	17- 8½	35	7- 7⅞	85	18- 7⅛
36	7- 1½	81	16- 0⅜	36	7- 6	86	17-11	36	7-10½	86	18- 9¾
37	7- 3⅞	82	16- 2¾	37	7- 8½	87	18- 1½	37	8- 1⅛	87	19- 0⅜
38	7- 6¼	83	16- 5⅛	38	7-11	88	18- 4	38	8- 3¾	88	19- 3
39	7- 8⅝	84	16- 7½	39	8- 1½	89	18- 6½	39	8- 6⅜	89	19- 5⅝
40	7-11	85	16- 9⅞	40	8- 4	90	18- 9	40	8- 9	90	19- 8¼
41	8- 1⅜	86	17- 0¼	41	8- 6½	91	18-11½	41	8-11⅝	91	19-10⅞
42	8- 3¾	87	17- 2⅝	42	8- 9	92	19- 2	42	9- 2¼	92	20- 1½
43	8- 6⅛	88	17- 5	43	8-11½	93	19- 4½	43	9- 4⅞	93	20- 4⅛
44	8- 8½	89	17- 7⅜	44	9- 2	94	19- 7	44	9- 7½	94	20- 6¾
45	8-10⅞	90	17- 9¾	45	9- 4½	95	19- 9½	45	9-10⅛	95	20- 9⅜
				46	9- 7	96	20- 0	46	10- 0¾	96	21- 0
				47	9- 9½	97	20- 2½	47	10- 3⅜	97	21- 2⅝
				48	10- 0	98	20- 5	48	10- 6	98	21- 5¼
				49	10- 2½	99	20- 7½	49	10- 8⅝	99	21- 7⅞
				50	10- 5	100	20-10	50	10-11¼	100	21-10½

TRADE *Genuine New England Harvards* MARK

4
31

OUR FIFTY-THIRD YEAR

THE BELDEN BRICK CO.

Manufacturers of "Belden Brick"

CANTON, OHIO

NEW YORK OFFICE: 15 East 26th Street

DETROIT OFFICE AND WAREHOUSE: 14305 Livernois Avenue

FACTORIES: CANTON, SOMERSET, UHRICHSVILLE and PORT WASHINGTON, OHIO

Distributors in All Principal Cities—Write Us for Name and Address

---

BUILD WITH COLORFUL FACE BRICK—IT PAYS

Belden Vitritex Facing Tile

A non-glare, dirt resisting, easily cleaned product. Made in Creams, Golden Buffs, Grays, Speckled Grays and Iron Spots.

Belden Facing Tile are available in standard 8 x 5-in. face, 3⅞-in. depth; in Soaps with 8 x 5-in. face and 1¾-in. depth, and in 8x5-in. units with 6-in. depth and 8-in. depth, permitting many types of pattern work for both interior and exterior work. Many shapes are carried in stock—for complete shape details ask us for Shape Bulletins 1 and 2, or refer to the catalog of the Glazed Brick and Tile Institute (for which see File Index).

Many beautiful walls have been erected and interesting and effective patterns achieved by a combination of Belden Facing Tile and Belden Face Brick.

All Belden Vitritex products in face brick and facing tile are produced by the de-aired process and thoroughly vitrified, insuring the highest obtainable quality and a wall that retains its beauty indefinitely.

Belden Facing Tile — in permanent, natural colors makes plastering and painting unnecessary. The wall is always the same—always beautiful.

Belden Face Brick

Manufactured from Ohio's finest plastic fire clays and shale—in more than 200 colors, combinations and textures—large stocks of all types carried on hand for immediate shipment. Orders for oversized brick and special shapes manufactured promptly upon receipt of details.

To prevent substitution with consequent disappointment all "Belden Brick" are branded

"Match Jobs"

We often supply match jobs and duplicate products that were made by plants no longer operating, and we solicit such inquiries.

Industrial Buildings

Aggressive manufacturers are now using face brick for their industrial buildings. Attractive colors and light reflecting walls are paramount, and available at small additional cost.

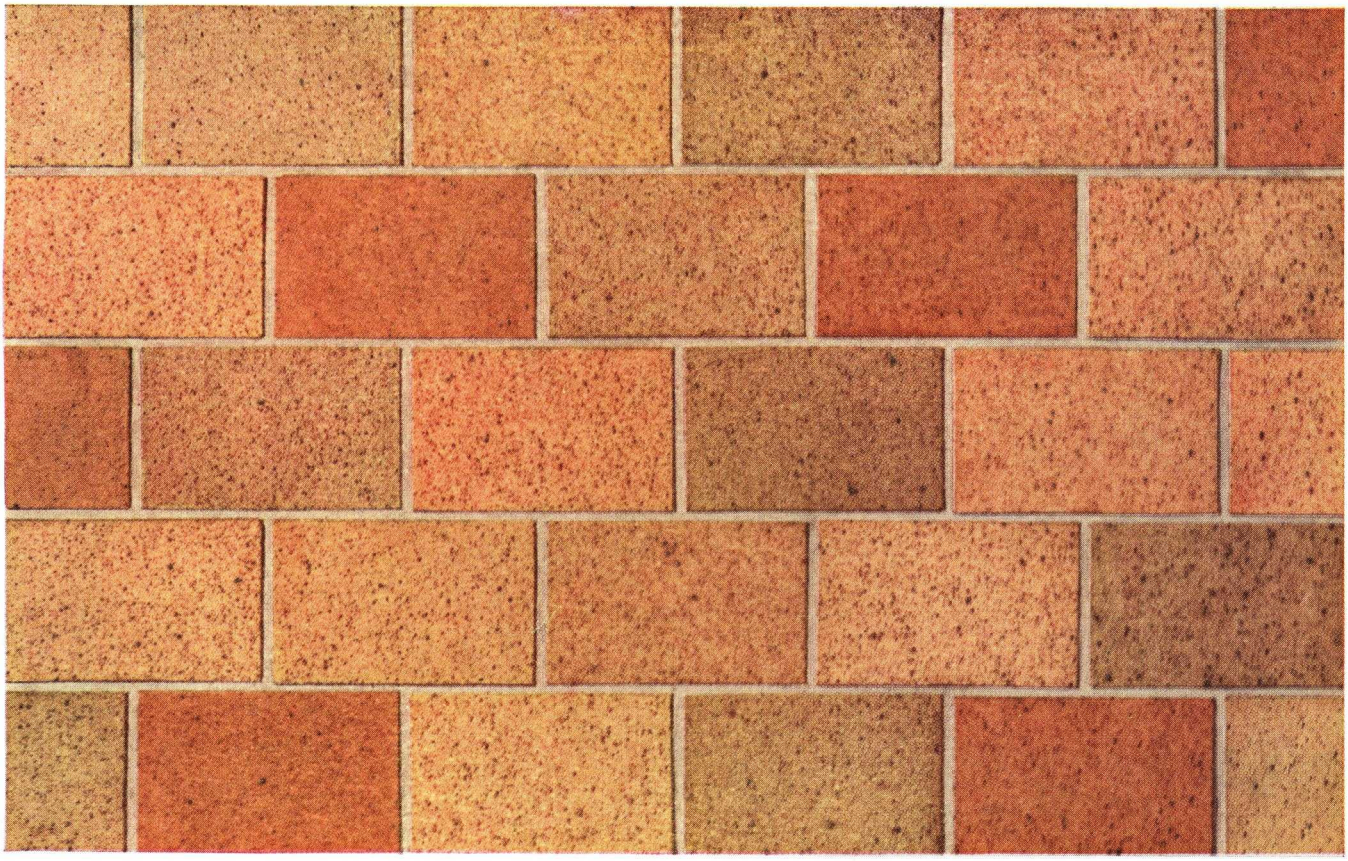
We manufacture Red Floor Brick for all purposes.

Corridor, Biology Building, University of Notre Dame, Notre Dame, Ind.

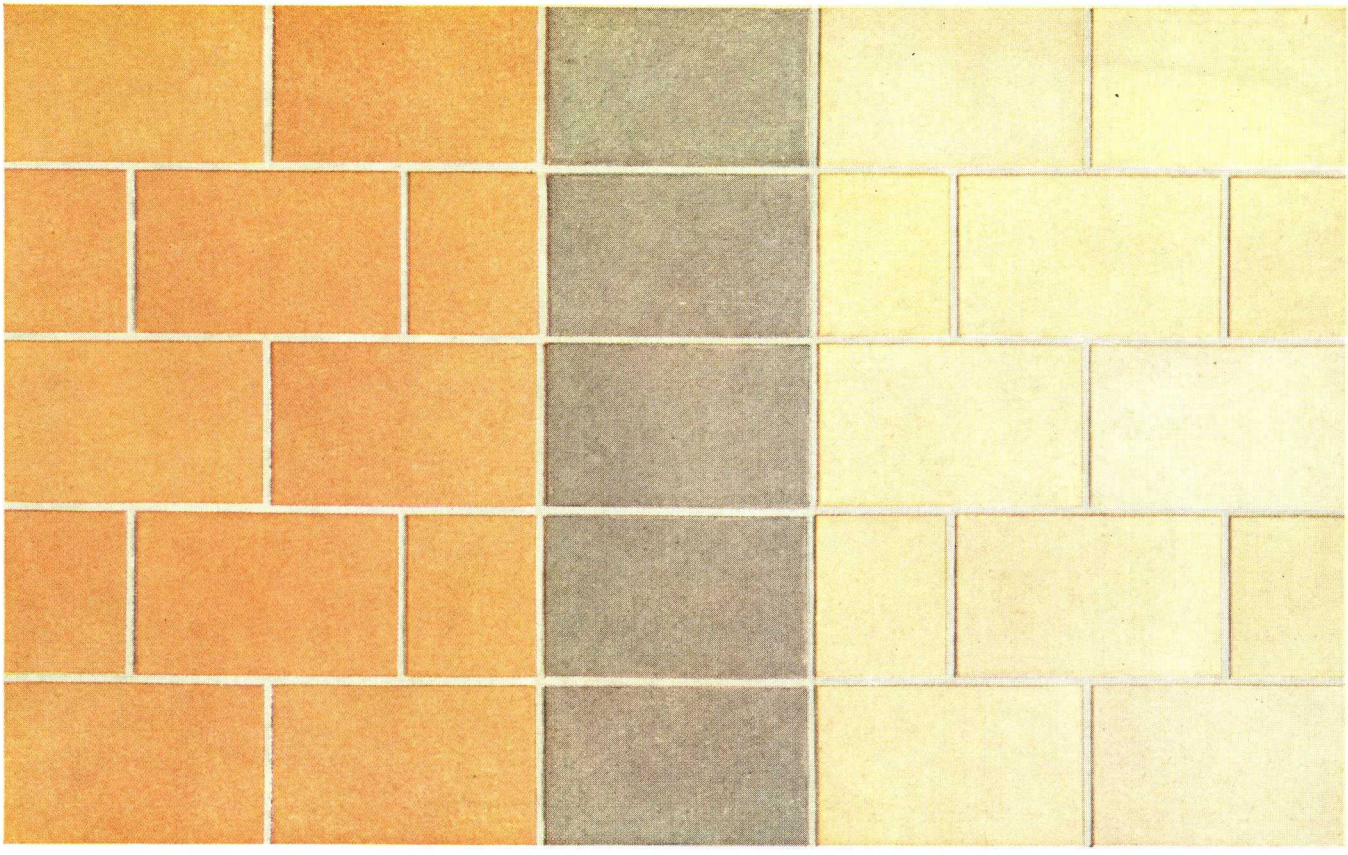
MAGINNIS & WALSH, Boston, Architects

Interior walls are Belden Aztec Blend. The floor is Belden Red Floor Brick

BELDEN FACING TILE—in permanent, natural colors—makes plastering and painting unnecessary—the wall is always the same—always beautiful.



AZTEC BLEND IRON SPOT FACING TILE.
We produce all standard shapes required in the 8x5x3 7/8" unit.



380 SERIES, SMOOTH BUFF FACING TILE

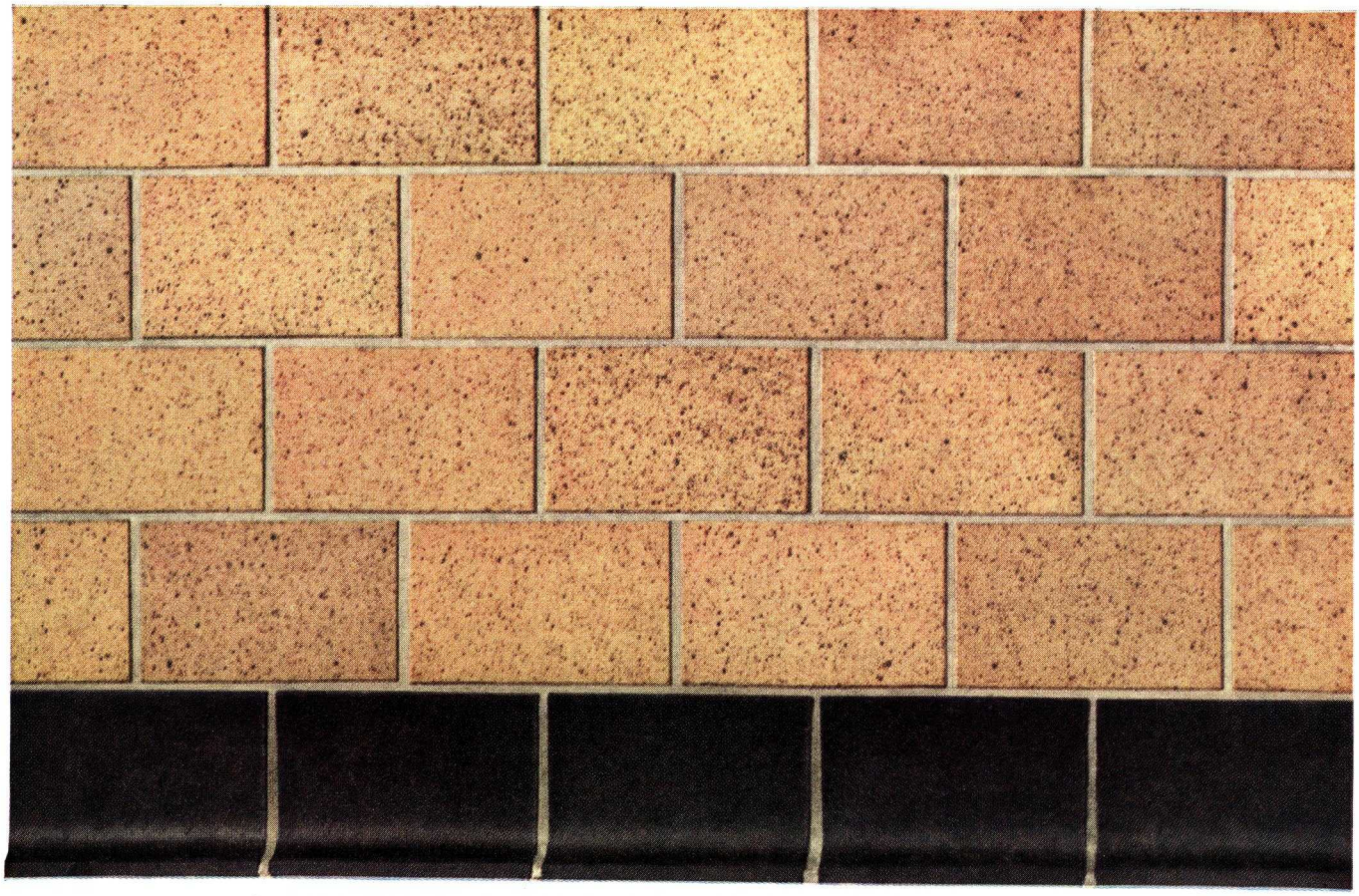
GRAYSTONES, SMOOTH GRAY FACING TILE

80 SERIES, SMOOTH CREAM FACING TILE

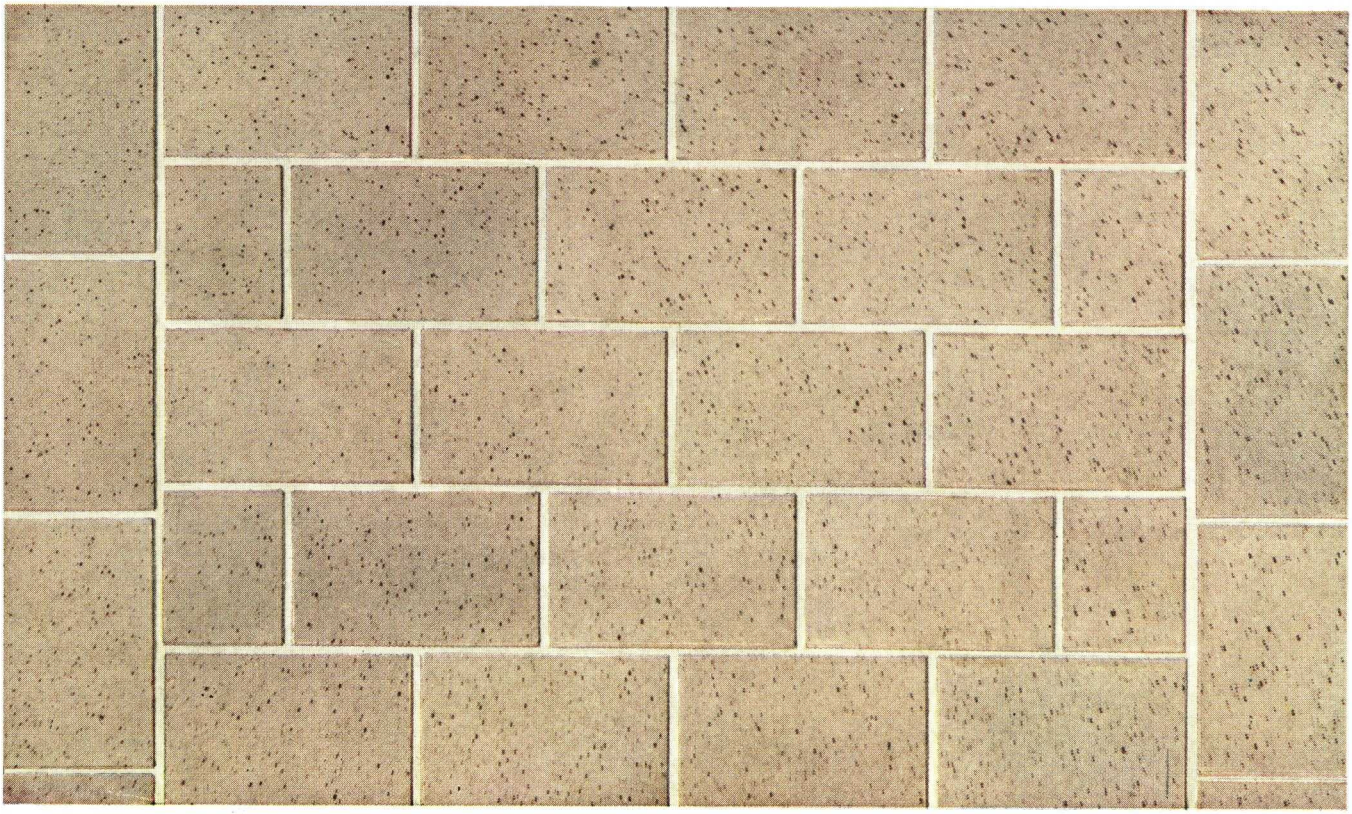
Catalog showing other shades and textures sent upon request.

THE BELDEN BRICK COMPANY

BELDEN VITRITEX FACING TILE — a non-glare, dirt resisting, easily cleaned product for both interior and exterior work — in beautiful, natural colors.



70 SERIES LIGHT RANGE IRON SPOT FACING TILE WITH BLACK IRON SPOT COVE BASE.



1280 SERIES GRAY MANGANESE SPECKLED FACING TILE.

These color ranges are also produced in standard size brick 8x2¼x3¾″, for combinations with Facing Tile, and standard brick walls.

Catalog showing other shades and textures sent upon request.

HANLEY COMPANY

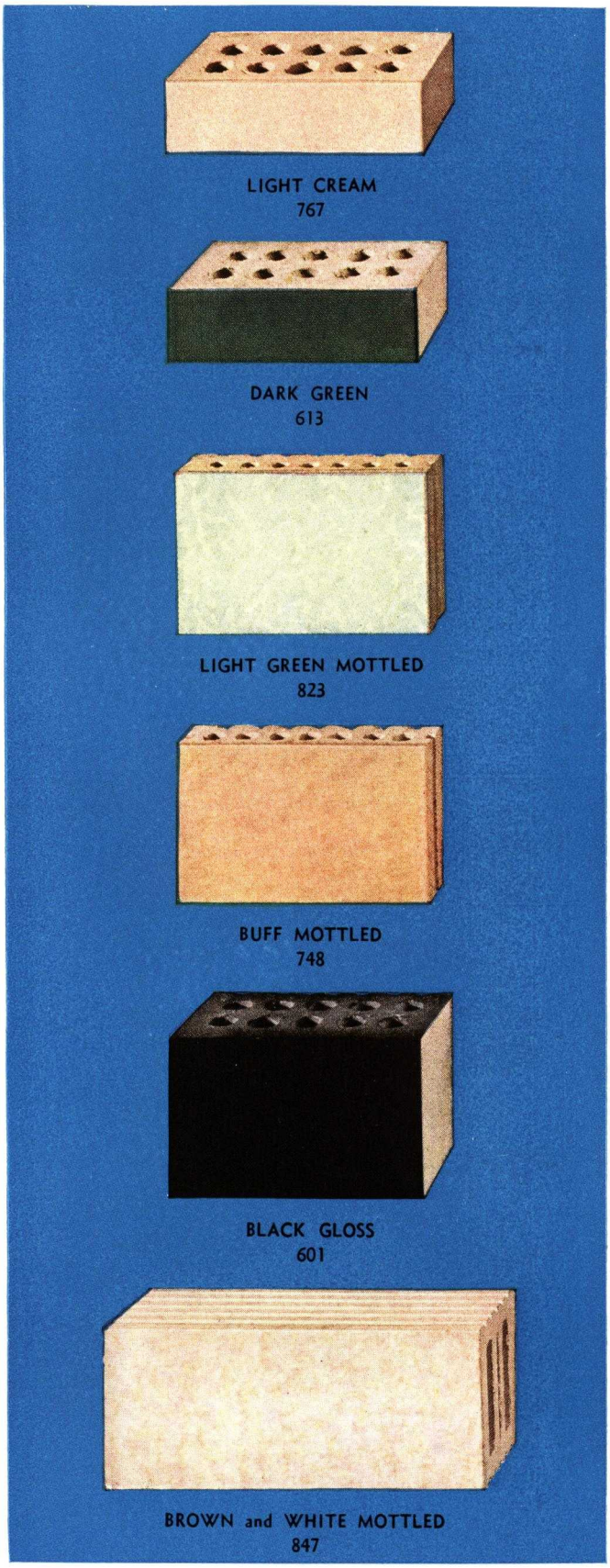
Members of Glazed Brick & Tile Institute

BOSTON, MASS.
PHILADELPHIA, PA.

101 Park Avenue, NEW YORK, N. Y.

BRADFORD, PA.
CHICAGO, ILL.

PLANTS: BRADFORD, PA., SUMMERVILLE, PA.
Sales Representatives in all principal cities.



PRODUCTS

Face Brick, Hollow Tile, Ceramic Glazed Brick and Structural Tile, Unglazed Facing Tile. See Tile Section for data and illustrations of Quarry and Heavy Duty Floor Tile.

FACE BRICK—DRY PRESSED AND WIRE CUT

A complete line of face brick in grey, limestone greys, buff, brown, tan, red and intermediate shades which are available in a wide variety of textures in each color. We specialize in distinctive grey and buff tones in both Dry Pressed and extruded face brick, certain shades of which have been developed to blend or harmonize with limestone and granite, while other shades can be used effectively to simulate various stone and granite finishes. Please refer to technical data and color illustrations on the next page.

CERAMIC GLAZED PRODUCTS

Hanley Ceramic Glazed Brick and Structural Tile units represent the utmost in quality and mechanical perfection. The colors illustrated are a small part of our standard line, consisting of a pleasing variety of solid colors, mottled and stippled effects, in matt, satin and high gloss finishes. These colors are manufactured in 5" x 8", and 5" x 12" Structural Tile Units as well as the 2¼" x 8" brick size. Standard shapes, complete technical data and color illustrations are given in the Hand Book of the Glazed Brick and Tile Institute contained in this edition.

UNGLAZED FACING TILE

This product is manufactured in face dimensions of 5" x 8", and 5" x 12", in buff and grey tones and is similar in color and finish to Hanley high grade face brick. The initial cost of Facing Tile, used as a load bearing material, compares favorably with painted plastered walls, and never needs replacing or repainting.

HOLLOW BUILDING TILE

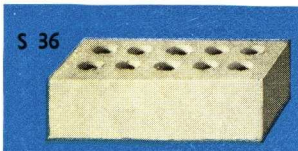
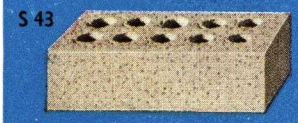
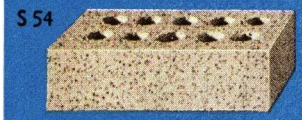
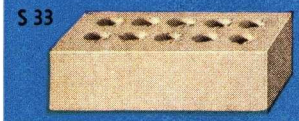
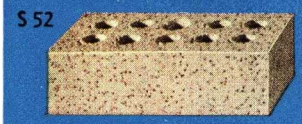
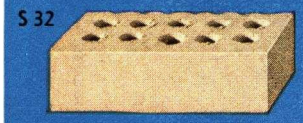
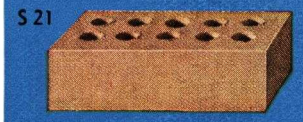
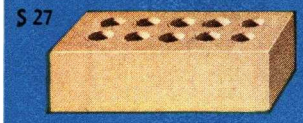
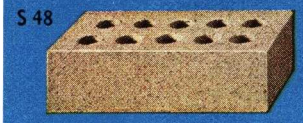
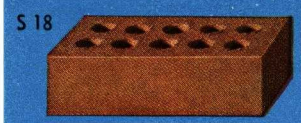
Hanley red shale hollow tile is available in various sizes in red colors of a slight range. This product is gas burned and its mechanical quality is unexcelled. Hanley Super Quality is being used extensively in the Oil and Chemical Industries, and other places where a good smooth unfinished wall or partition is desired at a minimum of cost.

MANUFACTURING FACILITIES

The huge plants of the Hanley Company located at Summerville, Pa., and Bradford, Pa., are equipped throughout with modern and advanced equipment. The latest types of Tunnel Kilns representing the most efficient method of burning known today, — De-Airing Equipment, and the precision methods employed at every stage of the manufacturing process, insures the highest quality attainable. Every production unit in both plants has its duplicate, eliminating the possibility of delay of orders through breakdowns, should they occur.

HANLEY COMPANY

Below are shown a few of the many colors and shades of Face Brick always in stock

	TEST DATA			TEXTURES					SIZES					
	Average Absorption	Average Light Reflection	Average Compressive Strength	Smooth	Matt	Vertical	Dapple	Dry Press	2¼"x8"	5"x8"	5"x12"	Flat Colors	Slight Range	PRINCIPAL USE
 S 36	2.4%	73%	13,800	√			√		√	√	√	√		A distinctive light grey tone; blends with Alabama and Indiana limestone. Particularly adaptable to monumental work.
 S 43	4.7%	60%	13,000	√	√		√		√			√		A warm light grey tone in constant demand for apartments, office buildings, institutions, etc.
 S 54	2.11%	69%	13,700	√				√	√	√	√	√		A distinctive medium speckled grey effect, largely used for office buildings, schools, apartments and institutions.
 S 33	5.05%	74%	10,400	√	√	√	√	√	√	√	√		√	A decided cream tone. Is dirt repellant and is largely used for corridors, basements, court walls and schools.
 S 52	6.75%	73%	10,400	√				√	√	√	√		√	Cream grey effect, attractively speckled. Apartments, hospitals, schools and corridors.
 S 32	7.55%	75%	9,500	√	√	√	√	√	√	√	√	√		Popular light buff. Unusually high in light reflection. Courts, school corridors and industrial buildings.
 S 21	9.42%	55%	10,000	√	√		√		√				√	A pleasing topaze tan tone used as a field color and trim for unique color effects, and for small residences.
 S 27	7.83%	60%	10,000	√	√		√		√			√		A warm maize yellow effect. Decidedly different from the regular buff shades. Apartments, schools, industrial buildings.
S 72	7.78%	50%	10,000	√	√			√					√	An attractive speckled grey with an unusual lavender tint. Post offices, office buildings, apartments and store buildings.
 S 48	3.07%	38%	12,500	√	√			√	√				√	Attractively flashed golden tan tone in mingled shades. For institutional buildings, office buildings, apartments, etc.
P 72	8.67%	50%	9,000	√	√			√	√				√	A fine speckled steel grey. Exceedingly attractive shade that harmonizes with almost every architectural scheme, involving limestone.
 S 18	9.2%	25%	11,000	√	√		√		√				√	A warm shade of sandalwood brown. Popular for residential work and as a trim color.

LOCHER & CO., INC.

Makers of Genuine Handmade Colonial Facing Bricks

HOME OFFICE AND WORKS

GLASGOW, VIRGINIA

Sales Office, 3714 West Broad Street, Richmond, Virginia

REPRESENTATIVES IN LEADING CITIES

PRODUCTS, FACILITIES AND SERVICE

Old Fashioned Handmade Virginia Bricks, duplications of every old color, size, texture and shape.

Stock Brick to duplicate Rockefeller restoration of colonial Williamsburg, Va.

Handmade Bricks produced from white burning clay to replace the usual whitewashed or painted jobs.

Our wares are produced from high grade clays and not shales as are used for imitations.

Durability guaranteed to withstand extreme freezing and thawing conditions of northern climates.

Capacity 25,000 hand moulded units daily.

ARCHITECTURAL REFERENCES

New Construction

WM. LAWRENCE BOTTOMLEY, New York, N. Y.
Edgerton residence, Raleigh, N. C.

WM. ROY WALLACE, Winston-Salem, N. C.
Coan Residence, Winston-Salem, N. C.
Bassett Residence, Bassett, Va.

NOEL & MILLER, New York, N. Y.
Hitchcock Memorial Clinic, Aiken, S. C.

JAS. C. MACKENZIE, JR., New York, N. Y.
Brown estate, Port Deposit, Md.

LEONARD L. BISHOP, New York, N. Y.
Suffolk Co. (L. I.) Home and Infirmary

JOHN H. MELSTROM, Chicago, Ill.
Hovey residence, Evanston, Ill.

KRUCKEMEYER & STRONG, Cincinnati, Ohio
Mt. Washington Public School

SAMUEL E. HOMSEY, Wilmington, Del.
Lammot duPont Copeland estate, "Mt. Cuba"

RICHARD PHILIPP, Milwaukee, Wis.
Kohler residence, Kohler, Wis.

C. J. McDONOUGH, JR., Albany, N. Y.
Keeler residence, Loudenville, N. Y.

OFFICE OF JOS. EVANS SPERRY, Baltimore, Md.
Baltimore Country Club, Baltimore
Stewart residence, Montross, Va.
duBose estate, Chapel Hill, N. C.

MUNICIPAL ARCHITECT, Washington, D. C.
Woodrow Wilson High School group

SUPERVISING ARCHITECT, Washington, D. C.
U.S. Post Office, Dover, Del.
U.S. Post Office, Freeport, L. I., N. Y.
U.S. Post Office, Chapel Hill, N. C.
U.S. Post Office, Arlington, Va.

NATIONAL PARK SERVICE, Washington, D. C.
Administration group, Fredericksburg, Va.
Battlefield National Park, Petersburg, Va.
C.N.M. Parkway, Williamsburg, Va.

WAR DEPARTMENT, Washington, D. C.
Chapel, Langley Field, Va.

Restoration Work

MORLEY J. WILLIAMS, Washington, D. C.
"Mount Vernon," home of George Washington

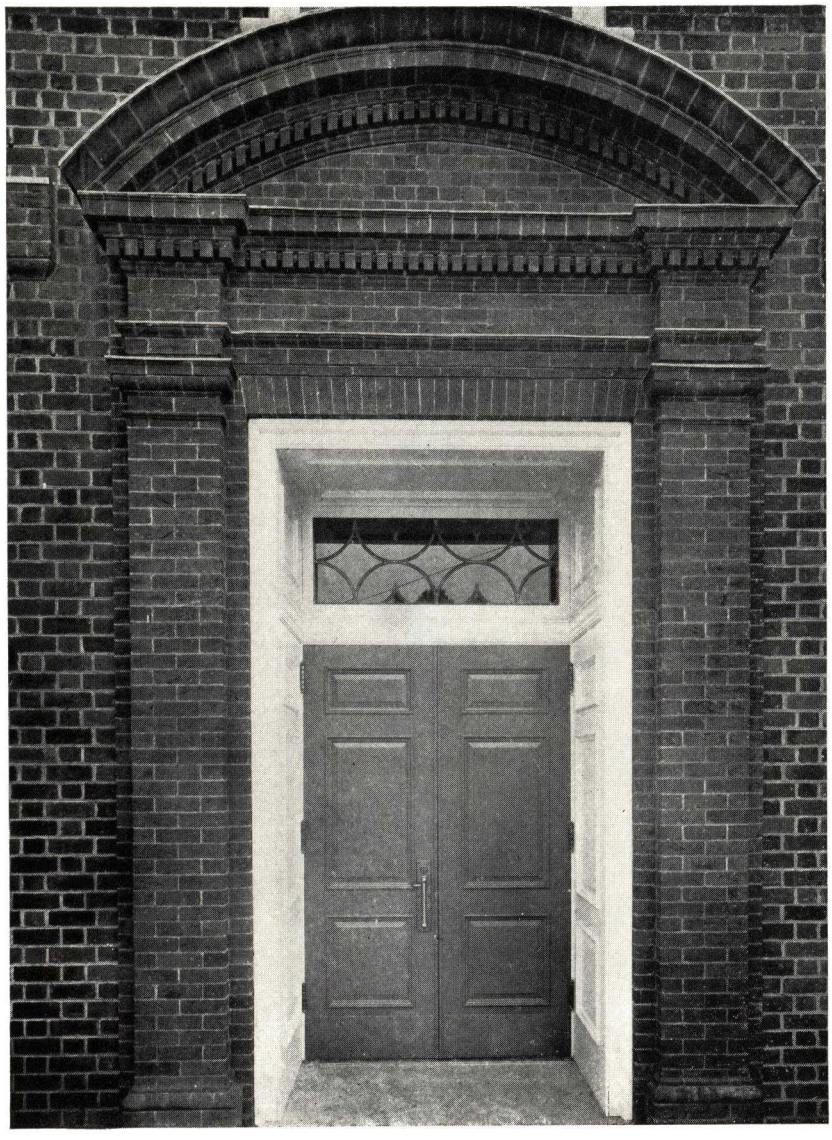
FISKE KIMBALL, Philadelphia, Pa.
"Stratford Hall," ancestral Lee Home

DELANO & ALDRICH, New York, N. Y.
"Staunton Hill," Charlotte Co., Va.

BEDFORD BROWN IV., Arlington, Va.
"Whitehall," Ann Arundel Co., Md.

TILDEN & PEPPER, Philadelphia, Pa.
"Wye Hall," Queen Anne Co., Md.

PERRY SHAW & HEPBURN, Boston, Mass.
Springsbury Farms, Berryville, Va.



Early 18th Century Doorway at "Hertford", London
LOCHER reproduction

NATIONAL BRICK CORPORATION

TELEPHONES
AStoria 8-8404-5

LONG ISLAND CITY, N. Y.

CALL OUR
REPRESENTATIVE

SAND-LIME BRICK

A.S.T.M. Designation C-73-30; Federal Standard Catalogue SS-B-681

Advantages

Physical—NATIONAL Sand-Lime Brick averages low in absorption and high in strength. Meets A.S.T.M. standards and all Building Code requirements.

Manufacture and Delivery—NATIONAL is one of the world's largest manufacturers of Sand-Lime brick. Made under the most scientific brickmaking conditions, our material is uniform in size and quality. NATIONAL Sand-Lime Brick is delivered stacked on the job site. This eliminates breakage, therefore eliminates excessive bats in walls. A load of Sand-Lime Brick stacked occupies approximately one-third the space of a dumped load of brick. Excellent service by our own trucking facilities.

Uses—NATIONAL Sand-Lime Brick serves all common brick usages and in addition, has the advantage of light color (gray-white) which adapts it for use in court facings or for interior unplastered walls. The color produces a light reflecting wall surface and saves the cost of face brick and of painting.

Size—NATIONAL Sand-Lime Brick are available in standard sizes. Special thicknesses may be obtained to match special face brick at slight additional cost.

Representative Users

REPRESENTATIVE BUILDINGS	ARCHITECT	GENERAL CONTRACTOR	QUANTITY	USED AS
U. S. Federal Courthouse	Cass Gilbert	James Stewart Co.	4,000,000	Backup
Rockefeller Apartments	Harrison & Fouilhoux	Barr, Irons & Lane	1,200,000	Backup
Port of N. Y. Authority Bldg.	Abbott & Merkt	Turner Const. Co.	8,000,000	Backup—Interior Exposed
First National Bank	Walker & Gillette	Marc Eidlitz & Son	300,000	Exterior Courts
Church of Good Shepherd	Corbett & MacMurray	Wm. Kennedy Co.	300,000	Backup
Pilgrim State Hospital	Wm. Haugaard	Cauldwell-Wingate	4,000,000	Backup—Interior Exposed
Andrew Jackson High School	Walter Martin	Geo. F. Driscoll Co.	1,500,000	Backup
Wm. Paley Residence	Eldredge Snyder	Hegeman-Harris Co.	150,000	Backup
General Motors Assembly Plant	Albert Kahn	Jerome Utley Co.	1,000,000	Backup—Interior Exposed
Spence School	John Russell Pope	Geo. A. Fuller Co.	300,000	Exterior Exposed
Physicians and Surgeons Hospital	James Gamble Rogers	Marc Eidlitz & Son	50,000	Exterior Courts

Abbreviated Specification

The contractor shall have the option of using Sand-Lime Brick of an approved manufacture in place of clay brick for common brick use.

Sand-Lime Brick shall comply with A.S.T.M. Specification C-73-30. (Designate special locations where Sand-Lime Brick shall be used for facing.)

HIGH PRESSURE STEAM-CURED CINDER UNITS

Underwriters Approved Manufacturer Laboratories File R-3052

NATIONAL offers in "Nabcor" High Pressure Steam Cured Cinder Units all the advantages of a well-made cinder block plus positive assurance of non-shrinkage due to the exclusive *high pressure steam curing process.* The latest development in block making machinery plus selected materials, combined with the high pressure steaming, produces a cinder unit far superior to anything ever offered to the building industry before. *High pressure steam curing* eliminates any injurious agents which might affect plaster. Nabcor units are stronger than ordinary cinder units but are considerably lower in weight because moisture is removed by our process.

Nabcor Units are more economical to use because they lay up faster due to their wide bedding surface. They produce a straight true wall for plastering. Nabcor units are nailable thus eliminating the necessity of plugging for grounds. Greater wall stability is obtained by the use of Cinder Units. Unplastered, Nabcor units produce a wall of high sound absorbing value. Painted, they present a pleasingly textured finished wall.

Sizes—Nabcor High Pressure Steam Cured Units are made in all commercial widths from 2-in. solid furring, partition 3, 4, 6, 8 and 10 in. (all 8 in. high and 18 in. long) to 12 x 8 x 16 in. For backing face brick we make a 7¾ x 8 x 16 in. Unit Backing vertical cell block.

Representative Users

BUILDING	ARCHITECT	GENERAL CONTRACTOR	QUANTITY	USED AS
Rockefeller Apartments	Harrison & Fouilhoux	Barr, Irons & Lane	200,000 sq. ft.	Partitions
Manhasset High School	Tooker & Marsh	John H. Eisele	100,000 sq. ft.	Partitions
Flagg Court Apartments	Ernest Flagg	F. Everett Inc.	80,000 sq. ft.	Backup and partitions
Broadway Theater	Acock & Lloyd	Hegeman-Harris Co.	60,000 sq. ft.	Partitions
Radio City Office Bldg. No. 5	Rheinhardt & Hofmeister	Barr, Irons & Lane	180,000 sq. ft.	Partitions
Rockland State Hospital	Wm. Haugaard	Turner Const. Co.	900,000 sq. ft.	Exterior walls and partitions
Mackey Estate	Cross & Cross	Matthews Const. Co.	10,000 sq. ft.	Foundation and partitions

Abbreviated Specification

Cinder Concrete Block shall comply with A.S.T.M. Specification C-90-34T except as follows:

After the blocks have been formed, they shall be steam cured for not less than 8 hours at not less than 120 lbs. nor more than 150 lbs. steam pressure. The blocks shall not be sealed in the steaming cylinder for at least 3 hours after forming.

SAYRE & FISHER BRICK COMPANY

ESTABLISHED 1851

Manufacturers of Burnt Clay Products

SAYREVILLE, N. J.

BRANCH SALES OFFICE: New York, N. Y., 101 Park Avenue—Telephone, LExington 2-5997
Address Communications to Main Office, Sayreville, N. J.; Telephone, South River 490

THE ORGANIZATION AND ITS EXPERIENCE

Sayre & Fisher Brick Company is among the oldest manufacturers of clay building products in this country, having a continuous production record for a period of 87 years. Through experience and large plant capacity it is well equipped to furnish proven, durable building material which answers the need of today's building requirements.

It has supplied material for many outstanding buildings throughout the United States, inspection of which should prove interesting. It cordially invites all architects to share their building problems. It has an organization of ability and experience, which it places at your disposal.

Architects and builders will be interested in the *Colonial Red Brick* manufactured under economical methods and marketed in numerous selections and grades. Two distinct processes, two burning methods, and three-way grading of the finished products give ten grade-varieties of staple stock which can be increased further by the addition of clinker brick in various blends.

A brief description follows which, it is hoped, will aid the designer and builder in the choice of a suitable selection.

COLOR

Perhaps of prime importance to all connected with the erection of a building is the matter of color and shade. The products of this company embrace an unusually broad line ranging from a light terra cotta red in a close shade range to a dark blend of brownish-purple which can be further darkened by the addition of almost black bench brick and clinkers. Between these limits, the various grades available will fit the requirements of most jobs, in either close or wide color ranges.

Light Runs

COLOR CHART

Color Description	Selected		Unselected
	Close Range	Wide Range	
Clear terra cotta red	Pioneer	....	....
Clear terra cotta red to brownish red	....	College	Bldg. Run Wire Cut
Kiln marked red to purple-brown	....	Jersey Special	Bldg. Run Up Draft
Kiln marked red to brown-red	Institute	....	....
Clear red to purple-red	G & B	University	Bldg. Run Down Draft
Kiln marked red to clinker and bench brick	....	Betsy Ross	....
Kiln marked red-brown to black and clinker	....	....	Flagg Court

Dark Runs

TEXTURE

In individual *Colonial Brick* the predominant surface texture is sand finished. In line with this well established tradition, the company produces brick with this type of finish. The wall built with *Colonial Brick* has been traditionally a rustic wall in which mechanical regularity is conspicuous by its absence. Brick offered will definitely produce this type of wall. Irregularities in the brick themselves, as well as in the finished wall, are natural and not artificial, resulting in a grace of masonry which gives an impression of sturdiness and comfort lasting for generations.

Smooth

WALL TEXTURE CHART

Brickwork Texture	Clear Face	Kiln Marked	Clinker Blend
Smooth Wall	Pioneer	....	....
	College	....	....
	G & B	....	....
		Institute	....
Comparative Wall Textures	University	....	....
		Jersey Special	....
	Bldg. Run Wire Cut	....	....
	Bldg. Run Down Draft	....	....
		Bldg. Run Up Draft	Betsy Ross
Rough Wall			Flagg Court

Rough

WALL EFFECTS

The colors and textures of the various selections of brick briefly described are unusually warm without being glaringly bright, and possess a certain "character" which typifies the products of this company. The variety embraced will cover the requirements of the smallest cottage or a large industrial operation.

CLAY BLOCK

For the more modern, and for the more economical as well, a clay block is being produced which has permitted sizable savings. 5x8x3¾ ins. in size, it displaces two brick and one bed joint, and numerous jobs constructed of this unit show interesting wall effects as well as a reduction in the cost of laying and mortar. Interior walls of Clay Block have been paint finished with excellent results.

GENERAL CHARACTERISTICS OF BRICK

The degree of hardness is a characteristic which is of interest to the builder of brickwork. Rapid, accurate work will result where the absorption of the brick is such that the brick will neither require wetting, nor slip in the wall during laying. Products of this company fall in this hardness range, with the resulting economies in laying.

Hardness carries with it the characteristics of durability and strength, resistance to frost and watertight construction. Mortar shrinkage cracks, poor bonding, and allied defects can be easily eliminated in walls built of the products offered.

Sizes of brick approach the 8x2¼x3½-in. dimensions which have been manufactured in this area for years. Mechanics have ample space in which to work, and pleasing patterned bonds are easily produced. In the growing popularity of rowlock-back walls, this size has been found to work to advantage. S & F Brick work best when laid four courses to 10½ ins. but in many instances have been used with both wider and narrower jointing.

SERVICES

In many instances the company has been helpful in assisting architects and builders in the matter of estimating, layout, special details, and the fabrication of special shapes either moulded or ground. Very often an otherwise plain building has been "decorated" by the use of simple arches, moulded courses, patterns in bonding, and the like. The company's Engineering Department is in a position to co-operate with its experience as a foundation.

Plant capacity and delivery facilities are unusually attractive to the builders of large operations. Delivery on car, barge, or truck assure the customer prompt service in any quantity. Delivery rates well in excess of half million per month are constantly being maintained.

The company takes pride and satisfaction in the fortunate condition which makes it possible to match buildings erected in some instances twenty years ago. Architects and owners of institutional developments can assure themselves that a building scheme need not be changed in the midst of long range construction program. Aside from technological improvements in the processes of manufacture, the brick produced are substantially the same as those first manufactured.

ARKETEX CERAMIC CORPORATION

SUCCESSOR TO

The Ar-ke-tex Corporation and The Clay Products Co., Inc. of Indiana

BRAZIL, INDIANA

REPRESENTATIVES IN ALL PRINCIPAL CITIES
Member Glazed Brick & Tile Institute

PRODUCTS

A structural clay product with a finely finished face, known as AR-KE-TEX Brick and Tile.

Also Velveduct, a vitrified glazed clay conduit for underground electrical transmission; Building Conduit, a jumbo building block for foundations, barns, etc.; and Raggle Block.

SIZES

AR-KE-TEX products are made in 2¼x8, 5x8, 5x12, 10¼x12, 12x12 and 8x16-in. face sizes with a full complement of shapes and fittings to build any type of bearing or partition wall, exterior or interior, with a permanent, impervious, sanitary finish.

TEXTURES AND COLORS

Cream Buff Stippled

A light color blend of cream buff, adaptable to a wider range of architectural effects than any shade ever developed.

Insul-Glaz

A finish that combines all the qualities that have ever been demanded of a salt glazed product with imperviousness of face, uniformly high gloss and a relatively close color range in light tan.

Mottled

In several mottled finishes including cream brown, cream white, green, blue and blue green.

Flat Colors

Black, blue, green, brown, ivory, cream and white.

Porcelain Coated

An unglazed but impervious product in close shade ranges of cream, gray and other pastel colors.

Insets

For decorative effects, such as borders, panels, trim courses, etc., in a wide variety of colors in geometric designs.

Special Colors

We will be pleased to consult with any architect or engineer without obligation, in an endeavor to meet his particular needs in color or textures that can be produced in high fire glazes on vitrified clay bodies for any individual project.

AR-KE-TEX
ART-KERAM'C-TEXTURE

Trade Mark Reg.

CONSTRUCTION FEATURES

AR-KE-TEX products combine many exclusive features of quality and construction:

Thorough vitrification of glaze and body.
Imperviousness of face.
Fire, acid, oil and grease resistant.
Insulating qualities.
Sanitary finish.
High bearing strength.
Low dead weight.
Indestructability and attractiveness of finish.
Wide choice of colors and textures.
Economy and rapidity of erection.
Permanence of color and glaze.
Readily cleaned with low maintenance cost.
Low relative cost.
Permanent beauty.

EXTERIOR USE

Due to the hard impervious body and glaze AR-KE-TEX products are recommended for exterior as well as interior wall areas. The finish will not craze, crack or peel and will not change color in the wall after erection.

FACILITIES AND SERVICE

AR-KE-TEX products are made in three plants with a total of 72 kiln capable of producing more than 8000 carloads per year. All plants are located on trunk line railroads.

Ample stocks of standard units are maintained for prompt shipment.

The Company maintains at Brazil an Engineering Department ready at all times to assist the architect, engineer or contractor with quantity surveys, typical coursing layouts, or the solution of any construction problem, where AR-KE-TEX products may be involved.

Special sizes and shapes can be manufactured to meet unusual conditions.

Principal Uses

AR-KE-TEX products have been widely used for interiors or exteriors of many different types of buildings, including:

Schools, for auditoriums, basements, cafeterias, class rooms, corridors, domestic science rooms, gymnasiums, laboratories, locker rooms, natatoriums, play rooms, power plants, shower rooms, swimming pools, toilets and work shops.

Field Houses
Office Buildings
Filtration Plants
Factories
Packing Houses
Dairies
Printing Plants
Service Stations
Comfort Stations
Country Clubs
Y. W. C. A.'s
Arenas
Airports
Penal Institutions
Infirmaries
Funeral Homes
Convents
Greenhouses
Granaries
Telephone Exchanges
Natatoriums
Steam Plants
Warehouses
Creameries
Bakeries
Department Stores
Laundries
Filling Stations
Tourist Camps
City Clubs
Armories
Municipal Buildings
Fire Stations
Insane Asylums
Hospitals
Cathedrals
Apartments
Refrigerating Plants
Hotels
Sub-stations
Boiler Rooms
Food Handling Plants
Ice Cream Plants
Restaurants
Store Buildings
Garages
Battery Rooms
Community Buildings
Y. M. C. A.'s
Theaters
Zoological Buildings
Police Stations
Homes for Aged
Orphanages
Churches
Residences
Abattoirs

New Developments

The AR-KE-TEX line is being constantly improved and increased with new colors and textures and new units.

Consult with our nearest representative regarding latest developments.

Mortar and Mortar Colors

AR-KE-TEX products may be laid in any kind of mortar made according to good practice with joint size and color to suit the individual taste of the designer or his client.

Cutting Tile

The installation of a portable electric saw with an abrasive disc for cutting AR-KE-TEX when necessary, is recommended on every project of any size. Our representative in every locality will gladly furnish any contractor with data on saws which have been found satisfactory. The use of these power saws has saved time and money for contractors on many recent projects, besides assuring excellent tile installations because of the precision with which mortises, mitres and odd lengths may be cut.

Double-Faced Walls

It is not recommended that double-faced walls be built of one tile unit extending through the wall, but rather of two units. This procedure will permit of alignment of both faces at a cost no higher than would be necessary with two-faced sorting and gauging.

Two-faced walls, of course, can be built of different colors on opposite faces.

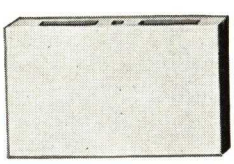
Samples

Full size or miniature samples of any standard texture of AR-KE-TEX products will be sent without charge to architects on request.

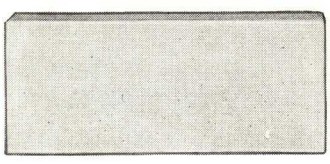
Institute Standards

AR-KE-TEX products conform to Glazed Brick & Tile Institute standards for sizes, shapes, and grading rules and are second to none for excellence of results in all tests prescribed.

13T 2¼ x 8



5 x 8



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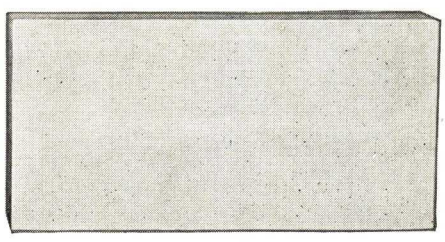


8 x 16

CONTINENTAL CLAY PRODUCTS COMPANY

MANUFACTURERS OF

Continental Glazed Brick and Tile
McNees-Kittanning Buff and Gray Face Brick
Unglazed Facing Tile

MAIN OFFICE AND FACTORY

KITTANNING, PA.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

CONTINENTAL GLAZED BRICK AND TILE

Sizes and Colors

CONTINENTAL GLAZED BRICK and TILE are manufactured in standard size glazed brick, 5x8-in. or two-brick size and 5x12-in. or three-brick size glazed tile. They are made in all colors and finishes which can be produced in high fired ceramic tile of this type.

Quality

The same high grade plastic fire clay is used in the manufacture of the body of CONTINENTAL GLAZED BRICK and TILE as we have used in our regular buff and gray face brick for many years. Our method of manufacture insures perfect bond between the body of our tile and the glaze. Because we manufacture by the one-burn process, both the body of the ware and the glaze are subject to a very high temperature in the burning. Both the body and the glaze will withstand oils and acids and are not affected by the methylene blue or liquid ink test.

Quantity

We have furnished glazed brick and tile for many outstanding buildings in different parts of the country. Our plant is always in operation.

Shapes

We are equipped to manufacture all standard fittings and shapes and can also make on order any specials that may be required.

McNEES-KITTANNING BUFF AND GRAY FACE BRICK

Quality

McNEES-KITTANNING BUFF and GRAY FACE BRICK have been the standard of quality for thirty years. They are made from the highest grade plastic fire clay. We have a large acreage of this clay which has a very uniform quality—there has not been any noticeable variation during our thirty years of manufacturing experience. This assures uniform size and color and enables us to duplicate at any time any shade of brick we have ever made.

We have supplied brick for outstanding buildings all over the country. We believe we enjoy a wider shipping range than the manufacturers of any other brick, as this particular type of light brick is manufactured only at Kittanning.

Permanent Colors

McNEES-KITTANNING BUFF and GRAY FACE BRICK are burned at high temperature entirely by natural gas to the lightest clear shades of buff and gray. This makes their color permanent and accounts for their not soiling after being in the walls and exposed to the weather for many years.

Near White Gray—We believe our gray brick are the lightest in color, or nearest white of any brick manufactured.

Buff—Our buff brick are made in several different tones of light clear buff and graded to uniform shades. This enables us to supply large orders of an absolutely uniform shade or, if a mingle is desired, we can mix the different shades, the color tones blending perfectly.

UNGLAZED FACING TILE

These are made in light buff shade in the same size units as our glazed tile and require the same line of shapes or fittings. They are load-bearing and can be used as part of the wall instead of just a lining. As they can be laid more quickly per square foot and are lighter in weight, the cost in the wall is considerably less than for standard size brick.

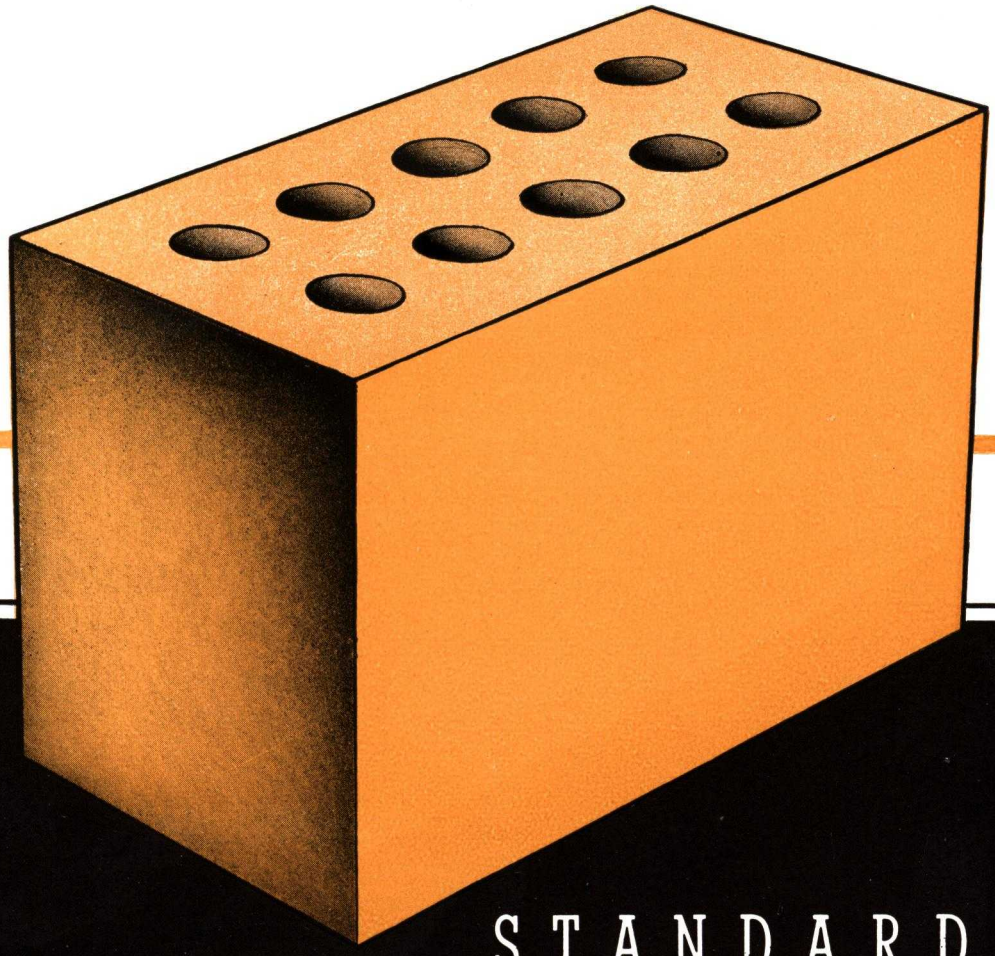
The type of coring used in both our glazed and unglazed tile enables the mason to make cuts on the job more readily than with other tile. This eliminates the shipping of different sized pieces and the trouble of keeping them separate on the job.

We are equipped to manufacture any of our products by the de-aired process.

We are members of the Glazed Brick and Tile Institute and for information regarding shapes and other details, kindly see Institute Catalog (refer to File Index) or write us direct.

4
38

HANDBOOK



STANDARDIZED

GLAZED BRICK & TILE

GLAZED BRICK & TILE INSTITUTE

THE GLAZED BRICK AND TILE INSTITUTE

THE GLAZED BRICK AND TILE INSTITUTE—PURPOSE

The Glazed Brick and Tile Institute was formed by the responsible manufacturers of the industry to codify the highest standards of quality and to unify physical dimensions of all units. In this manner the architect is able to design and specify from one set of specifications and be certain that no matter what material is used the shapes and sizes furnished will be the same and the quality will be certified above the Institute minimum.

PRODUCTS OF MEMBERS

The products manufactured are:
Ceramic Glazes in Matt—Satin and High Gloss Finishes—Solid.
Colors—Stippled—Mottled and Speckled Effects.
Salt Glazes—Glossy Finish—Gray, Cream and Buff Blends.
Clay Coated—Various Colors.

Experience has proven that fireclay bodies are superior for glazing. The Glazed Brick and Tile Institute specifications therefore are based on superior quality obtained with a *FIRECLAY BODY*. Specifications should always include the phrase "Glazed on a *fireclay body.*"

RESPONSIBILITY OF MEMBERS

Glazed jobs require very exacting servicing. A primary requisite for Institute membership is that the member's factory be fully capable of serving jobs of any size of the quality required in the rigid Institute specifications. The members are established firms with years of experience on every conceivable type of glazed job.

All Members' samples bear an Institute label—certifying quality.

STANDARDIZATION OF SIZES AND QUALITY

Institute standardization has reduced the shapes made from over a thousand to several hundred. This simplification not only aids the architect in design and the contractor in execution, but represents cumulative experience of the industry on thousands of jobs.

The art of glazing has reached its present refinements as an evolutionary development from very crude beginnings. It takes years of experience to produce a fine glazed product and Institute specifications are meant to define for the user the minimum quality he should receive.

WIDE RANGE OF PERMANENT COLORS

Ceramic Glazes are furnished in mottled, stippled and speckled effects, and solid colors running from white to jet black. Salt Glazes are furnished in cream, buff or gray blends.

These colors neither fade, nor deteriorate, and can be restored to newness by a soap and water washing.

LIGHT REFLECTION

For light courts, basements, laboratories and any other place where light reflection is desirable, *there is no permanent equal to* light colored glazed brick and tile. On dark rainy days, white glazed brick or tile reflect 80 per cent light as compared to 35 per cent for wet sand lime brick and 40 per cent for a white painted or plastered wall (after two years).

INTEGRAL GLAZED WALL CONSTRUCTION

Structural glazed units are furnished to interchange or bond with brick sizes. An exterior wall is commonly specified 4" brick exterior and 8" brick or hollow tile backup. As the wall is run up the structural glazed units can be bonded into the backup material and thus have a wall that is exterior facing, load-bearing and interior glazed eliminating the extra cost and loss of space when the glazed surface is veneered on the inside. This construction in a masonry wall is affected to the least degree possible by vibration, impact or settling. See Page 20 for various sections of load bearing walls and partitions. All two faced walls should be constructed of two units, bonded as shown.

DESIGN POSSIBILITIES

Glazed units are well adapted to the modern trend with smooth unbroken surfaces. Ranging from standard brick size (2¼ x 8) to 8 x 16 the mosaic possibilities are unlimited.

Glazed units, available in various colors, blend with limestone, granite and marble for classical structure exteriors, and with any type of interior trim.

INTERIOR FINISHES

Some interior conditions necessitate glossy glazes (Image Reflecting).

USE	*FINISH*	*REASON*
School Toilets	Glossy	This finish will not register pencil or chalk marks.
Swimming Pools	Glossy	A minimum amount of cleaning out necessary and minimum danger of bacteria adhesion.
School Corridors	Glossy	This finish will not register pencil or chalk marks.
Food Products Plants	Glossy	Less dirt adhesion and less chance of bacteria growth and odors, and can be cleaned with a hose.
Factory Toilets	Glossy	Intense usage necessitates smoothest finish to facilitate frequent cleaning

It is safe to say that the most sanitary results for interiors are obtained with a glossy (lustrous) finish. The slightly higher sound reverberation is easily and cheaply offset by ceiling sound proofing.

EXTERIOR FINISHES

(1) Matt (non-reflecting). This finish is generally desired from an architectural standpoint when used with stone or other non-reflecting materials in order that the brick work will weather in the same general way that the other material weathers. Since this product has a vitreous face, it can be cleaned satisfactorily without sand blasting.

(2) Satin Finish. This finish is satin but not shiny, even in large masses. It is cleaned easily with soap and water.

(3) Glossy or Lustrous Finish. This type of finish is bright, shiny and reflects images. It is generally preferred for buildings located near a dirty industrial center.

METHOD OF CLEANING

It is unnecessary to use acid to clean any glazed product that conforms with the Institute's specifications. The acid will not harm the glaze, but it may damage the mortar joint. Masons should be given a cloth to remove excess mortar as work progresses. After the masonry is finished, it should be cleaned by scrubbing with a bristle brush, strong soap and water. Abrasives need not be used.

TECHNICAL DATA

Physical Characteristics of Glazed Brick and Tile and Facing Tile

CERAMIC GLAZES

These are compounded of well known chemicals, thoroughly ground together then sprayed on a previously formed *fireclay body.* The sprayed unit is then burned at a temperature over 2000° F. which fuses the glaze to the body in such fashion that it is impossible to separate the two as their co-efficients of expansion are identical, and the glaze becomes an integral part of the body. The glazes are produced in various colors to give light reflection or light absorption. They are non-absorbent of any impurities and any acids (except only Hydrofluoric); and will resist exterior weather conditions in the most severe climate.

SALT GLAZE

This glaze is applied to a *fireclay body* as a vapor while the units are at a temperature over 2000° F. The resultant glaze being transparent takes on the color of the fireclay body—gray, cream or buff. The Salt Glaze (a sodium iron silicate) is smooth, lustrous (image reflecting) resists pencil or chalk markings and is one of the oldest known forms of sanitation. Salt Glazed ware produced centuries ago is still in an excellent state of preservation. Without doubt it is the most economical form of sanitary wall construction. To obtain a high degree of sanitation, a smooth and lustrous finish as manufactured by members of Glazed Brick and Tile Institute should be insisted upon.

CLAY COATED

Similar in appearance to the highest grade smooth face brick manufactured from fire clay. The vitreous surface is non-absorbent and is available in a variety of colors unobtainable in face brick.

FACING TILE—To Replace Plaster

The term "Facing Tile" is used to designate unglazed units in the Double (5″ x 8″ Face) and larger sizes manufactured by members of the Glazed Brick and Tile Institute and are similar in appearance to the highest grade Smooth Facing Material Manufactured from *Fire Clay.* These units are furnished in all the various shapes (with exception of cove and cap units) illustrated on pages 18 to 24 following, and are manufactured with smooth faces in pleasing buff and gray shades. The Standard Grading Rules, page 25, apply also to Facing Tile, except that the references to glaze and coating are omitted.

Facing Tile as manufactured by members of the Institute, is a quality product, adaptable to any structure where Face Brick would be used and gives less absorption and more sanitation than most units other than the Glazed or Coated products manufactured by the members of the Institute. Facing Tile used as a loadbearing material, compares favorably with the cost of plastered walls and never needs replacing or repainting.

USE THE PRODUCT OF A RESPONSIBLE MEMBER

The Ceramic Glazed Walls of the Pasteurizing Room and Stair Halls, Sheffield Farms Dairy Plant, Richmond Hill, Long Island. H. McNabb, Engineer — Stohldrier & Zetsche, Architects.

CERAMIC GLAZED STRUCTURAL TILE

A LOGICAL WALL SURFACE

Sanitation — Beauty — Light Reflection

Modern Dairies, Bakeries, Food Preparation Plants and Drug Manufacturing Laboratories demand the utmost sanitation and light reflection for wall surfaces. For this purpose the many advantages of Ceramic Glazed Brick and Structural Tile are unexcelled. The smooth impervious glazed surface affords no lodging place for bacteria. The wall surface can be kept immaculately clean and free from bacteria by hosing down with live steam and scalding water, even under high pressure without fear of dislodging the units which form an integral part of bearing walls and partitions.

The rooms illustrated are constructed with 5 in. x 8 in. Ceramic Glazed Units in a light brown and white mottled shade; assuring permanent, sanitary, outstandingly beautiful and highly light reflecting surfaces.

CERAMIC GLAZED BRICK

For Exterior Use

Use no substitute for Ceramic Glazed Brick when planning for permanent architectural beauty.

Ceramic Glazed Brick are particularly adaptable to the modern trend in design and are not limited to any particular type of structure. Manufactured in a wide variety of colors, including limestone and granite effects, in high gloss and matt finishes, this product offers unlimited flexibility in design and is adaptable to any conceivable type of building construction, whether used alone or in combination with other materials.

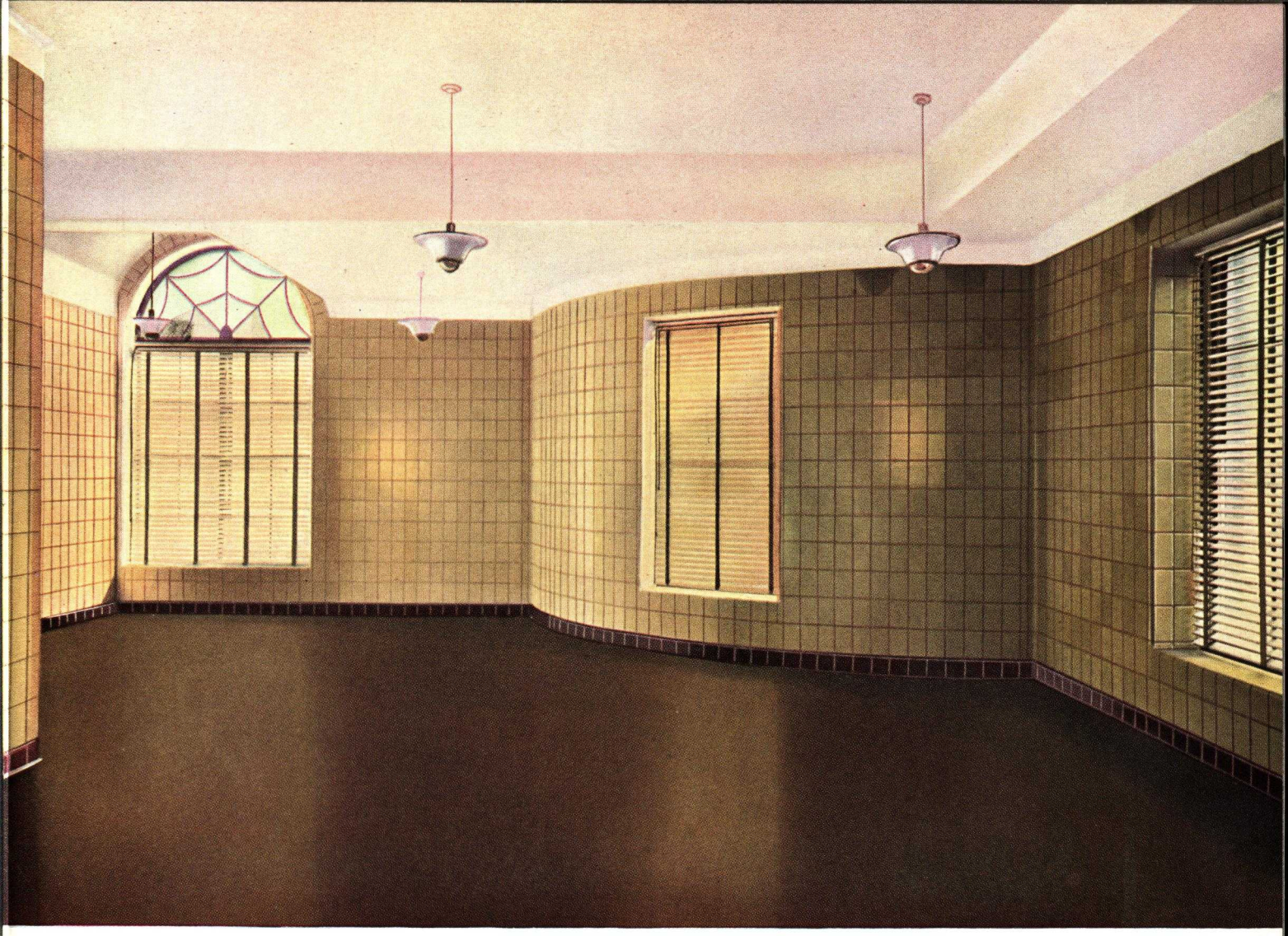
From the small "Taxpayer" to the huge Monumental Building, Ceramic Glazed Brick can be used effectively in the achievement of distinctive designs, as well as for architectural enrichment.

Because of their high compressive strength, Ceramic Glazed Brick has been approved without question by building departments throughout the country. It can be used as an integral part of bearing walls, thereby effecting a considerable saving in construction costs over non-structural veneering units.

Burned at high temperatures to insure permanence, Ceramic Glazed Brick that conform with the rigid specifications of the Glazed Brick and Tile Institute are "time tested" as well as laboratory tested and will withstand the elements satisfactorily in every respect even under the most severe climatic conditions. A product that literally keeps up with time.

Here is a striking example of Ceramic Glazed Brick as used for modernistic exterior treatment of the Hecht Building, Washington, D. C. Abbott Merki & Co., Engineers.

The alternating bands of rich Ivory and Black colors provide a pleasingly attractive color scheme —and the water repellent and stain-proof ceramic glazed surface will retain its original beauty indefinitely, without any maintenance expense during the life of the building.



Photograph illustrates interior treatment of some of the rooms in the Administration and Toll Buildings of the Tri-Borough Bridge Project, Randalls Island, New York City. Tri-Borough Bridge Authority Engineers.

SALT GLAZED STRUCTURAL TILE

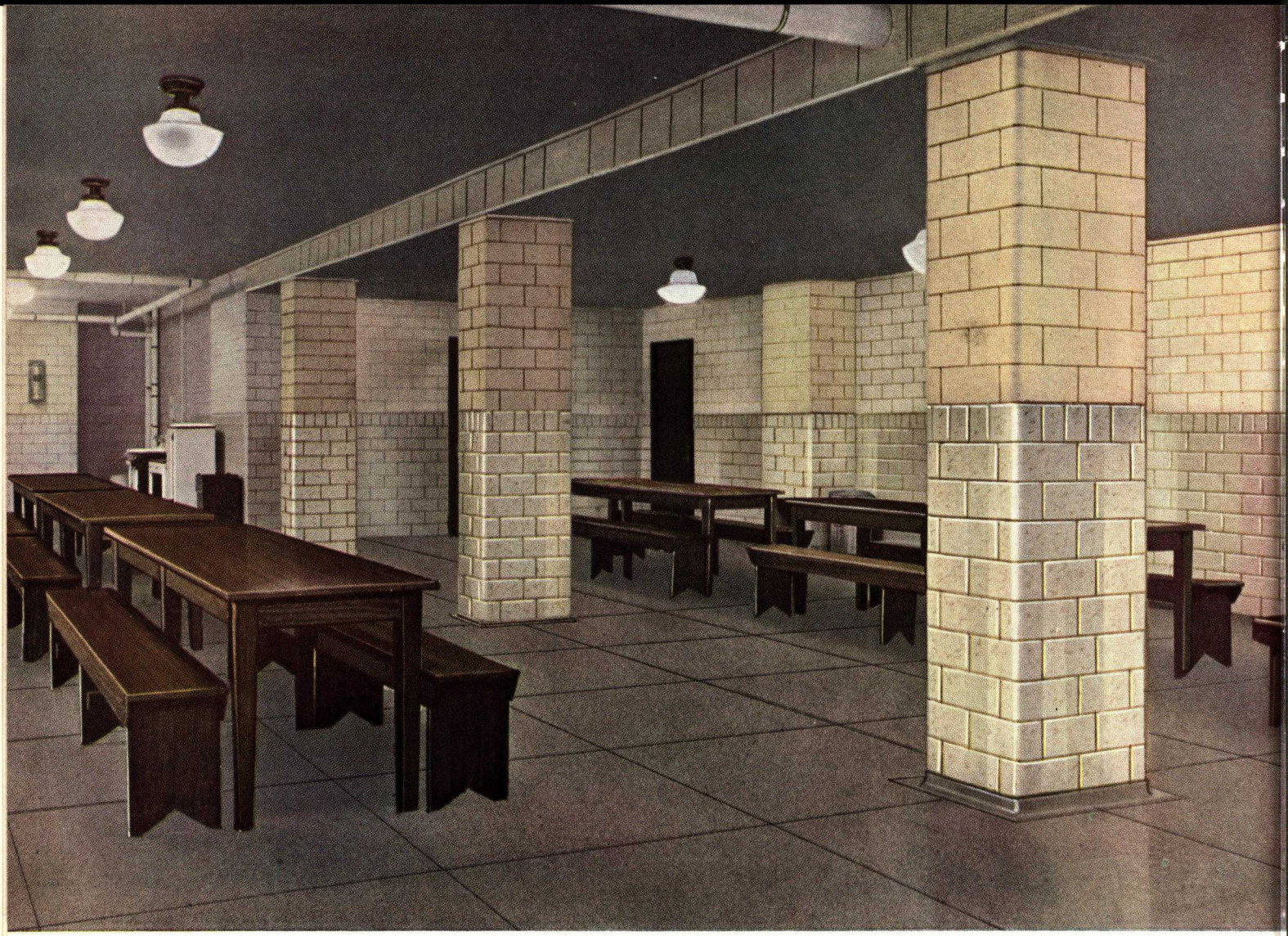
AN ECONOMICAL WALL SURFACE

This unique and attractive effect is produced by using Structural Salt Glazed Tile with face dimensions of 5 in. x 8 in. for the field, and Chocolate Brown Ceramic Glaze Sanitary Base, laid in soldier course fashion with continuous vertical jointing.

This departure from the conventional method of laying combines beauty with utility, and in the installation depicted above, reduced the cost of construction considerably in eliminating the necessity of special shapes for facing the radial walls.

Salt Glazed Units provide a permanent and sanitary lining that will require no maintenance cost during the life of the building, and the initial cost is no greater than many other materials that do not have the same sanitary and structural qualities.

Salt Glazed Units have been approved by Building Departments and other Governmental Agencies for use as a fireproofing material around stair wells, columns and fire walls, and are, therefore, particularly adaptable to those locations where space is limited as the fireproofing material and the wall finish is combined in one inexpensive unit.



Cafeteria of Thomas Mifflin School, Philadelphia, Pa.
Irwin T. Catherine, Supt. of Bldg., Phila. Bd. of Education.

GLAZED AND UNGLAZED STRUCTURAL TILE

FOR INTERIOR USE

The installation above is typical of many where Ceramic Glazed Structural Tile has been combined with Unglazed Facing Tile to produce a most satisfactory wall at a minimum of cost. Triple Size (5 in. x 12 in. Face) Ceramic Glazed units in a Brown and Cream Mottled tone have been used for the dado and form a pleasing contrast with the Buff unglazed units of the same size used above the dado.

The use of Unglazed facing tile above the dado effects a saving in construction costs, while the impervious surface of the Ceramic Glazed dado provides a durable and germ-proof surface in that part of the wall lining that is subjected to the most contact and abuse. Where funds are limited these two products can be used at a minimum of expense.

The use of 5 in. x 12 in. stretchers and only one stock shape for the bullnose finish of columns and external corners results in simplicity of design and economical construction, while the attractive color scheme produces an impressive artistic effect.

Actual installation of a Modern Filling Station.

CERAMIC GLAZED UNITS FOR FILLING STATIONS

ADVERTISING VALUE — SANITARY — PERMANENT

The advertising value of the artistic, permanent and sanitary appearance of Ceramic Glazed Structural Tile Units for filling stations is rapidly being appreciated by owners of such stations.

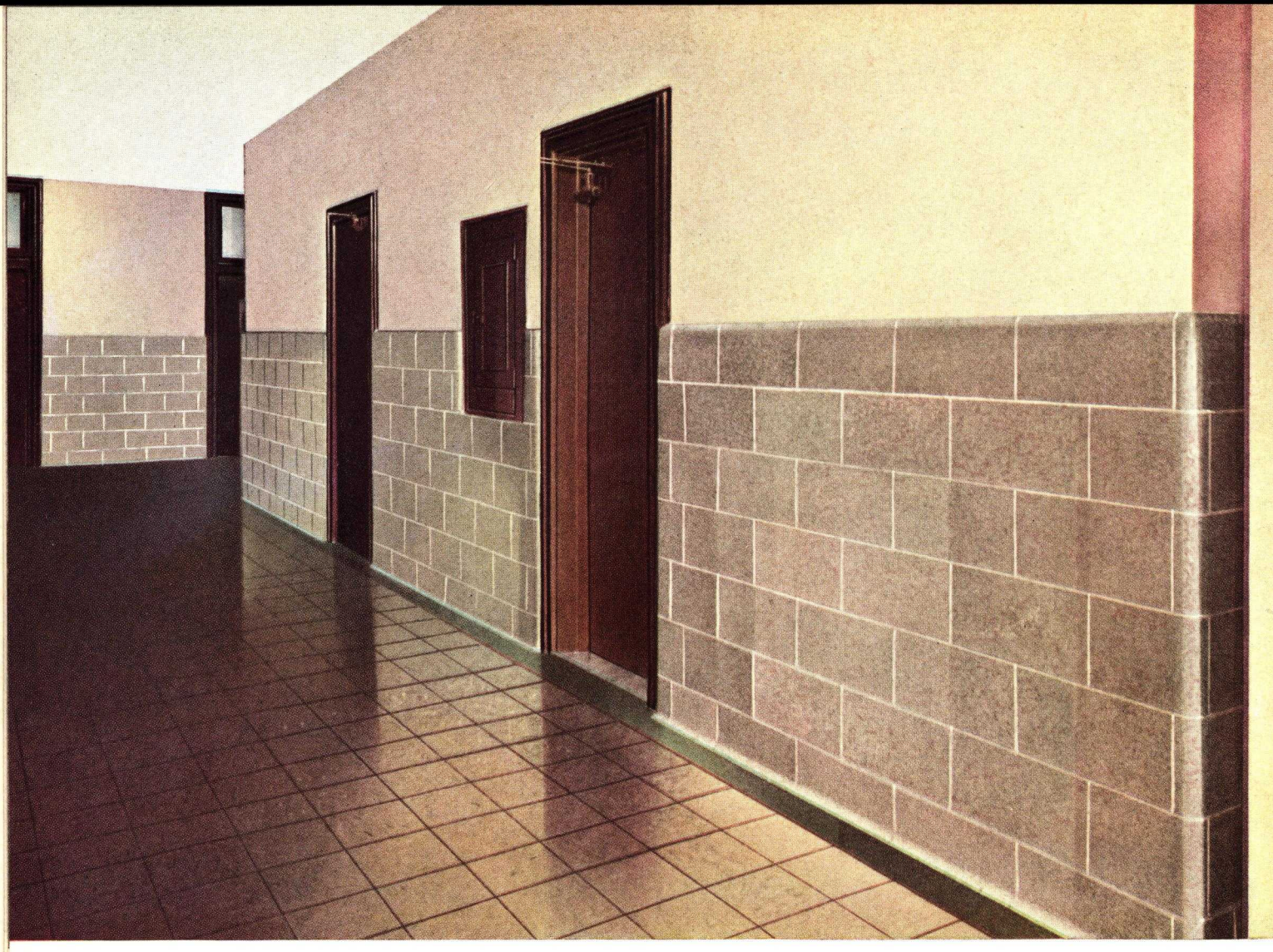
The appearance of a permanent, sanitary building creates a feeling in the minds of customers that they are dealing with a responsible distributor. This is not the case when stopping at a cheap, temporary station.

Resistant to oil and grease stains, the impervious water repellent Ceramic Glazed finish retains its original newness and beauty indefinitely. This factor makes it especially desirable for use on the surfaces of exterior and interior walls of filling stations.

The possibilities of a variety of designs and colors are almost endless with Ceramic Glazed Structural Tile. The illustration above shows the use of 5 in. x 8 in. Ceramic Glazed Structural Tile with continuous vertical jointing as one of the unique possibilities.

Laying units with continuous vertical joints is only possible when the material has the high mechanical accuracy and quality such as is produced by the members of the Glazed Brick and Tile Institute. No loss of structural strength results from this method of construction when the interior is lined with Glazed Structural Tile.

Both interior Salt Glazed and Exterior Ceramic Glazed units are bonded together using alternating courses of 1¾ in. and 4 in. Structural Tile.



The photo above shows the pleasing results obtained by using this material as a wainscoting throughout the corridors of the Olinville Junior High School, Bronx, N. Y., designed by the New York City Board of Education.

CERAMIC GLAZED UNITS FOR WAINSCOTING

COLOR — NO MAINTENANCE COST — SANITARY

Ceramic Glazed Structural Tile Units with Face dimensions of 8 in. x 16 in. are now manufactured by certain members of the Glazed Brick and Tile Institute, and conform with the high standards of quality as established for the smaller sizes. This product is available in a wide variety of colors — in high gloss and matt finishes with a complete line of special shapes as illustrated in the following pages covering the smaller units.

The use of a smooth, glazed, sanitary surface is especially desirable in schools, hospitals and institutions for corridors and stair halls. The smooth, stain-proof surface is not defaced by chalk, pencil or ink markings and abrasions such as are common in schools. All markings wash off with soap and water thus reducing maintenance costs. There is no annual painting bill with Glazed Tile Units.

The use of stock shapes, such as Sanitary Cove Base, Bullnose Cap and Bullnose Corners, combines with the smooth finish to produce a thoroughly sanitary surface.

The variegated mottled tone allows a more interesting treatment in the color scheme of a corridor. Light colors help to increase the light in long corridors by their light reflective qualities.

CERAMIC GLAZED STRUCTURAL TILE

A LOGICAL WALL SURFACE

Ceramic Glazed Structural Tile lends itself to almost every conceivable type of use in building construction. The use in a Board and Reading Room shows its unlimited adaptability for wall treatment as well as the advantages of this product for interior uses under many types of services.

In the above interior the units used have face dimensions of 5 in. x 12 in. in a soft cream and brown mottled tone for the main body of the wall. There is a top border around the room of several courses of white tile to the ceiling. This unusual combination of color produces a pleasing subdued and restful effect from the floor to a point well above the eye-level. The general light, warm tone of the tile does not distract the attention of the readers. The top courses of pure white tile add to the utilitarian advantages of greater light reflection at a point where it is most effective.

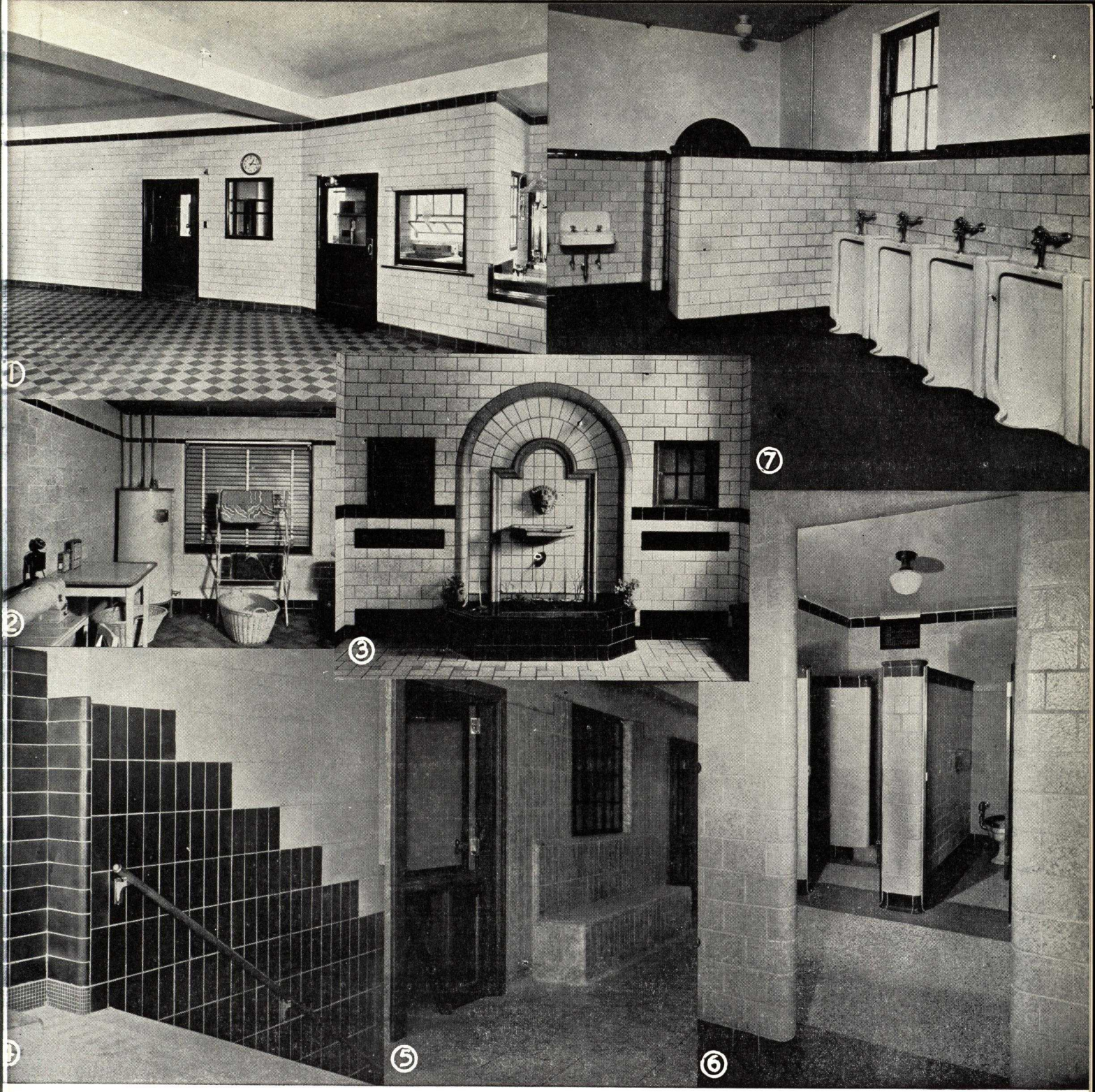
Used as an integral part of bearing and partition walls, Ceramic Glazed Structural Tile can never become dislodged due to vibration or settling of the walls.

There is no maintenance cost with this type of bearing construction tile such as is sometimes experienced with various other materials which require periodical replacements or re-conditioning.

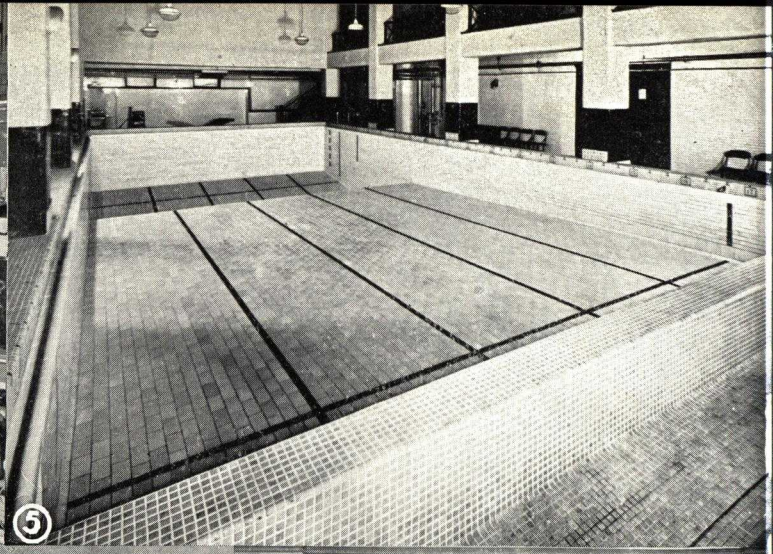
The available colors in plain or mottled glazed effects, which are now produced, afford the designer almost unlimited possibilities, as to interior treatments and color schemes. The colors are permanent and require only a periodical dusting or washing with plain soap and water at long intervals. The walls are then restored to their fresh and original brightness.

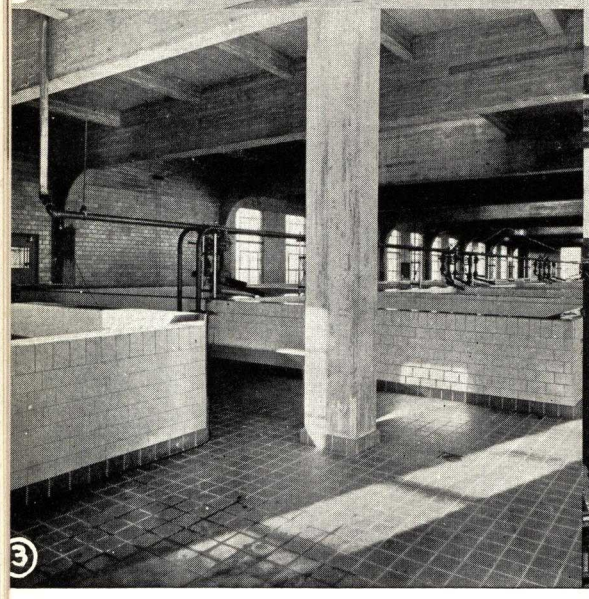
As they are structural units they count as part of the bearing walls and do not have to be added to it at additional expense as is required for most other finishes.

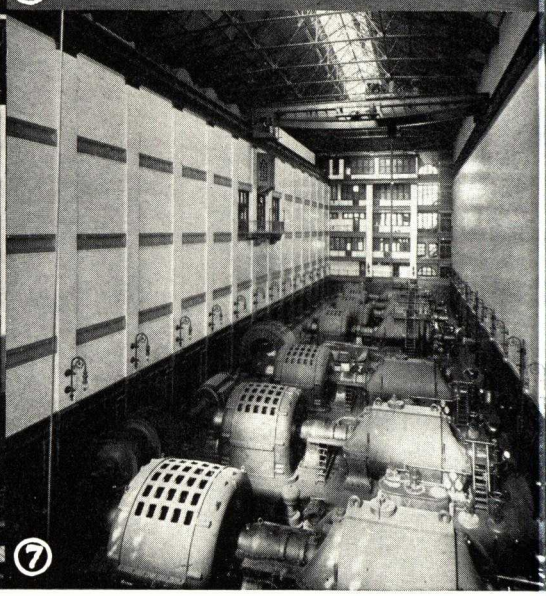
An original study showing the unusual decorative, as well as structural, possibilities in Ceramic Glazed Brick and Structural Tile for a complete facade. The design shows the combination of conventional brick size with standard 5 in. x 8 in. units and bullnose shapes. The effect of continuous vertical jointing and variety of pleasing colors offers almost limitless possibilities for the Architect in structural enrichment.



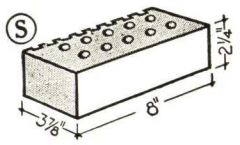
1. *Interior of kitchen.*
2. *Facing of private laundry.*
3. *Foyer—floor, walls and fountain.*
4. *Wainscot and side walls of stair hall.*
5. *Wainscot and seat of corridor.*
6. *Walls and partitions of lavatory.*
7. *Wainscoting and dwarf partition of comfort station.*



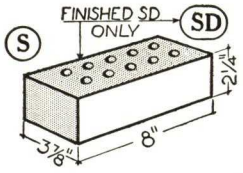




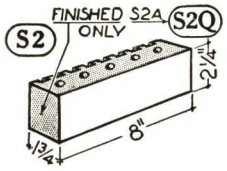
1. *Store interior—walls.*
2. *Exterior treatment of service station.*
3. *Distillery interior—walls and storage vat facings.*
4. *Office buildings—entire exterior facing, including black glazed brick spandrels.*
5. *Interior lining of side walls of swimming pool room, and walls and bottom of swimming pool.*
6. *Exterior of store front including black glazed bulkheads.*
7. *Walls and wainscot of power house.*



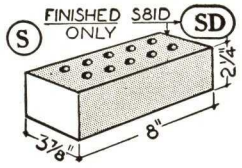
S Stretcher
S1 Same, 4" Length



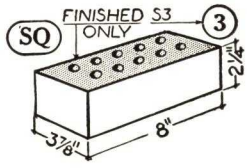
SSm Stretcher Smooth Back
SD Two Face Stretcher



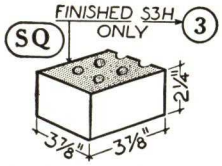
SA Soap Stretcher
S2A Soap Quoin (2" Ret.)



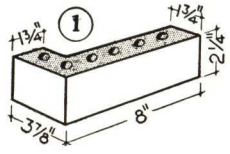
S81 Header
S81D Two Face Header



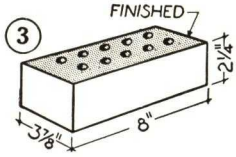
S2 Quoin
S2H Same, 4" Length
S3 Quoin End



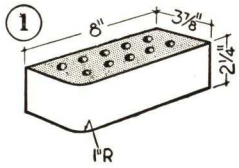
S2H Quoin, 4" Length
S3H Quoin end, 4" Length



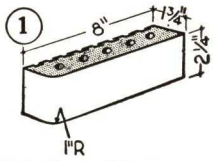
S2B Soap Bond Quoin (4" Return)



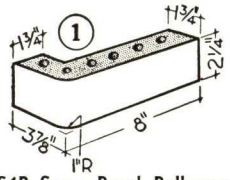
S83H 8" Quoin End, 4" Length (Double Quoin)



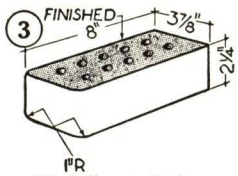
S4 Bullnose
S4H Same, 4" Length



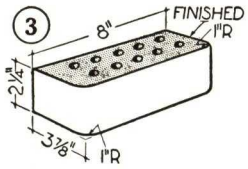
S4A Soap Bullnose (2" Return)



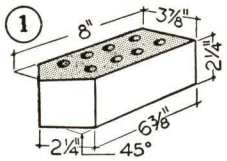
S4B Soap Bond Bullnose, (4" Return)



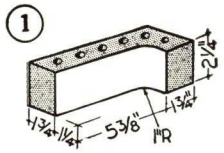
S5 Bullnose End
S5H Same, 4" Length



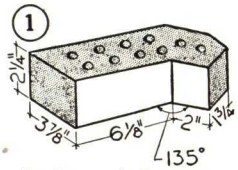
S85H 8" Bullnose End, 4" Length (Double Bn.)



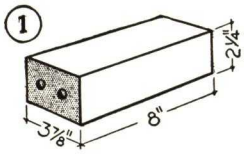
S6 Octagon
S6A Soap Octagon



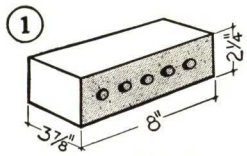
S8 Internal Bullnose



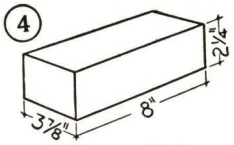
S9 Internal Octagon
S9A Soap Internal Oct.



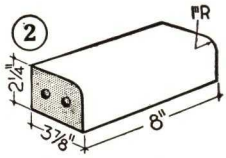
S10 Square Sill
S11 Same, 4" Length



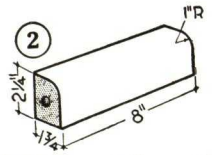
S811 8" Square Sill, 4" Length (Square Sill Header)



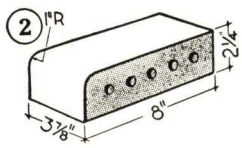
S12R Square Sill Quoin Rt.
S12H Same, 4" Length



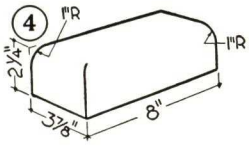
S20 Bullnose Sill
S21 Same, 4" Length



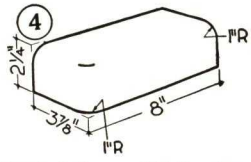
S20A Soap Bullnose Sill (2" Reveal)



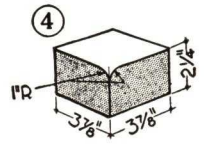
S821 8" Bullnose Sill, 4" Length (Bn. Sill Hdr.)



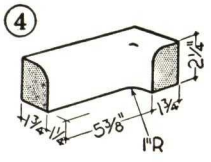
S22R Bullnose Sill Quoin, Rt.
S22H Same, 4" Length



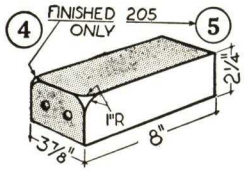
S24R Bullnose Sill Bn. Rt.
S24H Same, 4" Length



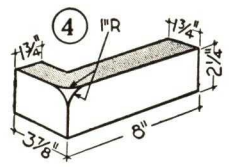
S27H Bullnose Sill Internal Square Corner



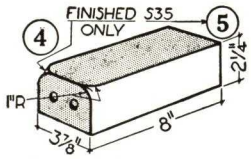
S28L Bullnose Sill Internal Bullnose, Left
S28H Same, Half Length



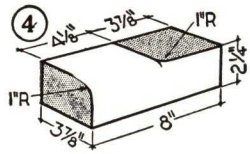
S204R Bullnose Starter, Rt.
S214R Same, 4" Length
S205 Bn. Coping Starter



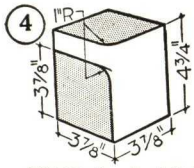
S204BR Soap Bullnose Starter, 4" Return, Rt.
S204AR Same, 2" Ret.



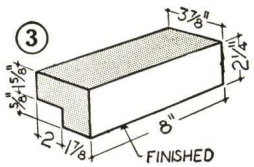
S34R Bullnose Mitre, Rt.
S34HR Same, 4" Length
S34AR Soap Bn. Mitre, Rt.
S35 Bullnose Coping Mitre



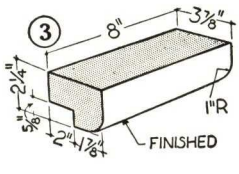
S34JR Bullnose Sill and Jamb Mitre, Right



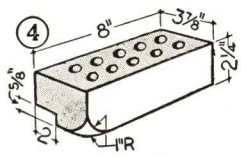
FS34R Rowlock Bullnose Sill Mitre 4" Length



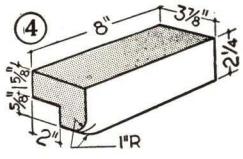
S710 Square Lintel



S720 Bullnose Lintel



S704R Bullnose Lintel Starter, Right



S734R Bullnose Lintel Mitre, Right

See Accompanying Notes for Explanation of Class Symbols (S), Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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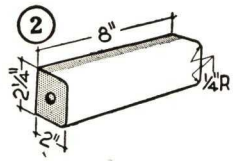
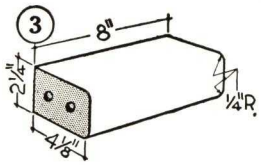
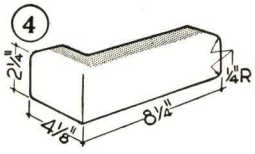
"S" SERIES CAP MOULDING



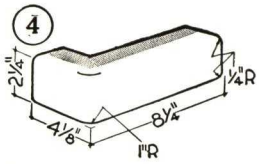
S40 Cap Stretcher



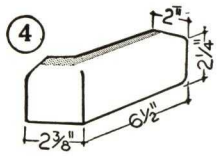
S40M Cap Stretcher, 4" Rev.
S41M Same, 4" Length



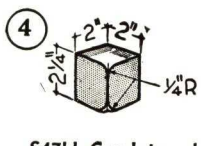
S42 Cap Quoin
S42H Same, 4" Length



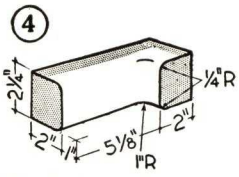
S44 Cap Bullnose
S44H Same, 4" Length



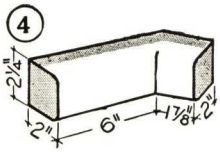
S46 Cap Octagon



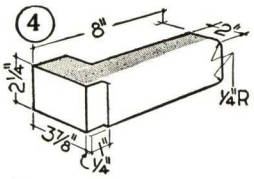
S47H Cap Internal Square Corner



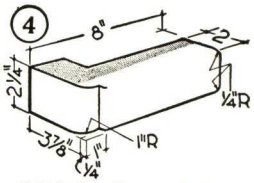
S48 Cap Internal Bullnose
S48H Same, Half Length



S49 Cap Int. Octagon



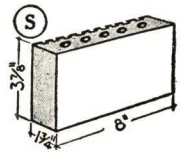
S402 Cap Starter Quoin
S402A Same, Soap, 2" Ret.



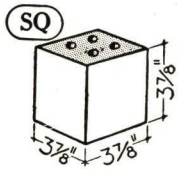
S404 Cap Starter Bullnose
S404A Same, Soap 2" Ret.

1½ BRICK EQUIVALENT UNITS "F" SERIES—3⅞" x 8" FACE

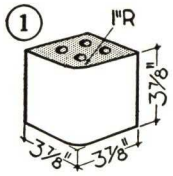
USED AS ROWLOCK OR SOLDIER UNITS WITH "S" SERIES



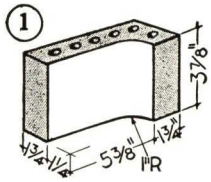
FA Soap Flatter



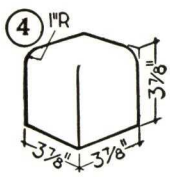
F2H Quoin, 4" Length



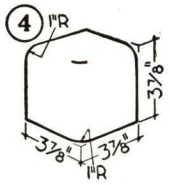
F4H Bullnose, 4" Length



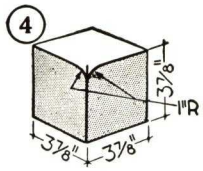
F8 Internal Bullnose
F8H Same, Half Length



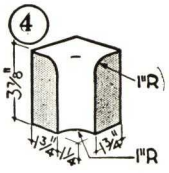
F22H Bullnose Sill Quoin, 4" Length



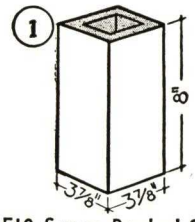
F24H Bullnose Sill Bullnose, 4" Length



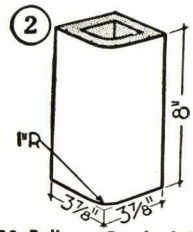
F27H Bullnose Sill Internal Square Corner



F28H Bullnose Sill Internal Bullnose, Half Length



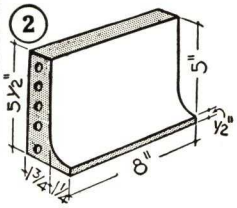
F10 Square Rowlock Sill (also Soldier Quoin)



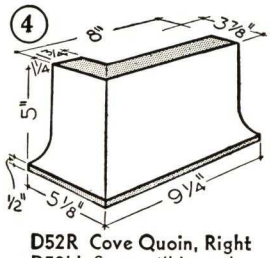
F20 Bullnose Rowlock Sill (also Soldier Ext. Bn.)

2 BRICK EQUIVALENT UNITS "D" SERIES—5" x 8" FACE COVE BASE

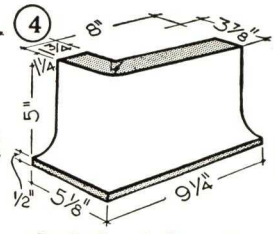
COVE BASE UNITS ARE NOT MADE IN "S" SERIES



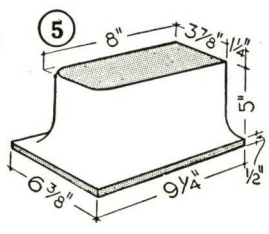
D50 Cove Stretcher



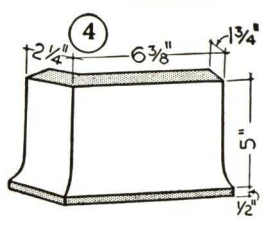
D52R Cove Quoin, Right
D52H Same, 4" Length
D52AR Same, Soap, 2" Ret.



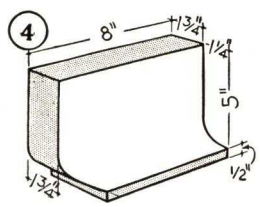
D54R Cove Bullnose, Rt.
D54H Same, 4" Length
D54AR Same, Soap, 2" Ret.



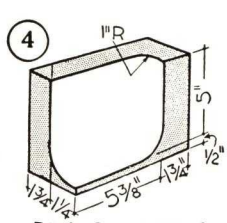
D55 Cove Bullnose End
D55H Same, 4" Length



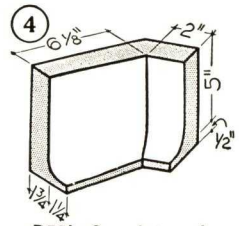
D56R Cove Octagon, Right



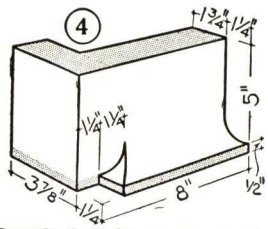
D57R Cove Internal Coped, Right



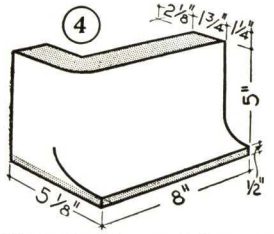
D58L Cove Internal Bullnose, Left



D59L Cove Internal Octagon, Left



D502R Cove Starter Quoin Rt.
D502AR Same, Soap thickness



D504R Cove Starter Bullnose Rt.
D504AR Same, Soap

See Accompanying Notes for Explanation of Class Symbols (S), Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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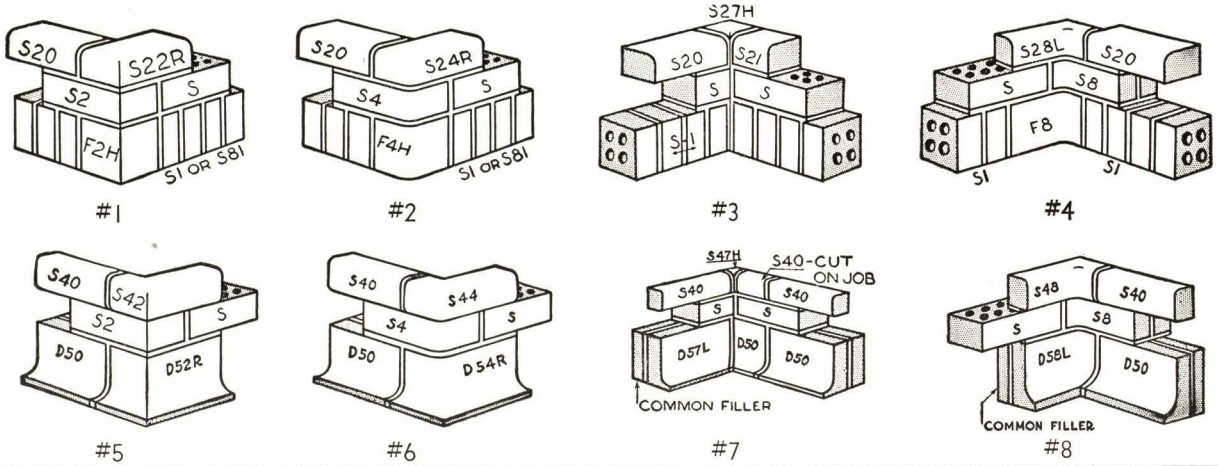
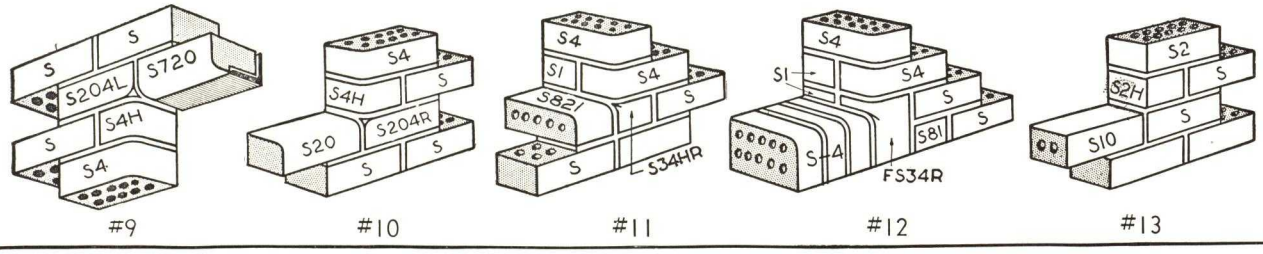
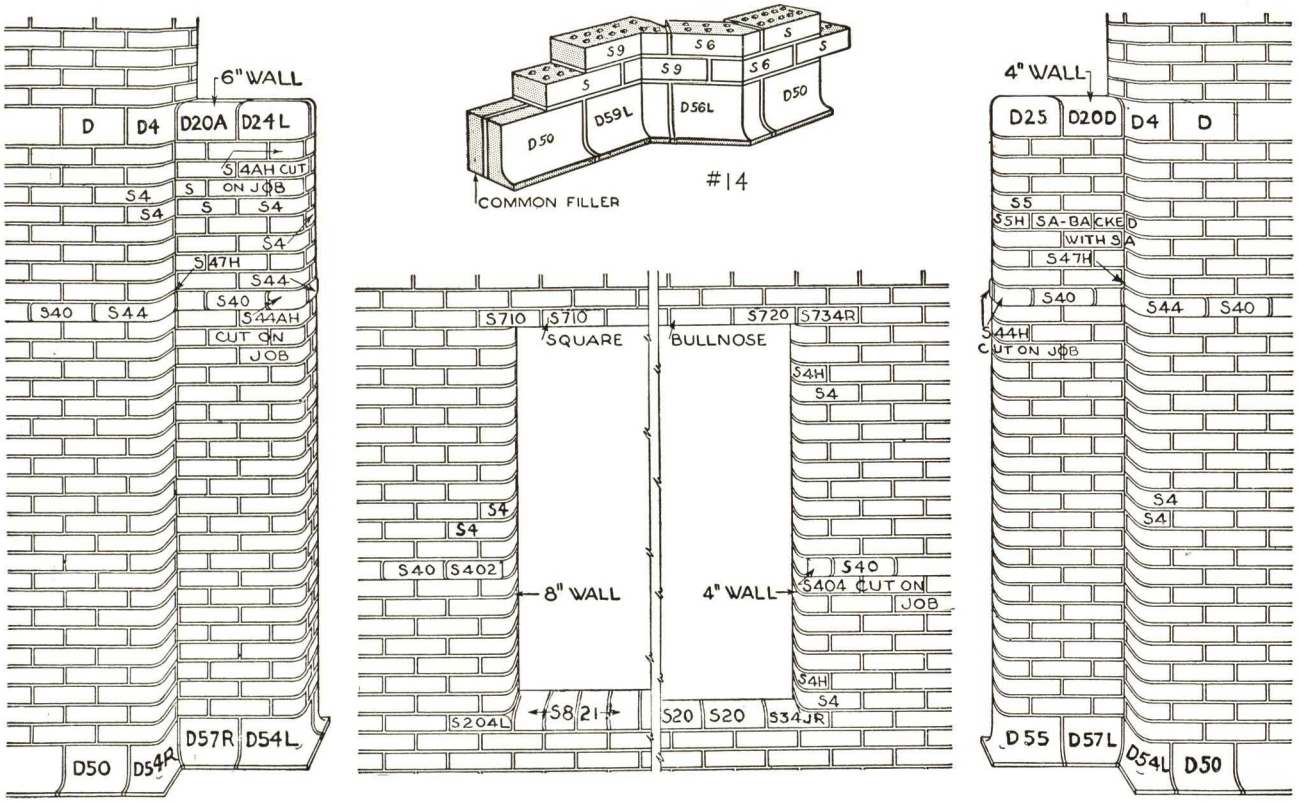
STRUCTURAL DETAILS—CORNERS—Refer to details by numbers.



LINTELS—SILLS



OCTAGONS



See Accompanying Notes for Explanation of Class Symbols (S), Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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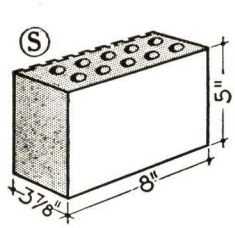
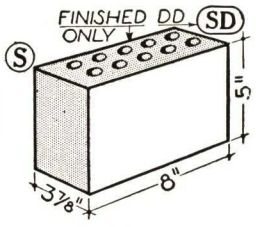
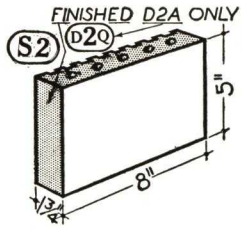


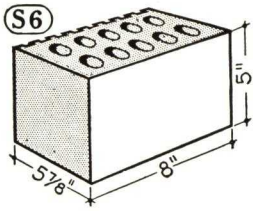
D Stretcher.
D1 Same, 4" Length.



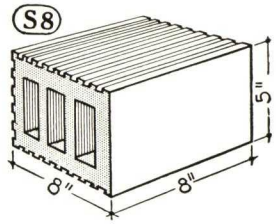
DSm Stretcher, Smooth Back
DD Two Face Stretcher.



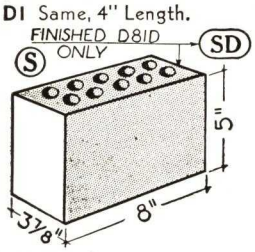
DA Soap Stretcher.
D2A Soap Quoin (2" Ret.).



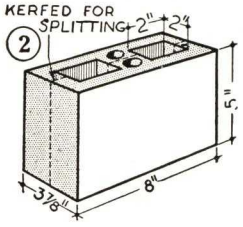
D60 6" Bonding Stretcher.



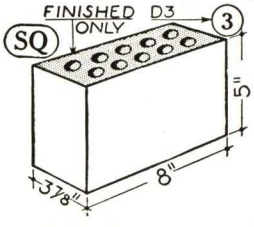
D80 8" Bonding Stretcher.



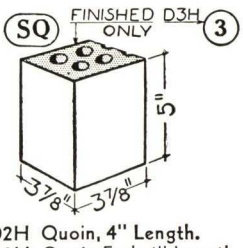
D81 Header.
D81D Two Face Header.



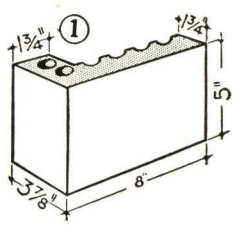
DV Kerfed Conduit Stretcher.



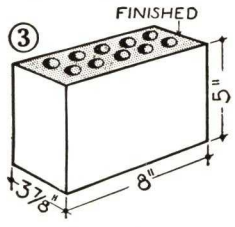
D2 Quoin.
D3 Quoin End.



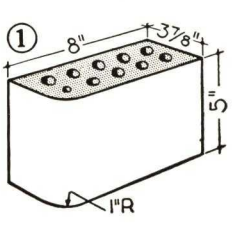
D2H Quoin, 4" Length.
D3H Quoin End, 4" Length.



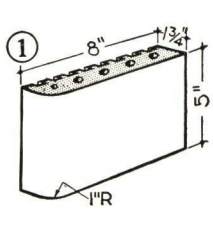
D2B Soap Quoin, 4" Ret.



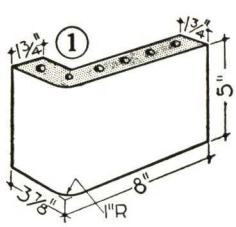
D83H 8" Quoin End, 4" Length. (Double Quoin).



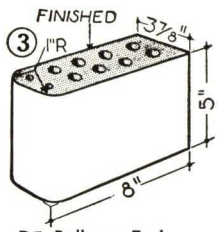
D4 Bullnose.
D4H Same, 4" Length.



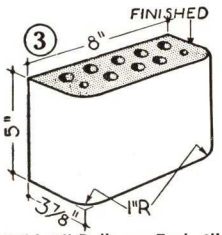
D4A Soap Bullnose (2" Ret.)



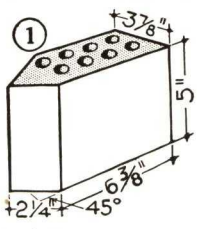
D4B Soap Bullnose, 4" Ret.



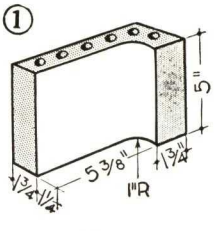
D5 Bullnose End.
D5H Same, 4" Length.



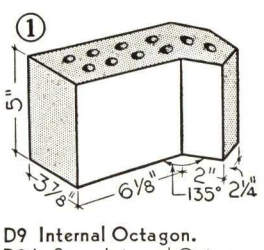
D85H 8" Bullnose End, 4" Length (Double Bullnose)



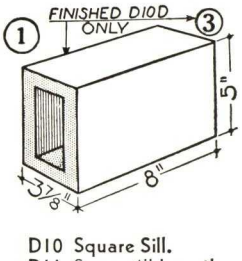
D6 Octagon
D6A Soap, Octagon.



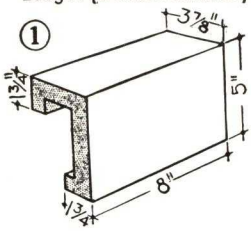
D8 Internal Bullnose.



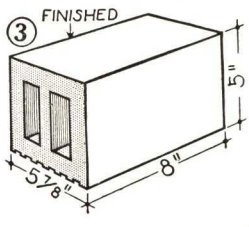
D9 Internal Octagon.
D9A Soap Internal Octagon.



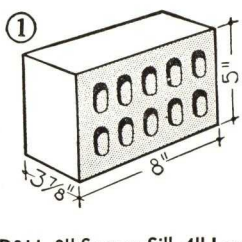
D10 Square Sill.
D11 Same, 4" Length.
D10D Square Coping.



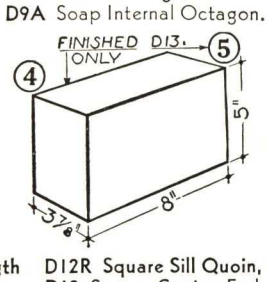
D10B Soap Square Sill 4" Reveal.



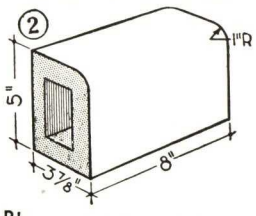
D610D 6" Square Coping. (Also 6" Lintel)



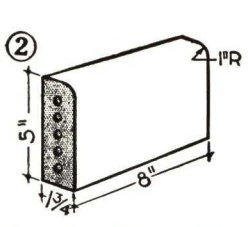
D811 8" Square Sill, 4" Length
DF Flat Stretcher, Head Not Finished.



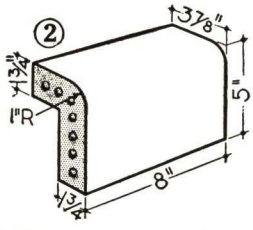
D12R Square Sill Quoin, Rt.
D13 Square Coping End.
D13H Same, 4" Length.



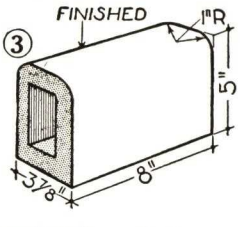
D20 Bullnose Sill.
D21 Same, 4" Length.



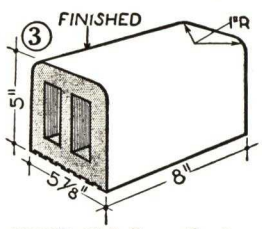
D20A Soap Bullnose Sill. (2" Reveal.)



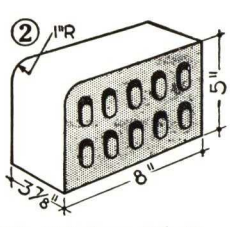
D20B Soap Bullnose, 4" Rev.
D21B Same, 4" Length.



D20D Bullnose Coping.
D21D Same, 4" Length.



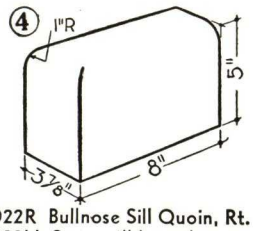
D620D 6" Bullnose Coping. (Also 6" Bullnose Lintel.)



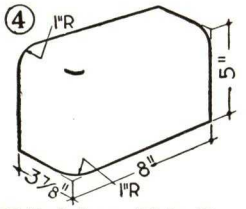
D821 8" Bullnose Sill, 4" Length. (Bullnose Header).

See Accompanying Notes for Explanation of Class Symbols (S), Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

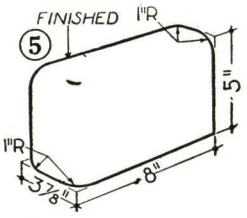
USE THE PRODUCT OF A RESPONSIBLE MEMBER



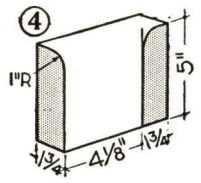
D22R Bullnose Sill Quoin, Rt.
D22H Same, 4" Length.
D22AR Same, Soap, 2" Ret.



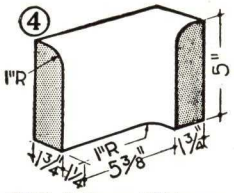
D24R Bullnose Sill Bn, Rt.
D24H Same, 4" Length.
D24AR Same, Soap, 2" Ret.



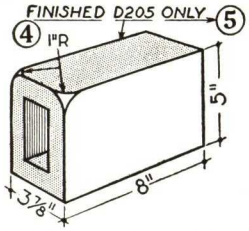
D25 Bullnose Coping Bn End
D25H Same, 4" Length.



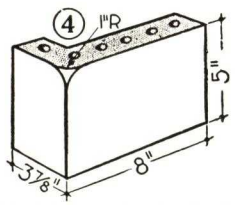
D27L Bullnose Sill Internal Corner, Left
D27H Same, Half Length.



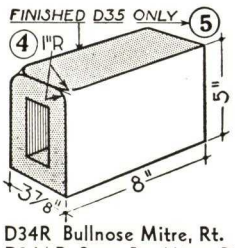
D28L Bullnose Sill Internal Bullnose, Left.
D28H Same, Half Length.



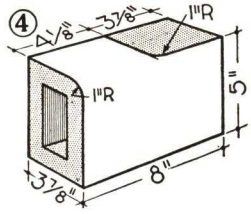
D204R Bullnose Starter, Rt.
D205 Bullnose Coping Starter
D215 Same, 4" Length.



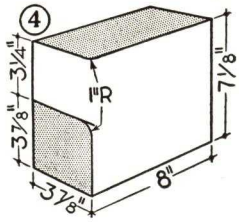
D204BR Soap Bond Bullnose Starter, 4" Ret., Right.
D204AR Same, (2" Return).



D34R Bullnose Mitre, Rt.
D34AR Soap Bn. Mitre, Rt.
D35 Bullnose Coping Mitre.
D35H Same, 4" length.

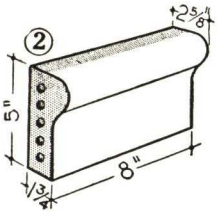


D34JR Bullnose Sill and Jamb Mitre, Rt.

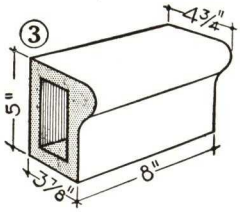


D34XR Universal Mitre, Rt.

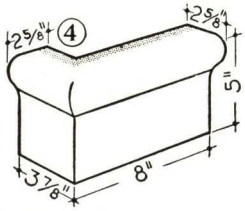
"D" SERIES CAP MOULDING



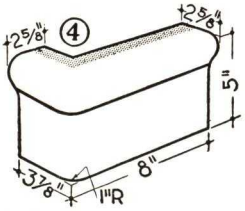
D40 Cap Stretcher.



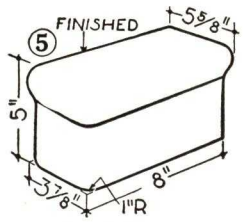
D40M Cap Stretcher, 4" Rev.
D41M Same, 4" Length.



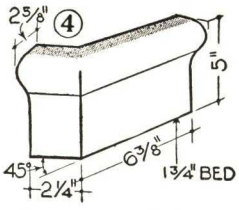
D42R Cap Quoin, Rt.
D42H Same, 4" Length.
D42AR Same, Soap, 2" Ret.



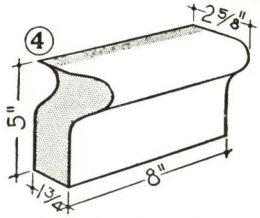
D44R Cap Bullnose, Rt.
D44H Same, 4" Length.
D44AR Same, Soap, 2" Ret.



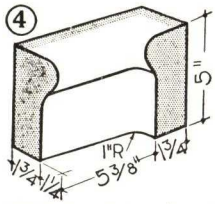
D45 Cap Bullnose End.
D45H Same, 4" Length.



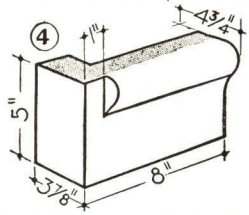
D46R Cap External Octagon.
D49R Cap Int. Oct. (Not Shown)



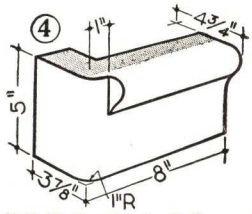
D47R Cap Internal Coped, Right.



D48L Cap Internal Bullnose, Left.

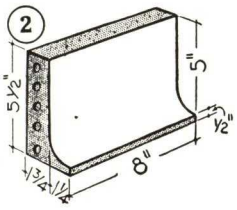


D402R Cap Starter Quoin, Rt.
D402AR Same, Soap, 2" Ret.

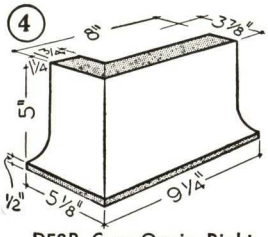


D404R Cap Starter Bullnose, Rt.
D404AR Same, Soap, 2" Ret.

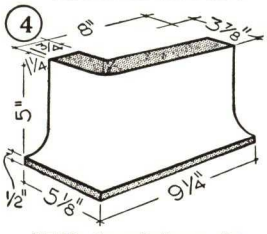
COVE BASE



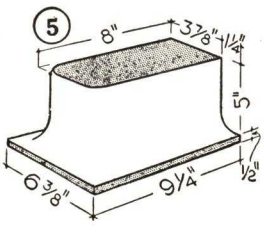
D50 Cove Stretcher



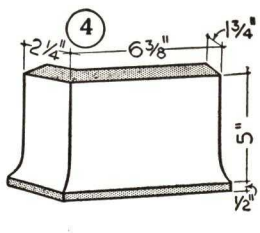
D52R Cove Quoin, Right
D52H Same, 4" Length
D52AR Same, Soap, 2" Ret.



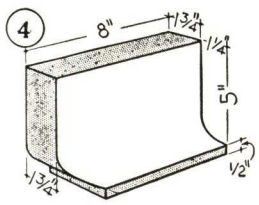
D54R Cove Bullnose, Rt.
D54H Same, 4" Length
D54AR Same, Soap, 2" Ret.



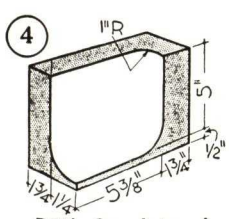
D55 Cove Bullnose End
D55H Same, 4" Length



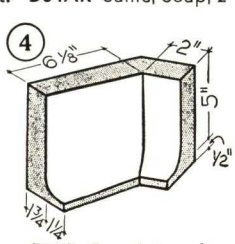
D56R Cove Octagon, Right



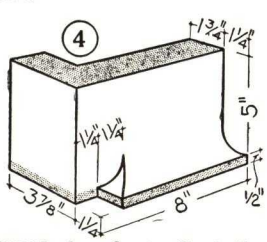
D57R Cove Internal Coped, Right



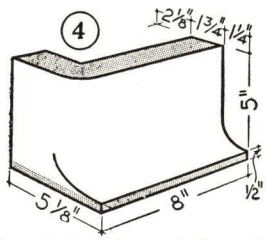
D58L Cove Internal Bullnose, Left



D59L Cove Internal Octagon, Left



D502R Cove Starter Quoin Rt.
D502AR Same, Soap thickness



D504R Cove Starter Bullnose Rt.
D504AR Same, Soap

See Accompanying Notes for Explanation of Class Symbols (S), Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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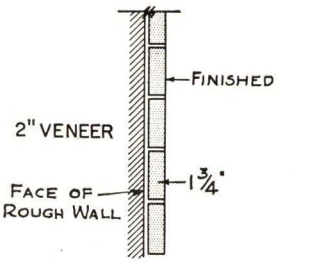
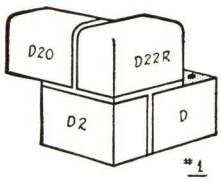
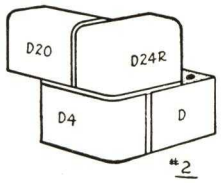
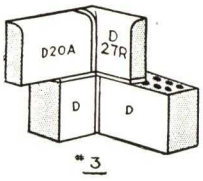
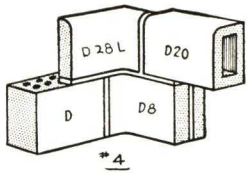
STRUCTURAL DETAILS—Refer to details by numbers

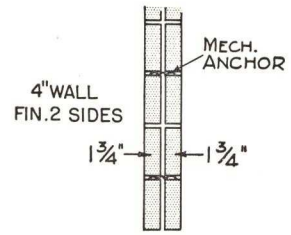


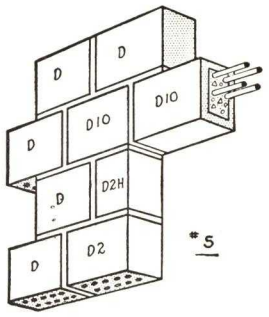


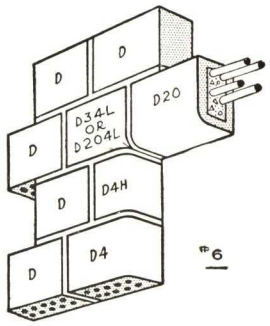


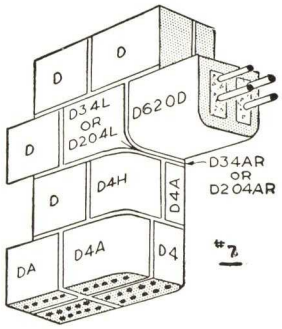


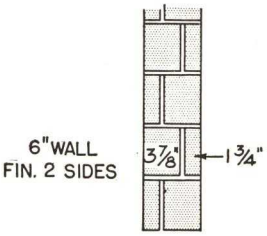


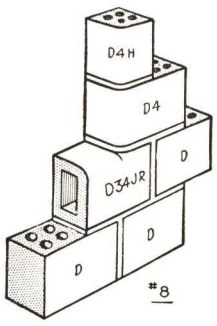


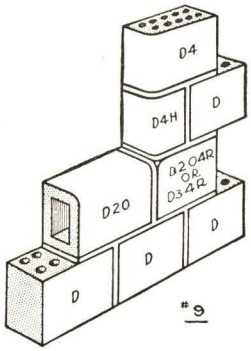


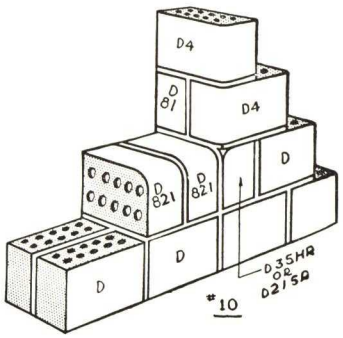


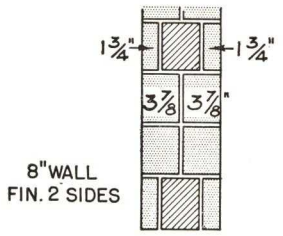


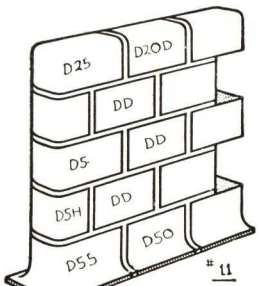


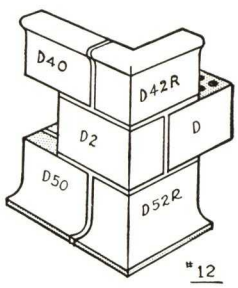


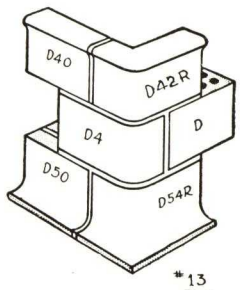


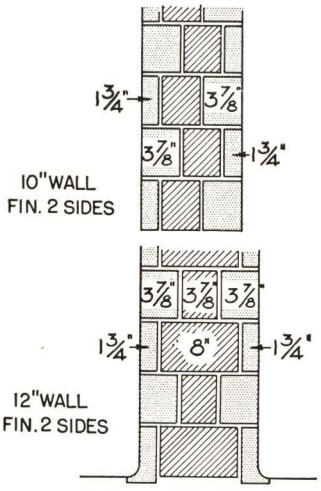




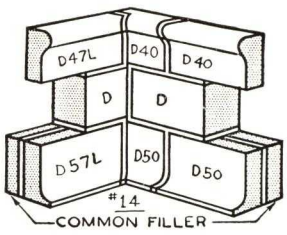


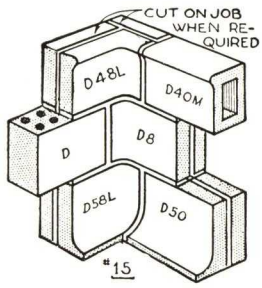


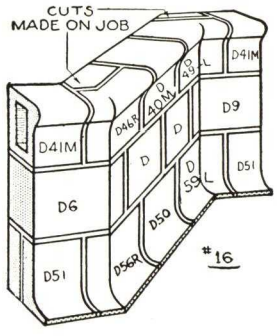




WALL SECTIONS SHOWING BONDING







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USE THE PRODUCT OF A RESPONSIBLE MEMBER

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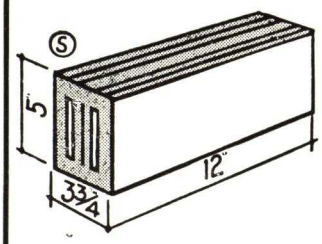
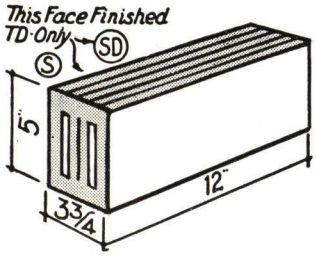
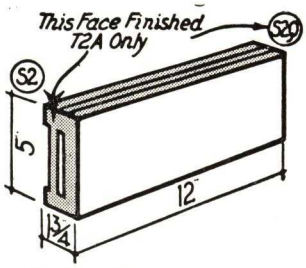


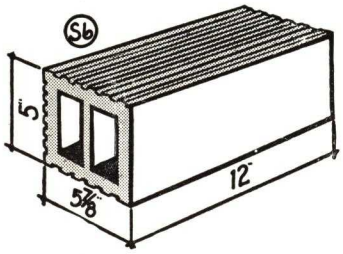
T Stretcher
T1 Stretcher 6" Length



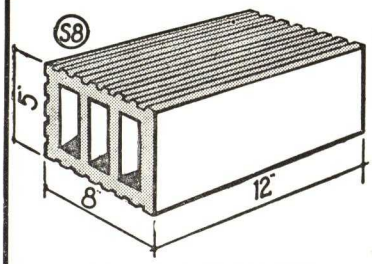
TSm Stretcher Smooth Back
TD Two Face Stretcher
TID Two Face, 6" Length



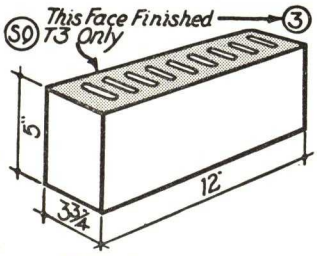
TA Soap Stretcher
T2A Soap Quoin 2" Return
T2AH, Same 6" Length



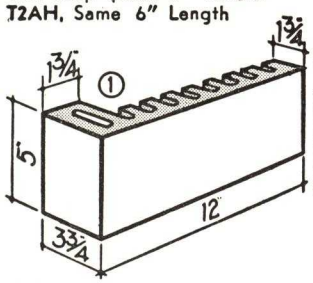
T60 6" Bonding Stretcher
T6I Same, 6" Length



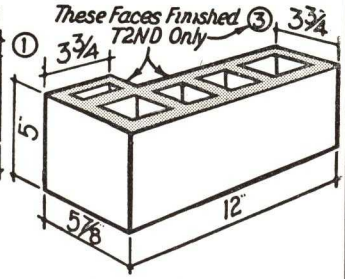
T80 8" Bonding Stretcher
T8I Same, 6" Length



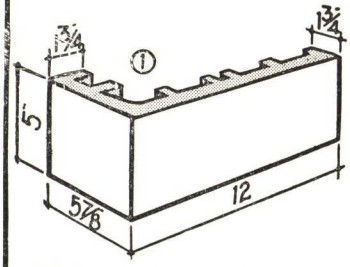
T2 Quoin
T2H Same, 6" Length
T3 Quoin End
T3H Same, 6" Length



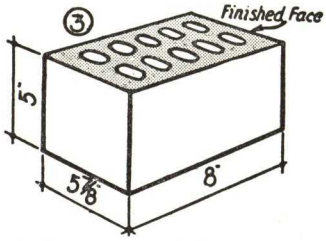
T2B Soap Bond Quoin 4" Return
T2BH Same 6" Length



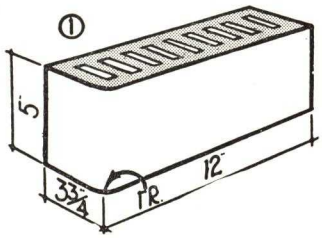
T2N Bond Quoin 6" Return
T2ND Same Two Face



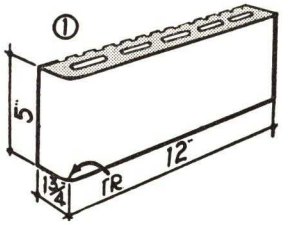
T2E Soap Bond Quoin 6" Return
T2EH Same, 6" Length



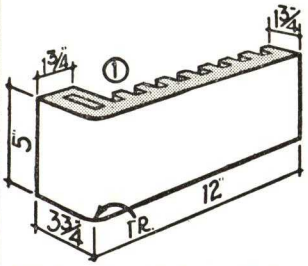
T83H 8" Quoin End 6" Length
(Double Quoin)



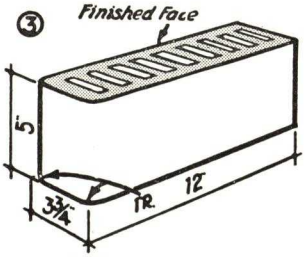
T4 Bullnose
T4H Same, 6" Length



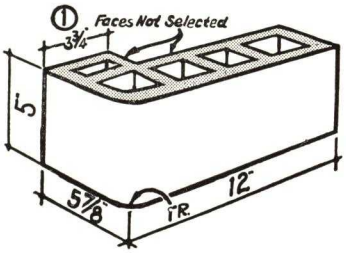
T4A Soap Bullnose 2" Return
T4AH Same, 6" Length



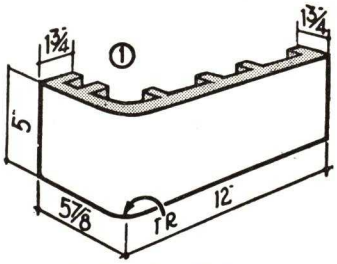
T4B Soap Bond Bullnose 4" Return
T4BH Same, 6" Length



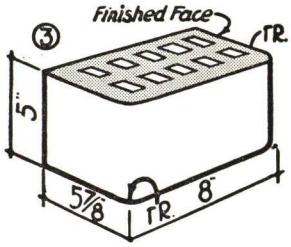
T5 Bullnose End
T5H Same, 6" Length



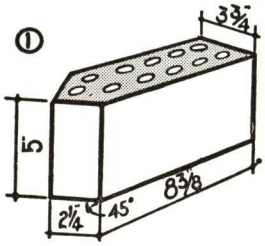
T4N Bond Bullnose
6" Return



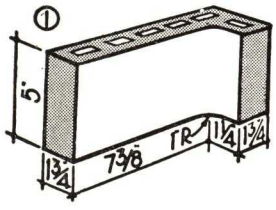
T4E Soap Bond Bullnose
6" Return
T4EH Same, 6" Length.



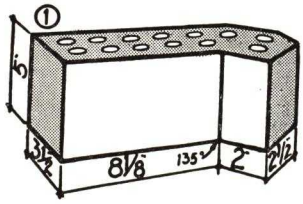
T85H 8" Bullnose End 6"
Length (Double Bullnose)



T6 External Octagon
T6A Same, Soap



T8 Internal Bullnose



T9 Internal Octagon
T9A Same, Soap

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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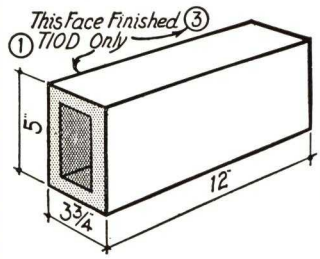
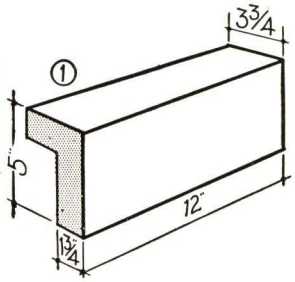
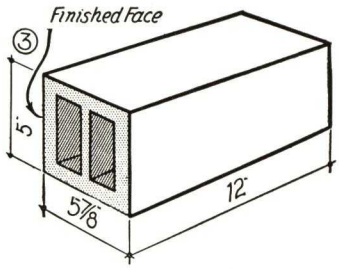


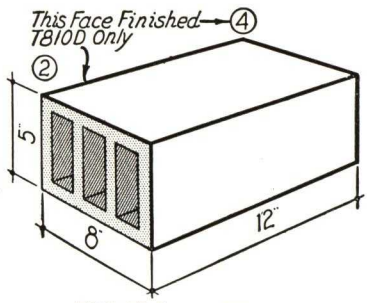
T10 Square Sill
T11 Same, 6" Length
T10D Square Coping



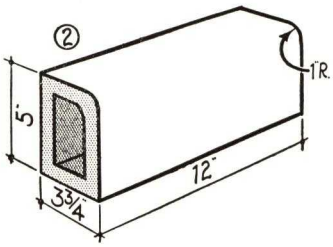
T10B Soap Square Sill
4" Reveal
T11B Same, 6" Length



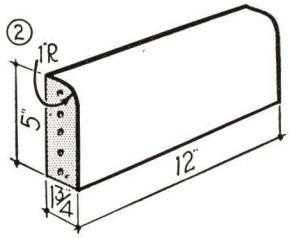
T610D 6" Square Coping
T611D Same, 6" Length



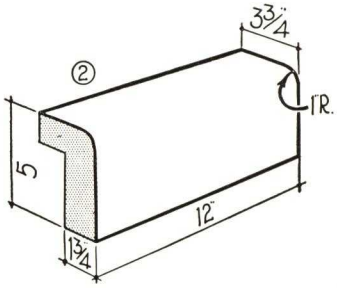
T810 8" Square Sill
T811 Same, 6" Length
T810D 8" Square Coping



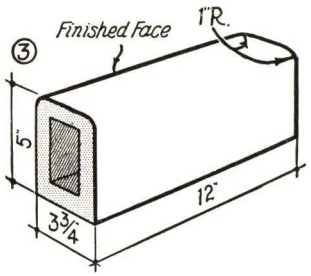
T20 Bullnose Sill
T21 Same, 6" Length



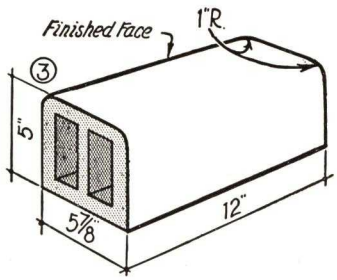
T20A Soap Bn. Sill 2" Reveal
T21A Same, Soap 6" Length



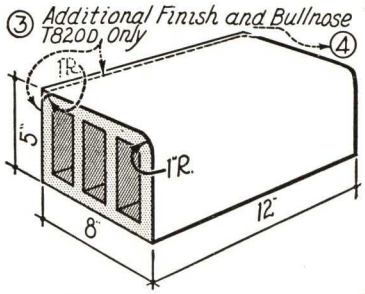
T20B Soap Bn. Sill 4" Reveal
T21B Same, 6" Length



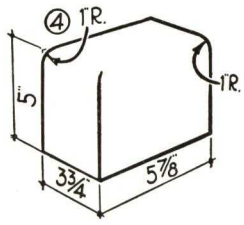
T20D Bullnose Coping
T21D Same, 6" Length



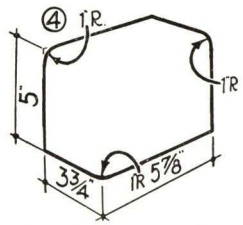
T620D 6" Bullnose Coping
T621D Same, 6" Length



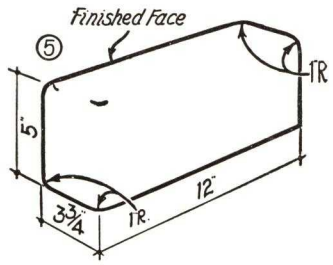
T820 8" Bullnose Sill
T821 Same, 6" Length
T820D 8" Bullnose Coping



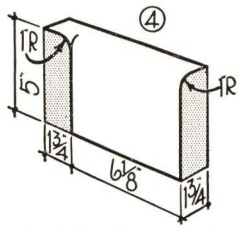
T22R Bn. Sill Quoin Right
T22AR Same, Soap 2" Return



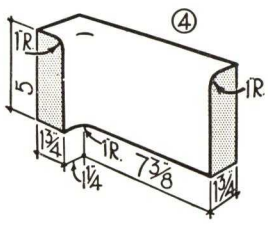
T24R Bn. Sill Bullnose Right
T24AR Same, Soap 2" Return



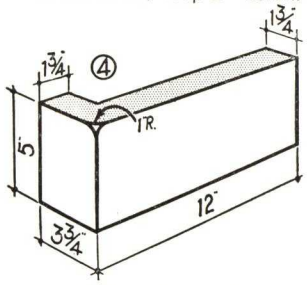
T25 Bn. Sill Bullnose End
T25H Same, 6" Length



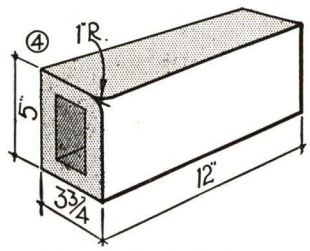
T27R Bn. Sill Internal
Square Right



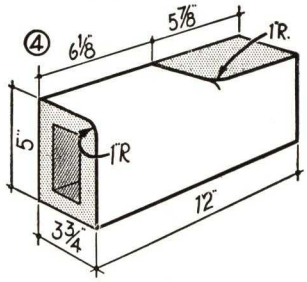
T28R Bn. Sill Internal
Bullnose Right



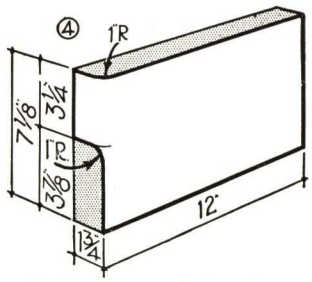
T204BR Soap Bn. Starter
4" Return Right
T204AR Same, 2" Return



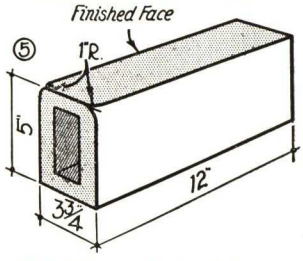
T34R Bullnose Mitre Right
T34AR Same Soap



T34JR Bullnose Sill & Jamb
Mitre Right



T34XR Bullnose Universal
Mitre Right



T35 Bullnose Coping Mitre
T35H Same, 6" Length

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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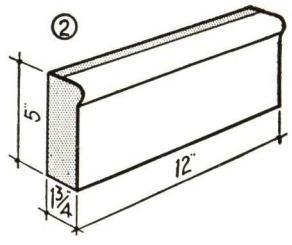
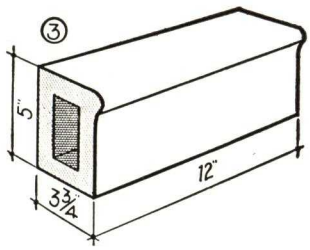
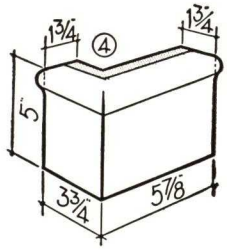


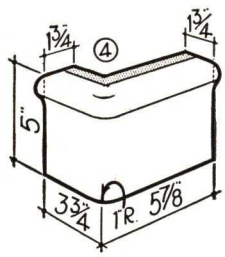
T40 Cap Stretcher 2" Reveal
T41 Same, 6" Length



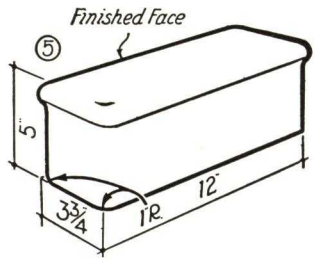
T40M Cap Stretcher 4" Reveal
T41M Same, 6" Length



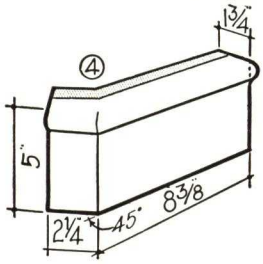
T42R Cap Quoin Right
T42AR Same, Soap 2"-Return



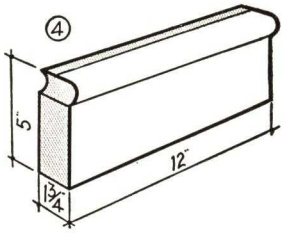
T44R Cap Bullnose Right
T44AR Same, Soap 2" Return



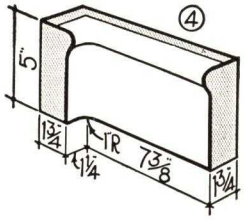
T45 Cap Bullnose End
T45H Same, 6" Length



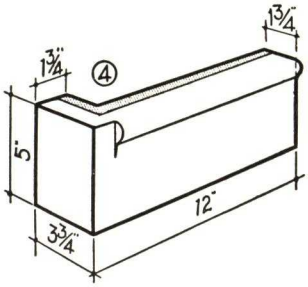
T46R Cap External Octagon Rt.
T49R Same Internal (Not Shown)



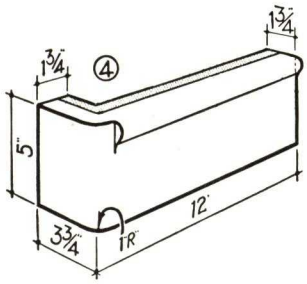
T47R Cap Internal Coped Right



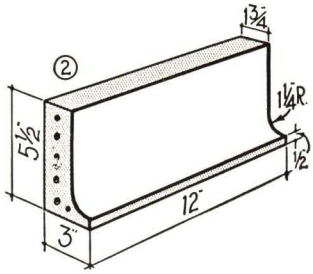
T48R Cap Int. Bullnose Right



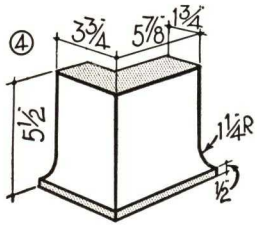
T402R Cap Starter Quoin Rt.
T402AR Same, Soap 2" Return



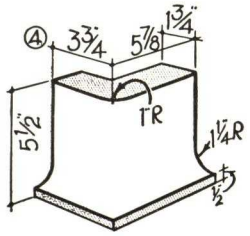
T404R Cap Starter Bullnose Rt.
T404AR Same, Soap 2" Return



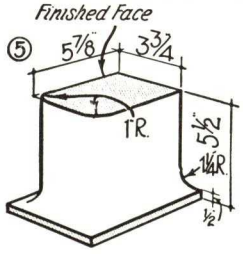
T50 Cove Stretcher
T51 Same, 6" Length



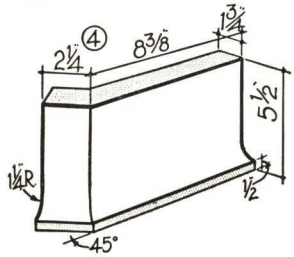
T52R Cove Quoin Right
T52AR Same, Soap 2" Return



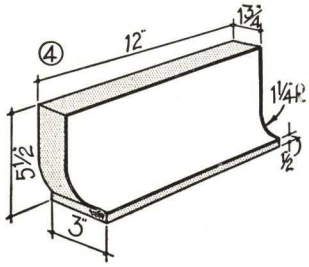
T54R Cove Bullnose Right
T54AR Same, Soap 2" Return



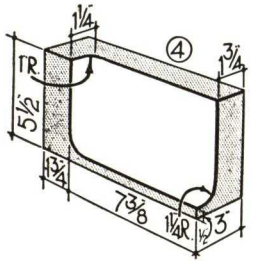
T55H Cove Bullnose End
6" Length



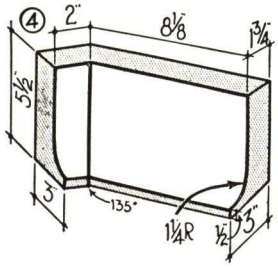
T56R Cove External Octagon Right



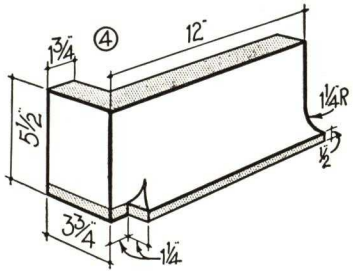
T57R Cove Internal Coped Right



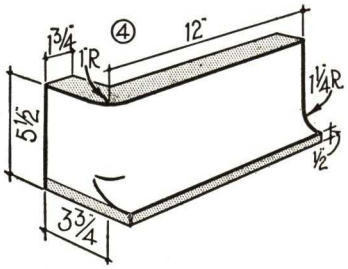
T58R Cove Internal Bullnose Right



T59R Cove Internal Octagon Right



T502R Cove Starter Quoin Rt.
T502AR Same, Soap 2" Return



T504R Cove Starter Bullnose Rt.
T504AR Same, Soap 2" Return

See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

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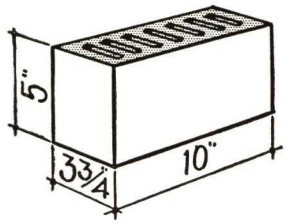
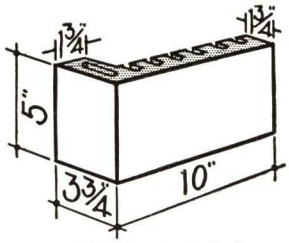
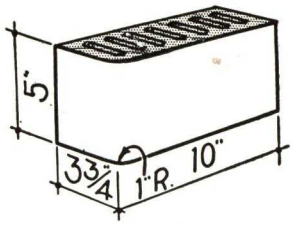


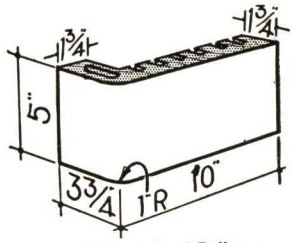
G2 Quoin



G2B Soap Bond Quoin
4" Return

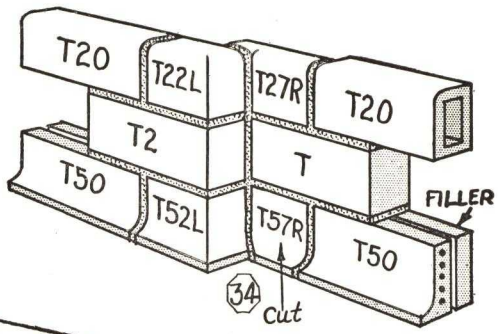


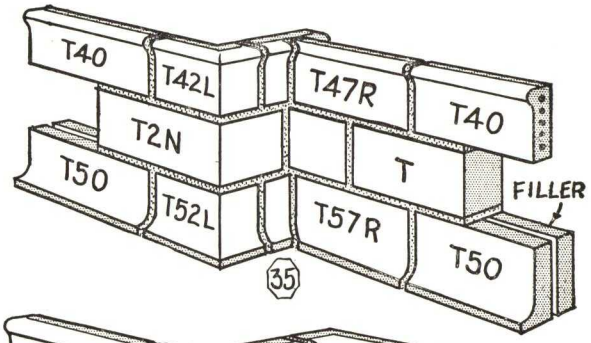
G4 Bullnose

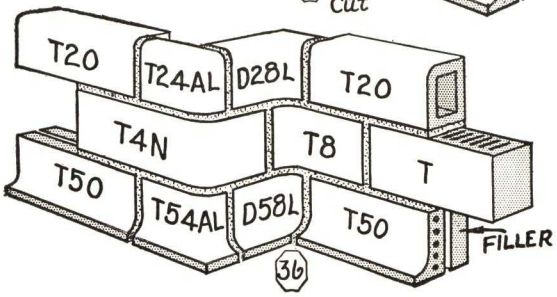


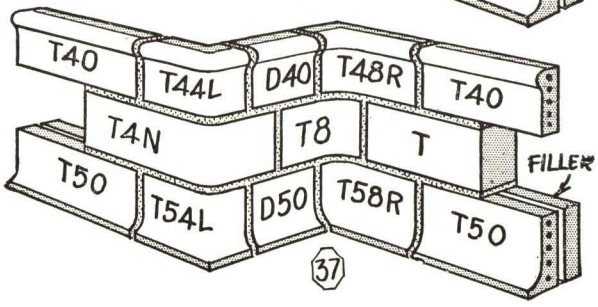
G4B Soap Bond Bullnose
4" Return

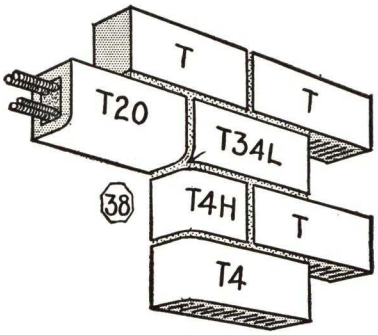
The Above Are Suggested As Substitutes for Closure Units T2N, T2E, T4N and T4E.

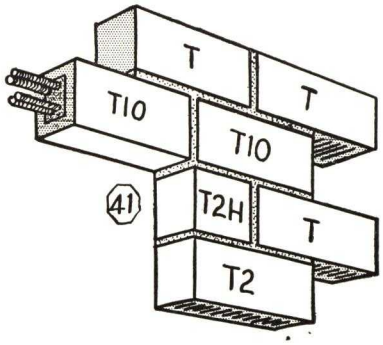


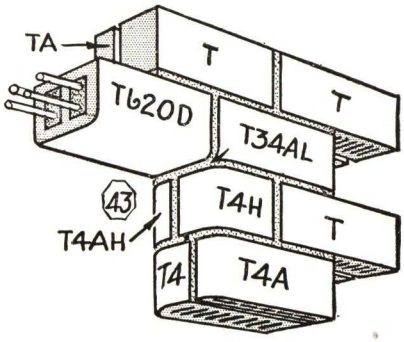


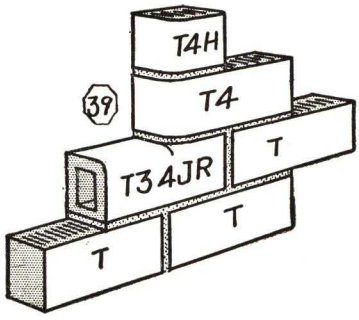


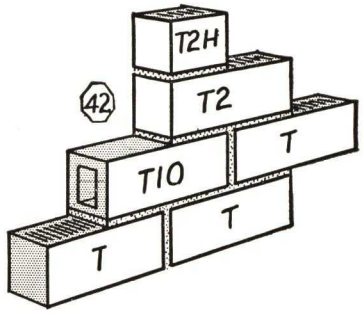


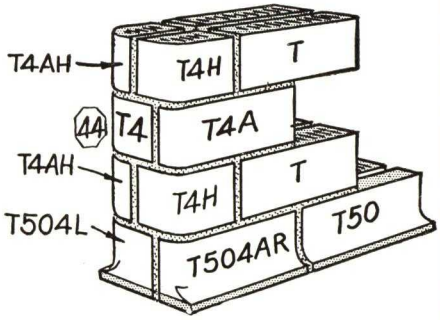












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NATIONAL SHAPE STANDARDIZATION

EXPLANATORY NOTES

SYMBOLS in circles or ovals shown in shape drawings indicate the Shape Group, determined by the amount of Special Shop Work required in manufacture and the average percentage of recovery from the kilns.

(S) Indicates Stretcher group with 4″ (3¾″ or 3⅞″) bed width.
(S2) Indicates soap stretcher group with 2″ (1¾″ or 1⅞″) bed width.
(S6) Indicates bonding stretcher group—6″ (5⅞″) bed width.
(S8) Indicates bonding stretcher group—8″ bed width.

(SQ) Indicates quoin or closure (Stretcher plus quoin differential).
(S2Q) Indicates soap quoin or closure (Soap stretcher plus quoin differential).
(SD) Indicates two face stretcher (Stretcher plus two face differential).

(1) Indicates Group I shapes—Bullnose, Octagon and Square Sills.
(2) Indicates Group II shapes—Caps, Coves and Bullnose Sills.
(3) Indicates Group III shapes—Lintels, Radials, and other double radial stretchers, additional two faced Group I and Group II shapes.
(4) Indicates Group IV shapes—Arch Units and Corner Fittings—hand-made.
(5) Indicates Group V shapes—Radial Fittings and Group IV shapes with additional finished faces.

6″ and 8″ bonding stretchers in Salt Glazed will take two face differential when ordered either glazed two face or smooth back.

RETURN indicates the depth (return) of the finished head or short face of a quoin (square closure) or bullnose (round closure).

REVEAL indicates the depth of the top face of a sill or cap or the bottom face of a lintel. Reveals shown shaded are not finished.

RIGHT OR LEFT HAND SHAPES shown are of course available in the opposite hand. When facing a shape and the long face is to the right, it is a right hand, and vice versa. (Suffix L is left and suffix R is right.)

SPECIAL LENGTHS. All lengths not shown are cut on the job by the contractor. Cuts should be made by carborundum or suitable abrasive wheel.

SCORED OR SMOOTH BACK UNITS. Stretchers may be shipped with scored back and/or end or smooth back and/or end or a mixture unless Stretcher Smooth Back is specifically ordered. On all other units surfaces not shown as "finished" may be smooth or scored at option of manufacturer.

CORING. Type and direction of coring is optional with manufacturer.

QUOINS. It is unnecessary to order quoins in salt glazed or clay coated units unless more than 20% of the total stretcher order is required in quoins.

BULLNOSE RADIUS. 1″ Radius Bullnose is standard. Any radius other than 1″ will take the next higher shape group.

ANGULAR SHAPES of odd size (other than 90° and 45°) are made on special order. They are Group III if plane surface; Group V if cove, cap or other irregular profile.

RADIALS. Radial stretchers (plane profile) are Group III shapes. Fittings for these are Group V. Made on special order only.

ARCH UNITS are Group IV shapes—made to special order only.

SPECIAL CAPS, COVES, ETC., having profile other than shown as standard are made to special order only. Such specials are classed in at least Shape Group next higher than that for similar standard shape.

DECORATIVE UNITS with stenciled patterns are available on special order.

SIZES shown are nominal. (See specification tolerances) Standardized units are furnished only in dimensions shown on detail sheets. 2″, 4″ and 6″ are (1¾″) (1⅞″) (3¾″) (3⅞″) (5⅞″).

STANDARD GRADING RULES FOR GLAZED BRICK AND TILE

FIRST QUALITY OR A-GRADE

Units of the highest structural and mechanical quality with shading consistent with the manufacturing process employed, and with the tolerances given below.

TOLERANCES FOR FIRST QUALITY OR A-GRADE

The variation from the standard dimensions of glazed units shall not exceed the maximums shown below, nor shall the variation on any job exceed these maximums:

Where the length of unit is:	8″	12″	16″	
Variation in dimension shall not exceed:	1/8″	3/16″	1/4″	
Where height of unit is:	2¼″	5″	8″	
Variation in dimension shall not exceed:	1/16″	3/32″	1/8″	
Where depth of unit is:	1¾″	3⅞″	5⅞″	8″
Variation in dimension shall not exceed:	3/16″	3/16″	3/16″	1/4″

Dimensions intermediate to those shown, shall have tolerances of next larger dimension.

DISTORTION FROM PLANE OR EDGE OF FACE OF FIRST QUALITY OR A-GRADE UNITS

The maximum tolerance for distortion of the plane and/or the edge of the face of A-Grade glazed units shall be:

1-Brick Equivalent size	(17 to 19 sq. in.)	3/64″
1½ and 2-Brick Equivalent size	(20 to 41 sq. in.)	1/16″
2½ and 3-Brick Equivalent size	(42 to 63 sq. in.)	3/16″
6½-Brick Equivalent size	(117 to 129 sq. in.)	1/4″
Larger sizes		5/16″

and only a reasonable percentage of all units shall approach the maximum.

Note: When units which are either concave or convex are laid upon a plane surface, the apparent variation is greater than the actual variation from the plane of the unit.

SECOND QUALITY OR B-GRADE

Units imperfect mechanically and/or beyond the maximum tolerances for A-Grade, and/or slightly chipped and with shade variation, and with glaze or coating defects.

THIRD QUALITY OR C-GRADE

Merchantable units having pronounced mechanical or glaze imperfections and/or noticeably chipped and with substantial shade variation.

FOURTH QUALITY OR D-GRADE

Units which will not meet the specifications of the above grades, and which are sold for uses similar to those of common brick.

STANDARD SPECIFICATIONS FOR GLAZED BRICK AND TILE

1. DESCRIPTION

Structural Glazed Ware for the walls of (Schedule of rooms) shall be of First Quality (Salt Glazed) or (Ceramic Glazed) Structural Glazed Units made on a *fireclay body.* The field units shall be (State color and shade No.) with units for (Cove Course, Cap Course, Trim, Borders, Panels, Etc.) and shall conform to the samples submitted and approved for this operation. The plans show the general scheme of decorative treatment and indicate where the colors are to be used.

2. SIZES AND SHAPES

Units shall be (State Face Dimensions) in face size and 1¾″, 3⅞″, 5⅞″ or 8″ in thickness as shown on the plans. All necessary shapes shall be furnished as required. In general, all external corners, sills, jambs and lintels shall be bullnosed. At the floor there shall be a base (with or without cove) in Shade (Contrasting to or the same as) the shade used in the field. (If a cap course is desired, state type and shade). (If header or bonding courses are to be used, so state). All two face walls or partitions shall be built of two single face units bonded.

3. QUALITY

All units shall be of the highest structural and mechanical quality with shading consistent with manufacturing processes and samples approved. All units shall be reasonably straight and true with finished faces free from chips, crazes, blisters, crawling and other imperfections noticeable *at a distance of 5 feet.* All units shall conform to Standard Grading Rules of Glazed Brick and Tile Institute on page 25.

4. FINISH

All surfaces that will be exposed when the units are laid in the wall, shall be finished with a uniform glaze which shall cover all exposed surfaces thoroughly.

4a. The glaze of a ceramic unit shall be:

a. Matt—(non-reflecting)
b. Satin
c. Glossy—(Lustrous—image reflecting)

4b. The glaze of ceramic glazed units or the finish of a clay coated unit shall be applied prior to final burning and shall be made permanent and vitreous by burning.

4c. The glaze of salt glazed units shall be produced by introducing salt into the fire during the burning process.

4d. Salt glazed products shall not be used where ceramic glazed is specified.

4e. Clay coated shall not be used where ceramic glazed is specified.

4f. Facing Tile shall not be used where glazed or coated products are specified.

5. CORING

All units may be either solid or cored up to 45% of the gross sectional area. When specified for use in Post Office workrooms or places where walls are unprotected against continuous heavy impact, units shall not be cored to exceed 25%.

6. STRENGTH

When used for load-bearing purposes, all units shall have a crushing strength of not less than 2500 pounds per square inch of gross bearing area.

USE THE PRODUCT OF A RESPONSIBLE MEMBER

7. TESTS

The following tests may be made on ceramic glazes:

7a. CRAZING, SPALLING, PEELING AND CRACKING: A definitely controlled and recorded steam autoclave test shall be made as follows: Three units carefully marked for identification shall be tested. They shall be thoroughly dry and then placed in an autoclave and the steam pressure started and slowly brought up to between 25 and 30 pounds pressure in thirty minutes, the pressure then increased gradually to between 65 and 75 pounds in the next fifteen minutes, then increased gradually to 150 pounds in not less than fifteen minutes. The pressure shall then be held at 150 pounds, plus or minus 5 pounds, for a period of one hour. The pressure shall then be released by a gradual opening of the autoclave to allow a gradual cooling over a period of not less than thirty minutes, to room or hand-handling temperature. The brick shall then be removed and examined. Ink shall then be applied to the finish and allowed to stand for five minutes, the surface washed with a wet cloth and running water and any development of crazing, spalling, peeling or cracking may be cause for rejection.

7b. IMPERVIOUSNESS: Liquid ink or Methylene blue shall be applied liberally to the finish, and allowed to stand for five minutes. The surface shall then be washed with a wet cloth and running water, and examined. If any trace of the ink or Methylene blue shall remain, it may be cause for rejection.

7c. OPACITY OF FINISH: If opacity of the finish of the glazed face is required it may be tested by applying ink or Methylene blue to the body of the burned product close to the finished surface. It may be grounds for rejection if, after five minutes, there is any visible indication of penetration of the coating by the liquid when viewed through the glazed surface.

7d. ACID RESISTANCE: A portion of the finished surface of one or more units shall be submerged in a 10% solution of hydrochloric acid for three hours, cleaned and examined. The color and/or luster of the finish shall not be altered by this treatment.

7e. SALT GLAZES: Salt glazes shall have a smooth, lustrous, light-reflecting surface, resistant to the acid test for Ceramic Glazes and resistant to pencil and crayon marks.

7f. CLAY COATED: This shall have a dull non-reflecting coating which will resist ink stains.

7g. FACING TILE: This shall be a "face brick" finish devoid of coating and subject to the same size and structural tolerances as glazed ware.

8. ABSORPTION OF BODY: When the units are intended for use where exposed to frost action, the absorption of the body of the unit by 24-hr. submersion in cold water shall not exceed 14 per cent, and in addition the units shall conform to at least one of the following requirements for absorption:

(a) The absorption by 24-hour submersion in cold water shall not exceed 7 per cent.

(b) The ratio of the absorption by 24-hour submersion in water to the absorption by 5-hour submersion in boiling water shall not exceed 0.80.

CHART OF STANDARD FINISHES AND COLORS

FINISHES

CERAMIC GLAZES: Glossy—Satin—Matt

SALT GLAZES: Gloss Finish

COLORS

Salt Glazes	Ceramic Glazes	
	Light Shades	Trim Shades
Ranges of: Grey Shades Cream Shades Light Buff Shades Medium and Dark Buff Shades	White Cream Ivory Buff Tan Grey Various Light Speckles Stipples of the above colors Mottles of two or more of the above light colors Mottles of light and trim colors, predominatingly of light colors.	Black Browns Blues Greens Yellow Stipples or mottles of the above dark colors Mottles of trim and light colors predominatingly dark

Special Colors are available by special arrangement with various manufacturers

MEMBER COMPANIES

Arketex Ceramic Corporation	Brazil, Indiana
Ayer-McCarel-Regan Clay Company	Brazil, Indiana
Cambria Clay Products Company	Blackfork, Ohio
The Claycraft Company	Columbus, Ohio
Continental Clay Products Company	Kittaning, Pa.
Hanley Company	101 Park Ave., New York, N. Y.
Hydraulic Press Brick Company	Indianapolis, Ind.
The Mapleton Clay Products Company	Canton, Ohio
National Fireproofing Company	Pittsburgh, Pa.
The Stark Brick Company	Canton, Ohio

GLAZED BRICK & TILE INSTITUTE

Affiliated with

STRUCTURAL CLAY PRODUCTS, INC.

1427 EYE ST., N.W. • WASHINGTON, D. C.

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HYDRAULIC-PRESS BRICK COMPANY

Manufacturers and Distributors of Hy-tex Brick

ST. LOUIS, MO.

BRANCH OFFICES, EXHIBIT ROOMS AND DISTRIBUTING CENTERS

CHICAGO, ILL., Builders' Building
DAVENPORT, IOWA, Putnam Building
DUBOIS, PA., Deposit National Bank Building
INDIANAPOLIS, IND., Board of Trade Building
KANSAS CITY, MO., 56th and Lister Streets
NEW YORK, N. Y., 295 Madison Avenue
PEORIA, ILL., Lehmann Building
PHILADELPHIA, PA., Otis Building
ROSEVILLE, OHIO
SOUTH PARK, OHIO
WASHINGTON, D. C., Colorado Building

REPRESENTATIVES

NEW YORK, N. Y., Fredenburg & Lounsbury, Architects Building, 101 Park Avenue

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES

Member of Glazed Brick and Tile Institute

Hy-tex Products

Hy-tex

A complete line of Face Brick; Enamel Brick; Ceramic Glaze Brick; Equitable Brick; Salt Glaze Brick; Common Brick; Paving Brick; Hollow Building Tile; and Swimming Pool Linings. Also Haydite, the ideal lightweight aggregate for concrete and Lightweight Haydite Building Units.

Company and Service

The Hydraulic-Press Brick Company has been specializing in the manufacture of Face Brick for over a half century.

With modern plants located in seven great clay producing states and in close proximity to the principal markets, its facilities are adequate to handle operations of any kind.

Process

In the manufacture of Hy-tex Brick, both the "Dry Press" and "Stiff Mud" processes of manufacture are used.

Hy-tex Dry Press Brick are made under a forty-ton hydraulic pressure on machines of the Company's own invention, and, after burning, have an absorption low enough to prevent penetration, yet sufficient to guarantee a perfect bond between brick and mortar joint.

Hy-tex Stiff Mud Brick are semi-vitreous, and practically impervious to moisture.

Face Brick

Hy-tex Face Brick are produced in a great variety of soft, natural color tones, ranging through Reds, Browns, Blacks, Buffs, Tans and Grays. They are obtainable in uniform shades, or in combination of various color ranges, in smooth, semi-smooth and sand struck finishes, or in a number of distinctive rough textures.

Literature

Booklets on Hy-tex Enamel and Polychromatic Decoration; Hy-tex Equitables; Hy-tex Ceramic and Salt Glaze Brick; Hy-tex Swimming Pools; Bonds and Mortars in the Wall of Brick; Brick Scales and Tables; and other material. Apply to nearest branch office.

ENAMEL, CERAMIC AND SALT GLAZE PRODUCTS

Hy-tex Enamel Brick

A genuine hand dipped Enamel brick manufactured by the two-burn process on a dry press fire clay bisque. Standard colors are White, Cream, Ivory, Green, Jade, Blue, Brown, Black, Yellow, Red and Transparent Speckled Buff. Manufactured in standard on edge (8x2¼x3⅞ in.) and standard on flat (8x3⅞x2¼ in.) size units.

Hy-tex Ceramic Glazes

A bright, satin-like, vitreous glaze product of the highest quality, produced in smooth and stippled textures, in "S" series standard size (8x2¼x3⅞ in.) and "D" series—"Two Brick Equivalent" (8x5x3⅞ in.) units. Standard shades are as follows:

Light Shades

Shade No. 356 White
Shade No. 594 Cream
Shade No. 845 Gray, Light
Shade No. 915 Cream Grays
Shade No. 1040 White Stipple
Shade No. 1049 Cream Buff Stipple

Trim Shades

Shade No. 661 Jade Green
Shade No. 742 Apple Green
Shade No. 747 Apple Green Stipple
Shade No. 603 Royal Blue
Shade No. 662 Black
Shade No. 667 Black Ripple
Shade No. 1176 Chocolate

Hy-tex Equitable Brick

A dull, china glazed brick, devoid of gloss, made in White and White Speckled shades. These bricks were originally developed for use in the Equitable Life Insurance Building, New York, and have since been used in many large projects, including the Chrysler Building and the New York Hospital-Cornell College Association Group of New York.

Hy-tex Salt Glazes

A transparent salt glaze burned into the exposed surfaces. Manufactured in Gray-tones, Buff-tones, and Golden Brown shades, in "S" series standard size (8x2¼x3⅞ in.) and "D" series—Two Brick Equivalent (8x5x3⅞ in.) units. Standard shades are as follows:

Shade No. 72 Gray-tone
Shade No. 73 Buff-tone
Shade No. 752 Light Brown
Shade No. 753 Medium Brown
Shade No. 754 Dark Brown

Hy-tex Molded Shapes

Refer to standardized shapes of the Glazed Brick and Tile Institute, of which we are members. For catalog see File Index. Exception—Radius on Hy-tex Enamel Brick is 1½ in.

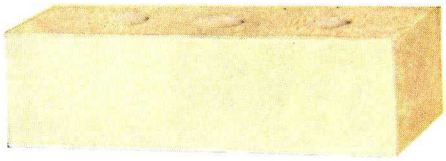
Hy-tex Swimming Pools

The fitness of Hy-tex Enamel and Ceramic Glaze Brick for pool linings is at once obvious. Their durable and beautiful surface, which will not peel or discolor, admits of perfect cleansing with a minimum of labor.

HYDRAULIC-PRESS BRICK COMPANY

Gray-tone Salt Glaze No. 72

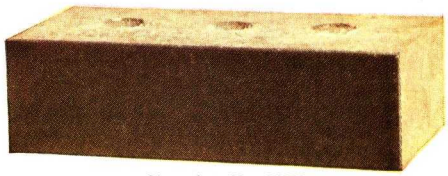
Buff-tone Salt Glaze No. 73



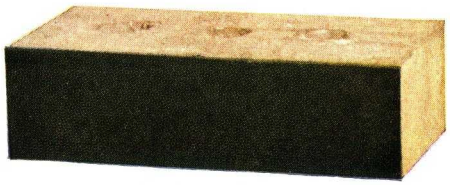
Cream No. 594

White No. 356

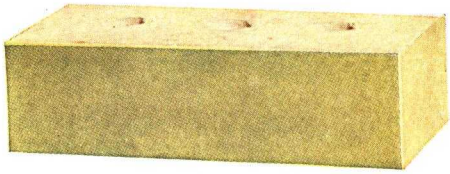
Equitable No. 120



Chocolate No. 1176



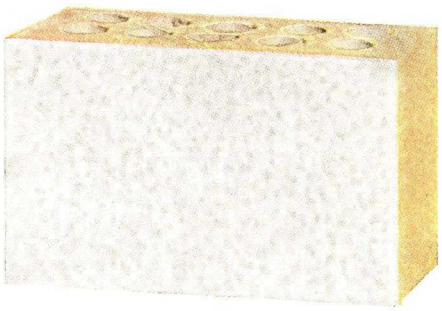
Jade Green No. 661



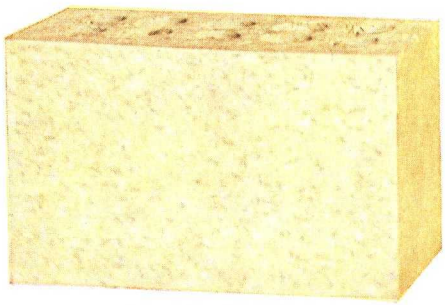
Apple Green No. 742

Blue No. 603

Black No. 662



White Stipple No. 1040



Cream Stipple No.1049

A Complete Line of Smooth, Ripple and Stipple Applications

Write for Samples

GLAZED WARE PLANTS

St. Louis, Mo. Sparland, Ill. Brazil, Ind. Cowan, Pa. Reynoldsville, Pa. Winslow Junction, N. J.

For Moulded Shape information see catalog of Glazed Brick and Tile Institute as listed in File Index.

4/40

NATCO

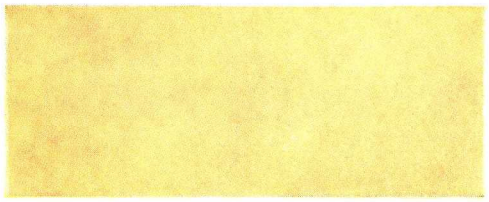
STRUCTURAL FACING TILE

SINCE 1889

NATIONAL FIREPROOFING CORPORATION

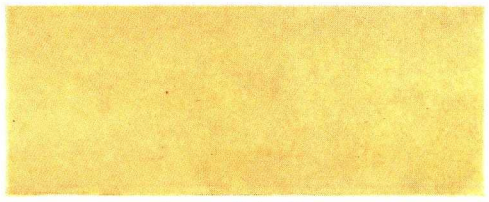
NATCO CERAMIC GLAZE COLORS

(See paragraph headed "Color Reproductions")

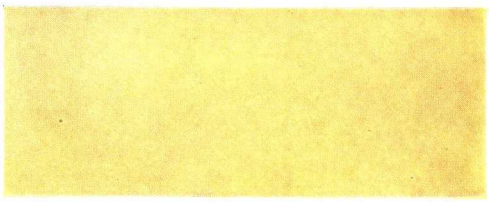


2040—Solid Cream Tones

3040—Ivory



2060—Solid Buff



6100—Gray Tan

The color reproductions shown on this page, illustrate shades for which the building industry has expressed a decided preference. In addition, we have other shades, recently developed in line with changing architectural demands throughout the country.

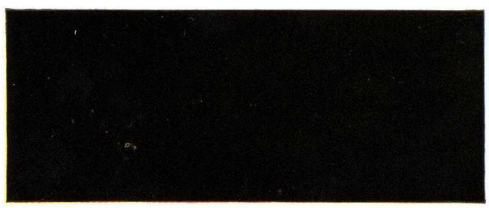
1760—Dark Green

Full information on these additional shades will be furnished on request.

1800—Navy Blue

90—Dark Brown or Chocolate

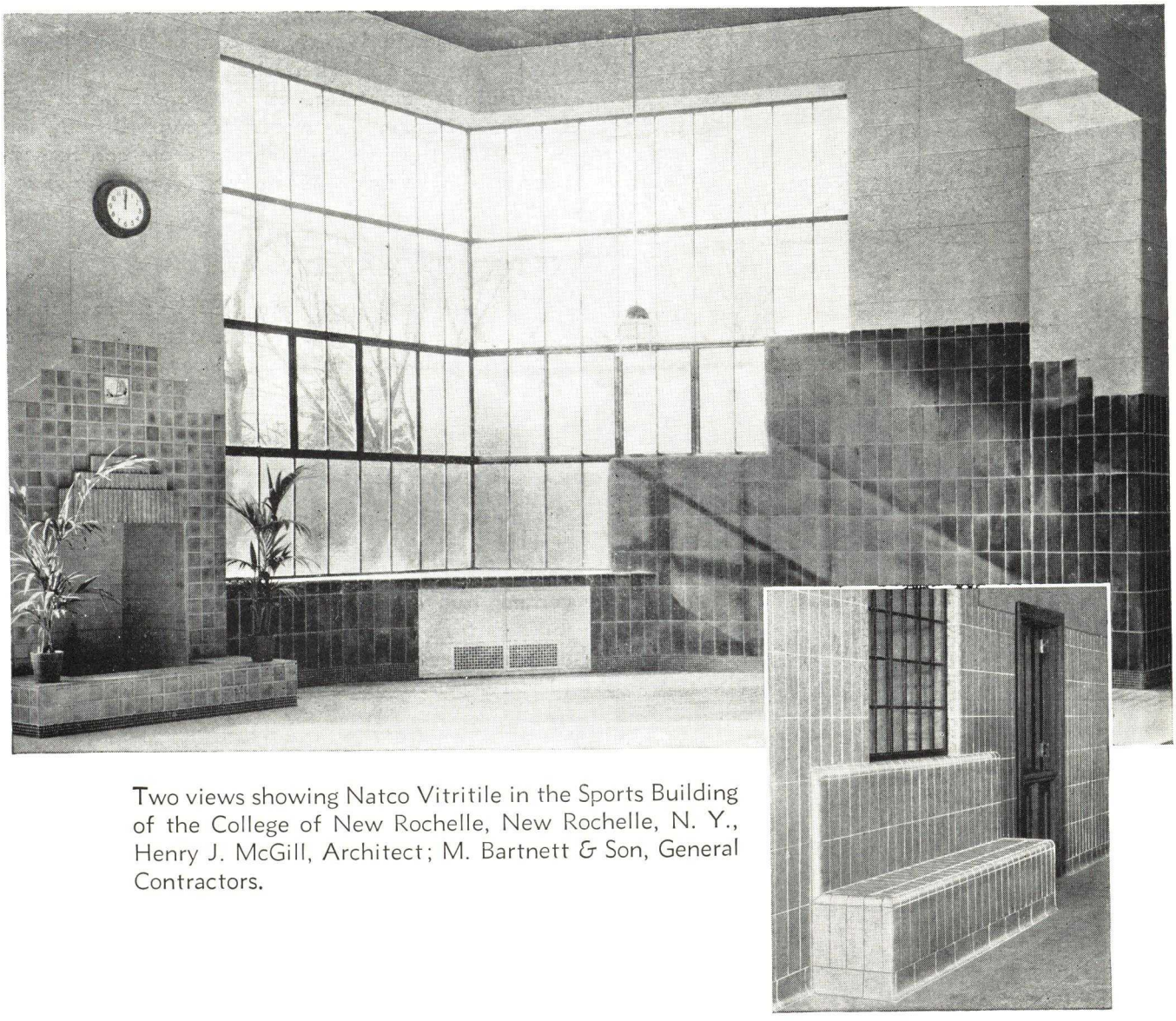
Also
5200—Glossy White



6500—Glossy Black

FOR NATCO CERAMIC GLAZE MOTTLES
SEE INSIDE BACK COVER

NATCO STRUCTURAL FACING TILE



Two views showing Natco Vitritile in the Sports Building of the College of New Rochelle, New Rochelle, N. Y., Henry J. McGill, Architect; M. Bartnett & Son, General Contractors.

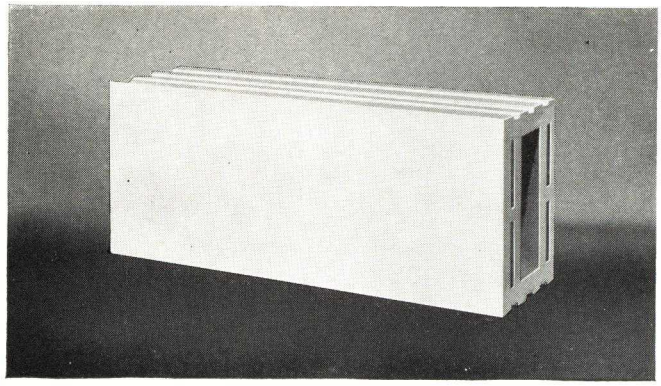
For Walls of Enduring Beauty

DUE to its pleasing appearance, sanitary qualities, ease of cleaning, insulation advantages, as well as savings in erection and maintenance costs, Natco Structural Facing Tile is receiving increased preference from architects for walls, partitions and wainscots in public, institutional, commercial and industrial buildings of every type and kind. It readily adapts itself to strikingly modern as well as conservative decorative wall treatments.

All of the different types illustrated and described are made of selected fire clay, cured and burned under the direction of experienced ceramic engineers. The new deairing process is used in its manufacture. This removes all entrapped air from the clay before it is formed into shape, eliminates surface imperfections and promotes true and even edges.

The ceramic glazes used are of the highest quality. They are high fired, that is burned at temperatures of 1800 to 2000 degrees Fahrenheit. As shown on the inside front and back covers, they comprise attractive matt and glossy effects in solid colors as well as mottles. The salt glazes, as shown at the bottom of the inside back cover, are furnished in mingled light shades. The mingled tones in both the ceramic and salt glazes produce wall surfaces with much more character than uninteresting, uniform shades.

These colors and shades will not fade. Life expectancy tests, by the auto-clave method, accurately simulate the wear and tear of years of exposure. Applied to Natco Structural Facing Tile, they confirm, what has already been proved in thousands of actual installations, that Natco glazes positively will endure.



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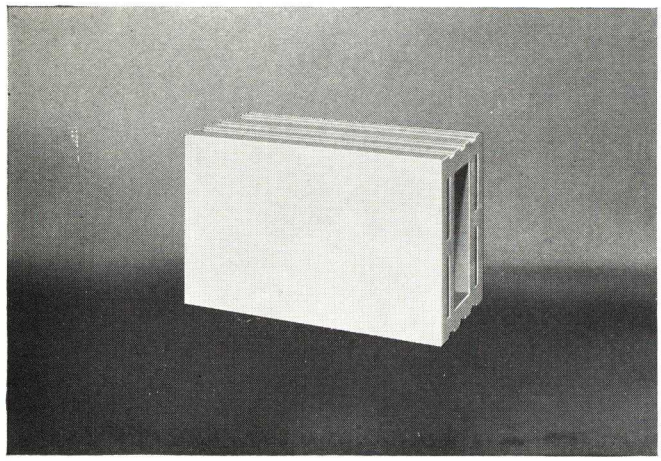

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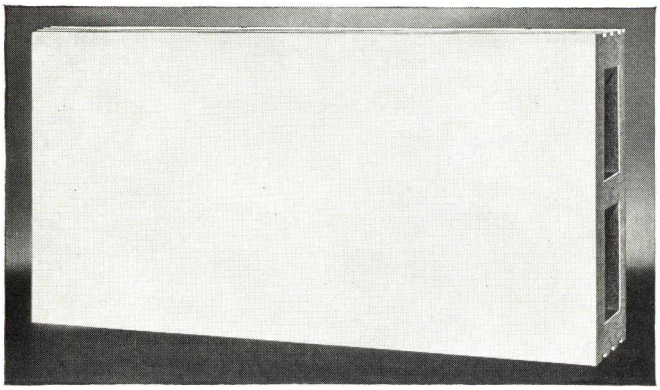

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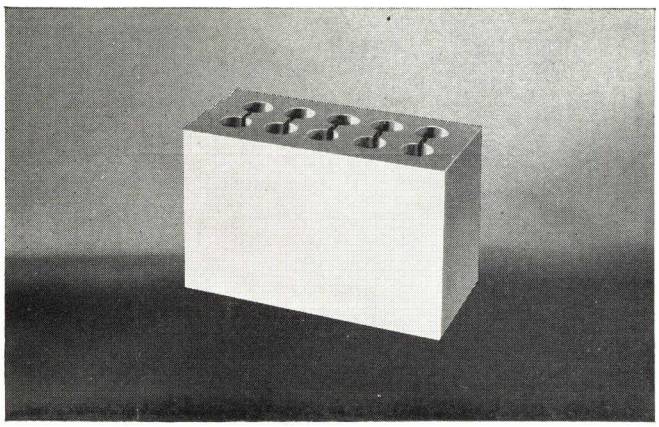
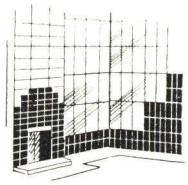


NATCO VITRITILE



"V" Series—5x12-inch face (equivalent to 3 standard brick). Double shell construction. Furnished in ceramic and salt glazes. For 3¾, 6 and 8-inch wall thickness; also in 1⅞-inch for furring. Usually furnished select one face; on special order can be supplied select two faces. See pages 6 and 7 for shape details.

NATCO UNGLAZED

"U" Series—5 x 12-inch face. Specifications as to sizes and shapes same as Vitritile, other than no cove base and wainscot caps are furnished.

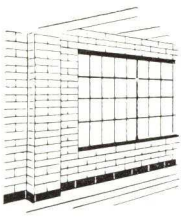
NATCO DECORATA

"N" Series—5 x 8-inch face (equivalent to 2 standard brick). Double shell construction. Furnished in ceramic and salt glazes. For 3¾, 6 and 8-inch wall thickness; also in 1⅞-inch for furring. Usually furnished select one face; on special order can be supplied select two faces. See page 9 for shape details.

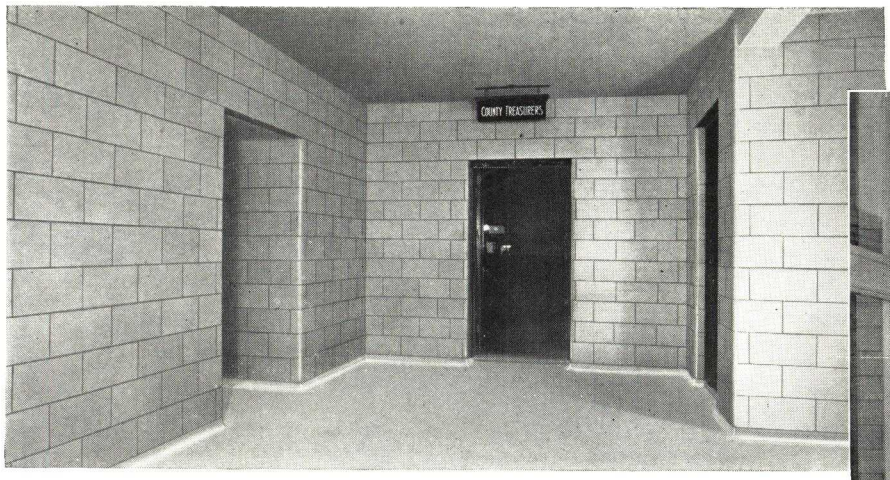
NATCO DECORATA

"W" Series—8 x 16-inch face (equivalent to 6 standard brick). Furnished in ceramic glazes only, for 3¾-inch wall thickness; also 1⅞-inch for furring. Natco Decorata "W" Series is furnished select one face only. See pages 10 and 11 for shape details.

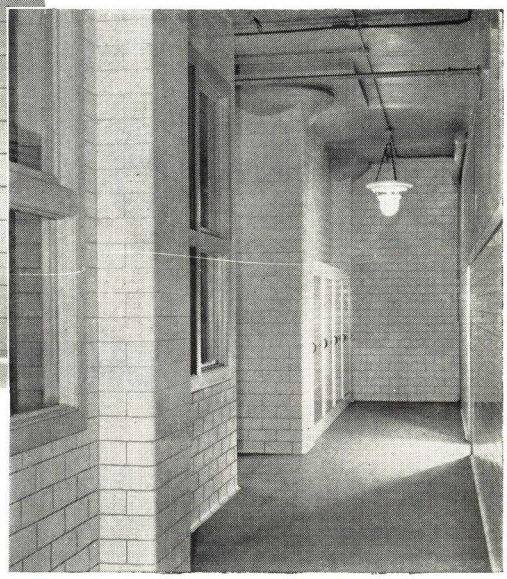
NATCO VITRIBRIK



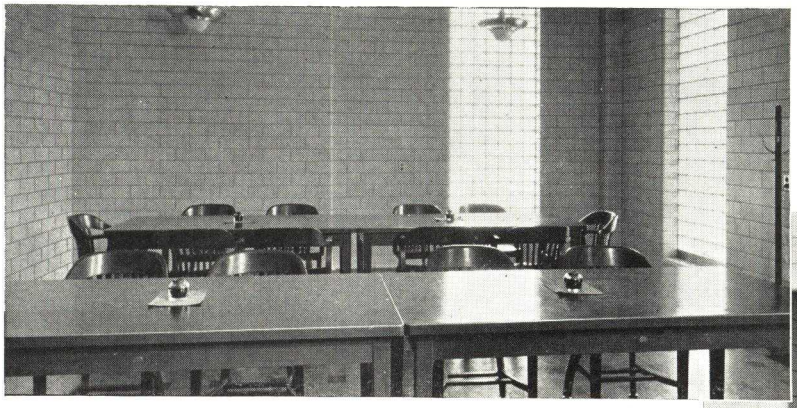
"K" Series—5 x 8-inch face (equivalent to 2 standard brick). Vertical construction. Furnished in ceramic and salt glazes. For 3¾, 6 and 8-inch wall thickness; also in 1⅞-inch for furring. Usually furnished select one face; on special order can be supplied select two faces. See page 13 for shape details.



Above—View showing Natco Decorata Tile, "W" Series in the corridor of the Wayne County Building, Detroit. Nathaniel O. Gould, Architect and Engineer, Board of Wayne County Auditors; Russell Hunt, Supt., Contractors.



Above—Natco Vitritile in Armour Pharmaceutical Laboratory, Chicago. Armour & Company, Architect and Engineer; Claes A. Erlandson, Contractor, Chicago.



Above and Right—Office and corridor in Scranton Electric Company Building, Scranton, Pa., Natco Vitritile was extensively used throughout. Davis & Lewis, Architects, Breig Brothers, Contractors.

WITH walls of Natco Structural Facing Tile, there is an assurance of freedom from future maintenance, painting, plastering or repair bills. The glass-hard surfaces are easily cleaned and kept clean—are not affected by heat, cold, dampness, grease or chemicals.

Scientifically designed to offer maximum strength with minimum weight, Natco Structural Facing Tile are all true load-bearing units which effect savings in dead load, with consequent reductions in steel and foundation costs. Proof against fire, the large, comparatively light units are also quickly handled and laid. With each tile laid, a portion of the finished wall is put in place.

Used for veneering or furring purposes, Natco Structural Facing Tile has also proved its economy and enduring attractiveness in thousands of representative buildings throughout the country.

The double shell construction assures secure mortar joints—combined with the cellular construction, with its enclosed air spaces, resists the passage of heat, cold, sound and moisture going through the walls.

Natco Unglazed Structural Facing Tile is generally used where walls of lower cost are desired. Similar in structure to Natco Vitritile, it is furnished in unfading, light mingled buff shades which are the natural colors of burned clay.

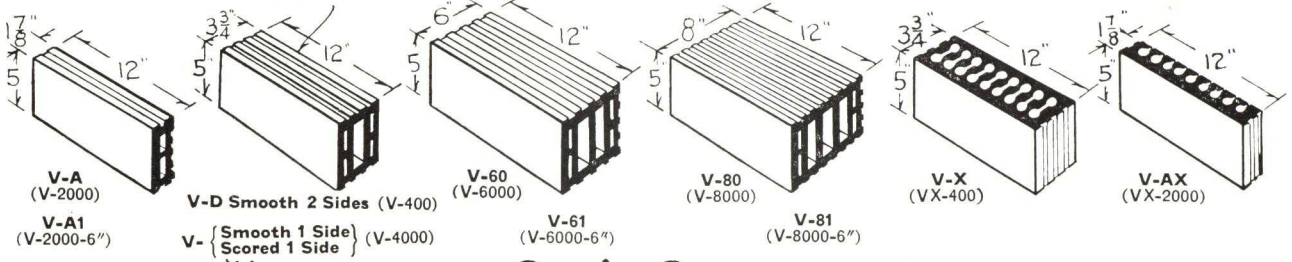
In the following pages, we show the comprehensive lines of shapes available in every type of Natco Structural Facing Tile, that make possible the widest latitude in structural design. Estimates of the cost of Natco Structural Facing Tile will be gladly furnished on any job. Also, on any specific application, if desired, our Engineering Department will be pleased to co-operate in working out the most efficient and economical use of Natco Structural Facing Tile.

SHAPE DETAILS, NATCO VITRITILE, "V" SERIES

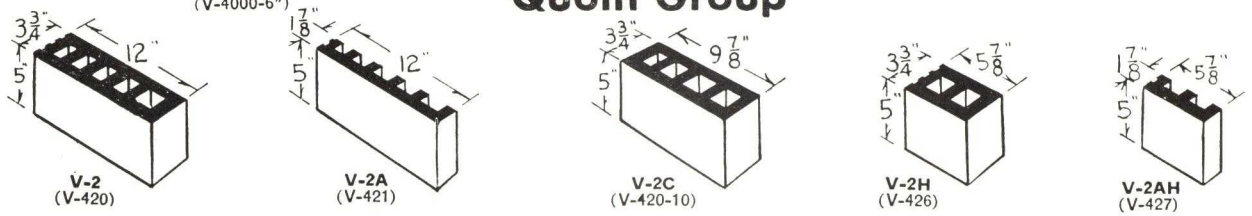
Stretcher Group

V-Sm—Unfinished Smooth Back

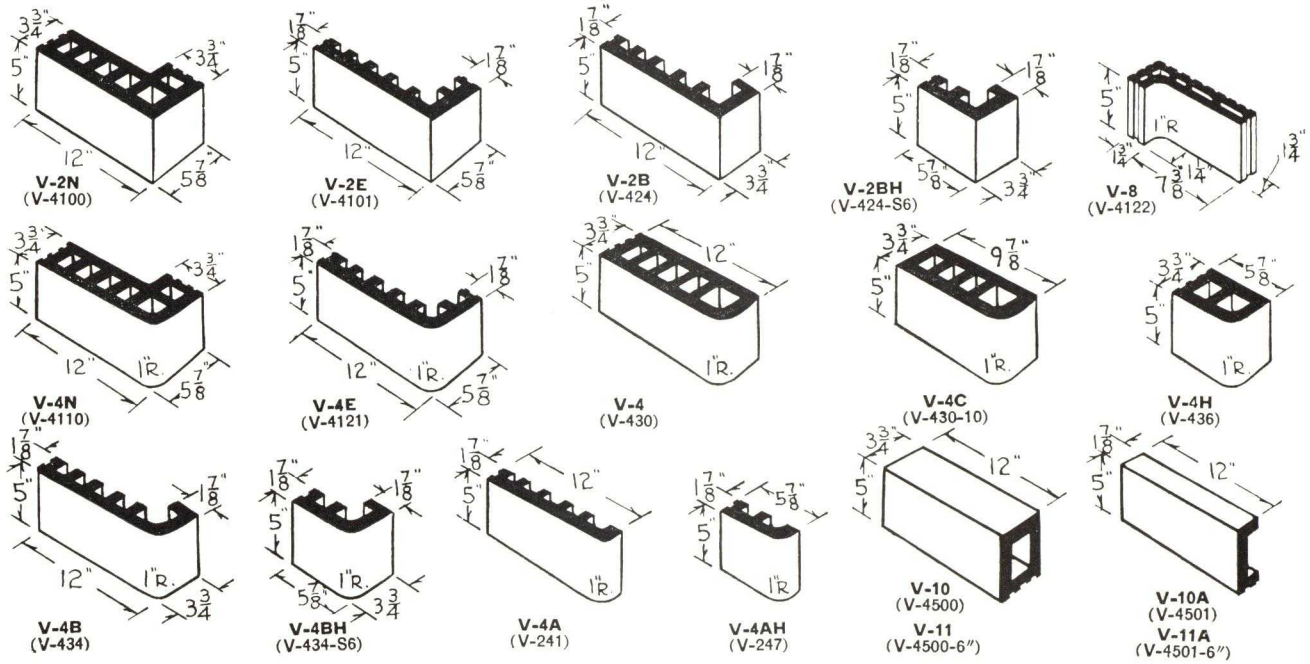
CUTTING UNITS



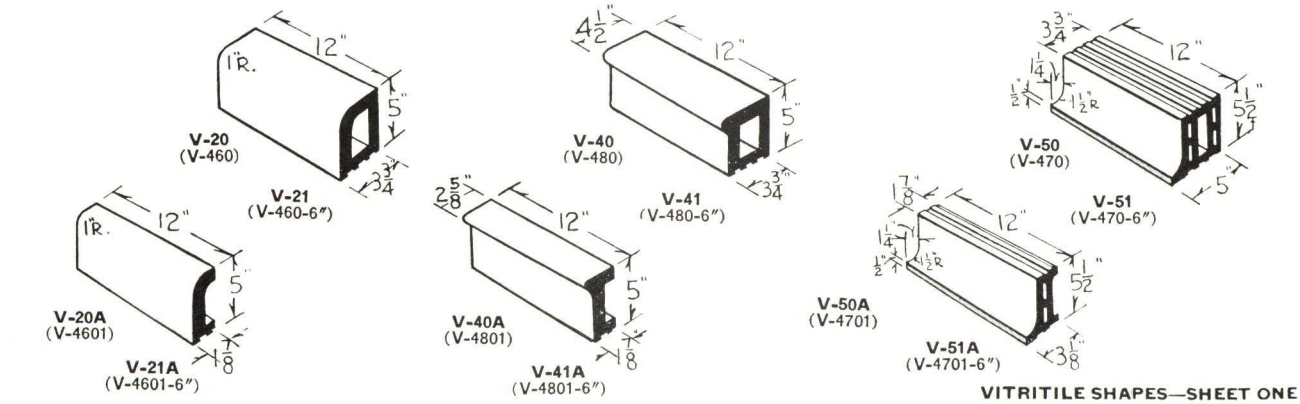
Quoin Group



Machine Made Group—Class No. 1 (See Note Class No. 3)



Cove Base and Wainscot Cap Group—Class No. 2 (See Note Class No. 3)

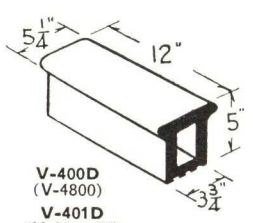


VITRITILE SHAPES—SHEET ONE

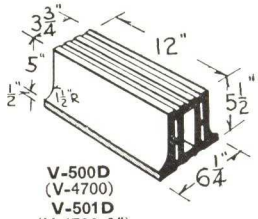
SHAPE DETAILS, NATCO VITRITILE "V" SERIES

Two Face Fitting Group—Class No. 3

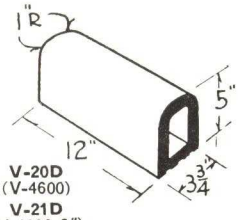
(Includes all Class No. 1 and Class No. 2 Fittings and Quoins when finished on two faces)



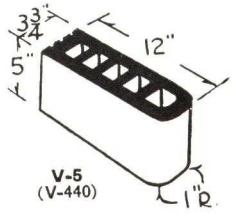
V-400D (V-4800)
V-401D (V-4800-6")



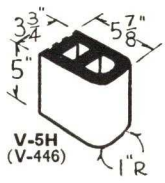
V-500D (V-4700)
V-501D (V-4700-6")



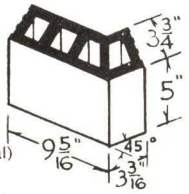
V-20D (V-4600)
V-21D (V-4600-6")



V-5 (V-440)

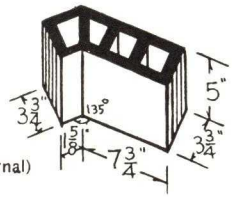


V-5H (V-446)



V-6—(VC-4225 External)

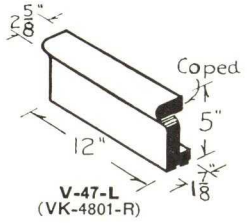
V-6A—Soap—(V-4045)



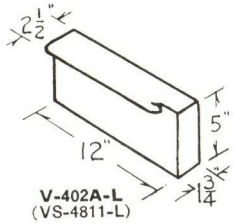
V-9—(VO-4225 Internal)

V-9A—Soap—(V-4135)

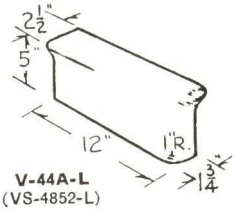
Hand Made Fitting Group—Class No. 4



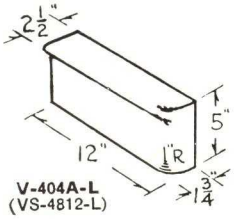
V-47-L (VK-4801-R)



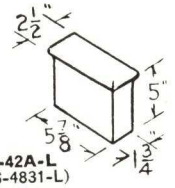
V-402A-L (VS-4811-L)



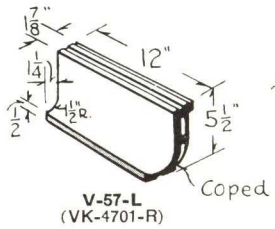
V-44A-L (VS-4852-L)



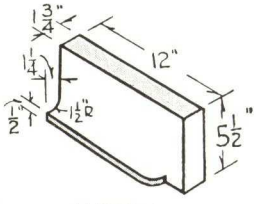
V-404A-L (VS-4812-L)



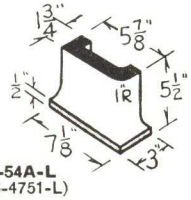
V-42A-L (VS-4831-L)



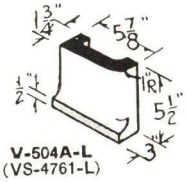
V-57-L (VK-4701-R)



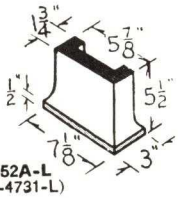
V-502A-L (VS-4711-L)



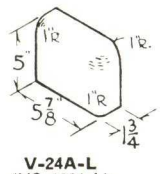
V-54A-L (VS-4751-L)



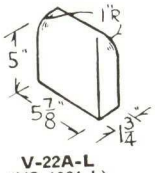
V-504A-L (VS-4761-L)



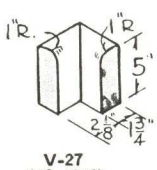
V-52A-L (VS-4731-L)



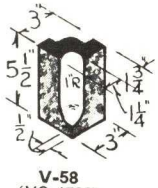
V-24A-L (VC-4661-L)



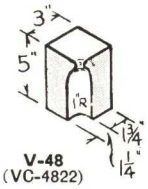
V-22A-L (VS-4631-L)



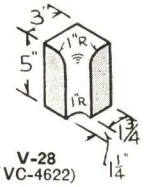
V-27 (VC-4602)



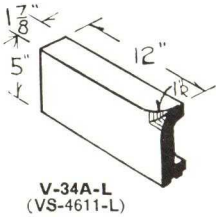
V-58 (VC-4722)



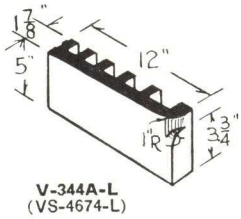
V-48 (VC-4822)



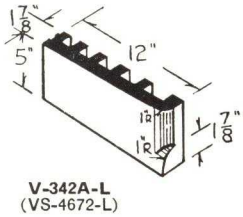
V-28 (VC-4622)



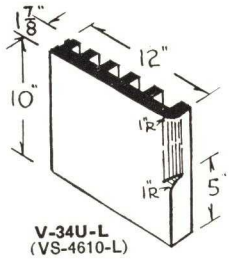
V-34A-L (VS-4611-L)



V-344A-L (VS-4674-L)



V-342A-L (VS-4672-L)



V-34U-L (VS-4610-L)

Note—Bold figures represent new shape numbers adopted by the Glazed Brick and Tile Institute. Light figures in parenthesis are old shape numbers.

VITRITILE SHAPES—SHEET TWO

DETAILS OF VITRITILE CONSTRUCTION

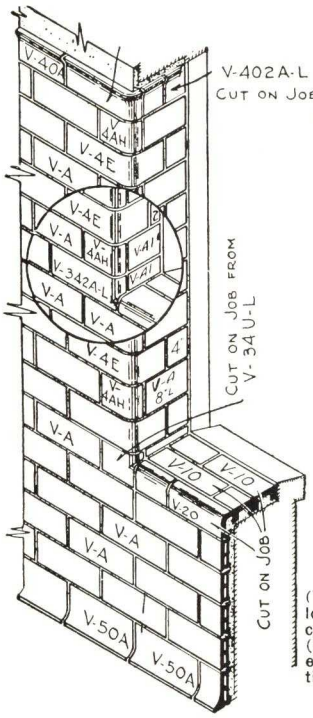


Fig. 9
Vitritile used as furring. In circle, the use of different height of starter is shown. A starter for any desired sill height can be cut on job from Universal Sill Starter V-34-U.

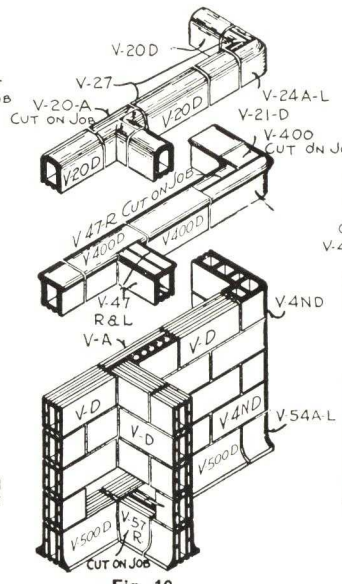


Fig. 10
(Top) Bullnose coping, top course, low partitions. (Center) Wainscot cap, top course, low partitions. (Below) Square internal bullnose external corners in two-faced partition, bonded cross partition.

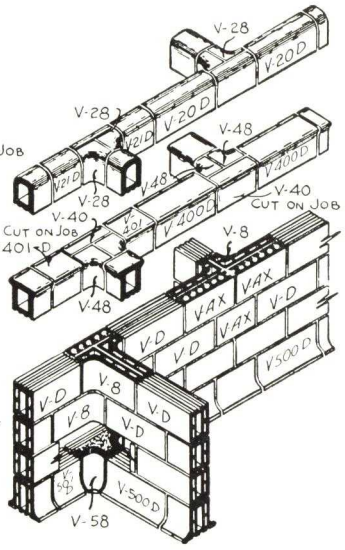


Fig. 11
(Top) Bullnose coping, top course, low partitions. (Center) Wainscot cap, top course, low partitions. (Below) Coved internal corners, two-faced partition.

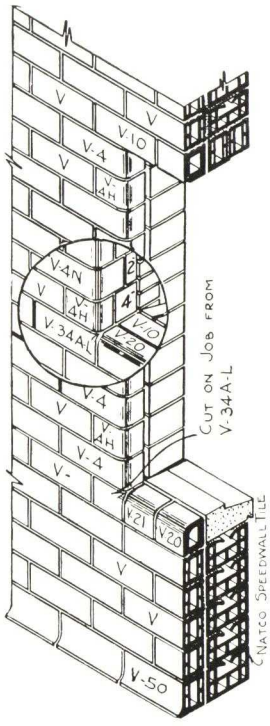


Fig. 12
Vitritile used in connection with Natco Speedwall Tile. Alternate sill and jamb construction is shown in circle.

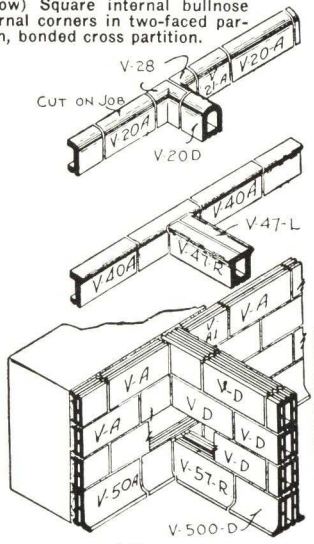


Fig. 13
Bullnose coping, top course, low partitions. (Center) Wainscot capping, top course, low partitions. (Below) Bonding partitions into furred internal walls; square internal corners.

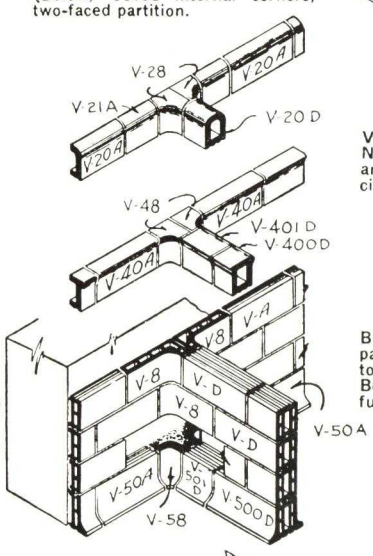


Fig. 14
Bullnose coping, top course, low partitions. (Center) Wainscot cap, top course, low partitions. (Below) Bonding two-faced partitions into furred walls, coved internal corners.

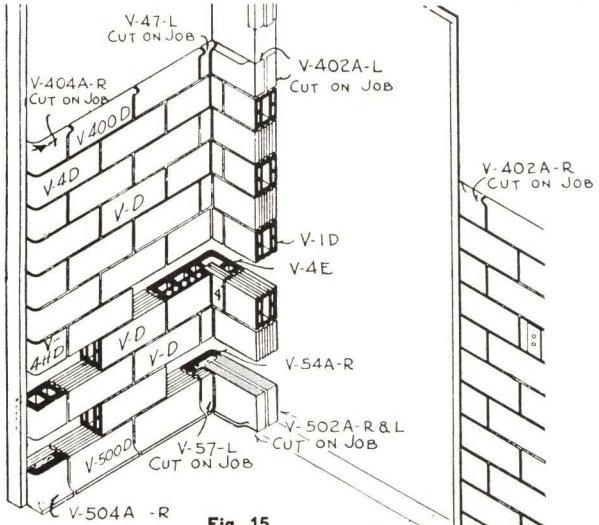


Fig. 15
At left hand, door stops V-54A-R may be used instead of V-504A -R and V-44A-R may be used instead of V-404A-R.

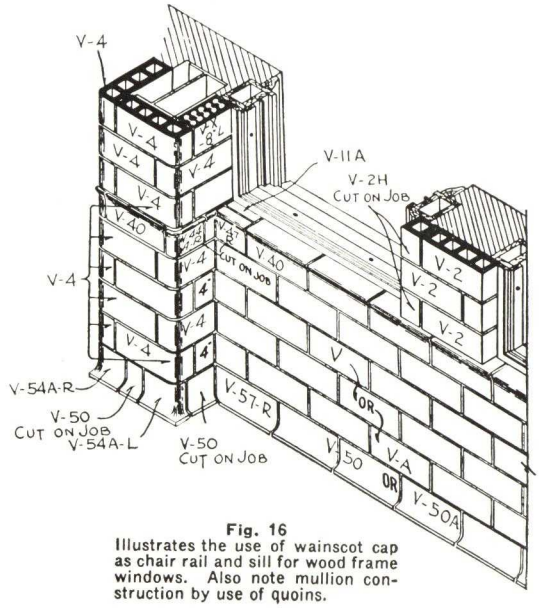


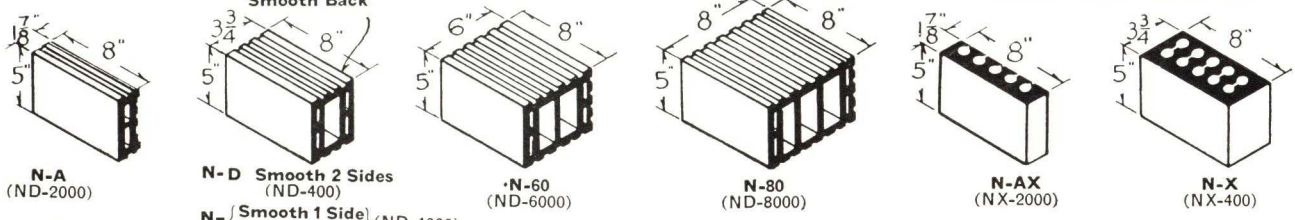
Fig. 16
Illustrates the use of wainscot cap as chair rail and sill for wood frame windows. Also note mullion construction by use of quoins.

SHAPE DETAILS, NATCO DECORATA TILE, "N" SERIES

Stretcher Group

N-Sm—Unfinished Smooth Back

CUTTING UNITS (Scored Ends)



N-A (ND-2000)

N-D Smooth 2 Sides (ND-400)

N- {Smooth 1 Side / Scored 1 Side} (ND-4000)

N-60 (ND-6000)

N-80 (ND-8000)

N-AX (NX-2000)

N-X (NX-400)

Quoin Group

Note—Bold figures represent new shape numbers adopted by the Glazed Brick and Tile Institute.

Light figures in parenthesis are old shape numbers.

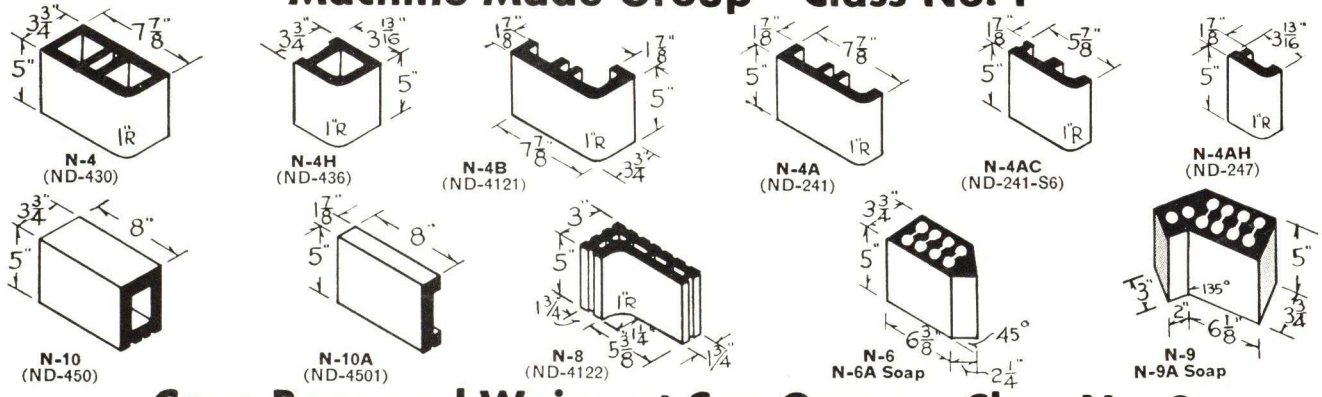
N-2 (ND-420)

N-2H (ND-426)

N-2A (ND-421)

N-2AH (ND-427)

Machine Made Group—Class No. 1



N-4 (ND-430)

N-4H (ND-436)

N-4B (ND-4121)

N-4A (ND-241)

N-4AC (ND-241-S6)

N-4AH (ND-247)

N-10 (ND-450)

N-10A (ND-4501)

N-8 (ND-4122)

N-6 N-6A Soap

N-9 N-9A Soap

Cove Base and Wainscot Cap Group—Class No. 2

N-20 (ND-460)

N-20A (ND-4601)

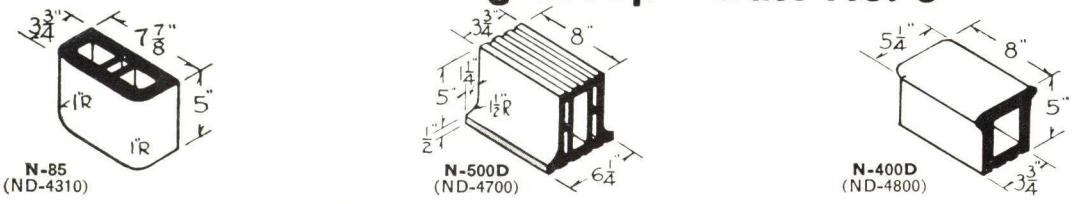
N-50 (ND-470)

N-50A (ND-4701)

N-40 (ND-480)

N-40A (ND-4801)

Two Face Fitting Group—Class No. 3

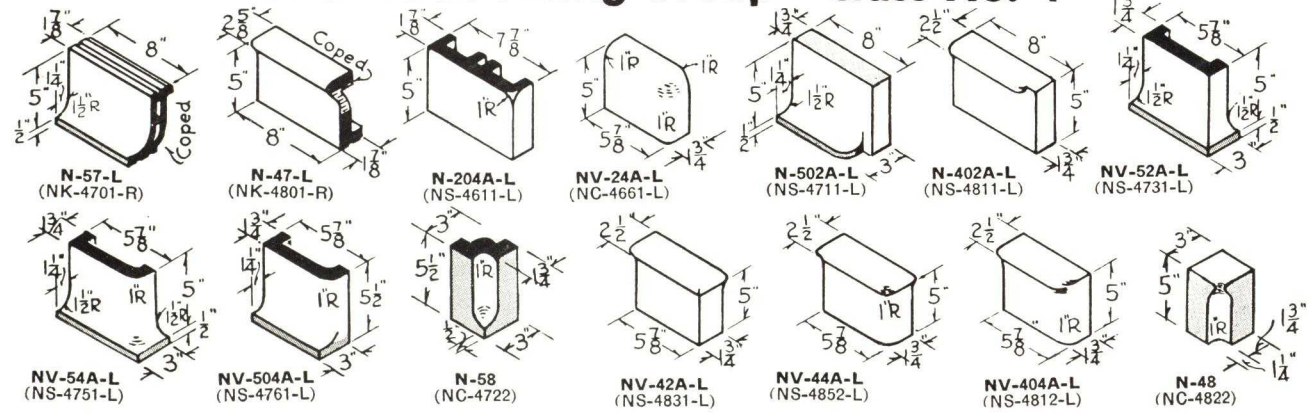


N-85 (ND-4310)

N-500D (ND-4700)

N-400D (ND-4800)

Hand Made Fitting Group—Class No. 4



N-57-L (NK-4701-R)

N-47-L (NK-4801-R)

N-204A-L (NS-4611-L)

NV-24A-L (NC-4661-L)

N-502A-L (NS-4711-L)

N-402A-L (NS-4811-L)

NV-52A-L (NS-4731-L)

NV-54A-L (NS-4751-L)

NV-504A-L (NS-4761-L)

N-58 (NC-4722)

NV-42A-L (NS-4831-L)

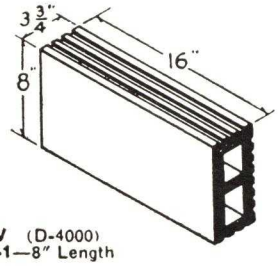
NV-44A-L (NS-4852-L)

NV-404A-L (NS-4812-L)

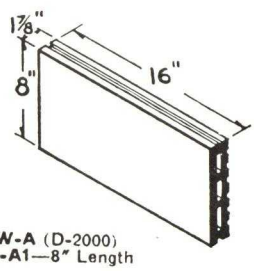
N-48 (NC-4822)

SHAPE DETAILS, NATCO DECORATA TILE, "W" SERIES

Stretcher Group

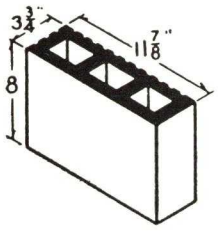


W (D-4000)
W-1—8" Length

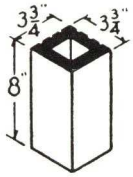


W-A (D-2000)
W-A1—8" Length

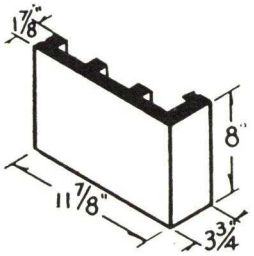
Machine Made Group—Class No. 1



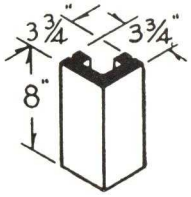
W-2C
(D-4212)



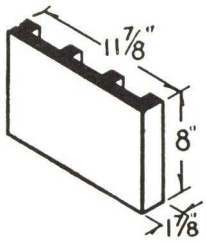
W-2Q
(D-424)



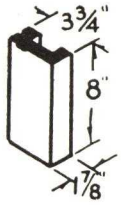
W-2CB
(D-4101)



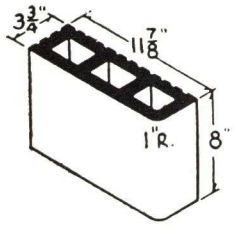
W-2QB
(D-4106)



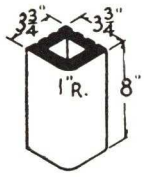
W-2CA
(D-2212)



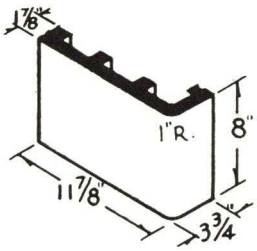
W-2QA
(D-224)



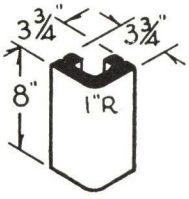
W-4C
(D-4312)



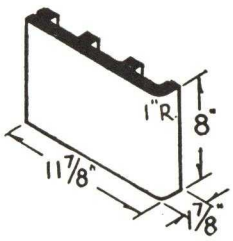
W-4Q
(D-434)



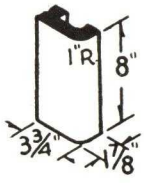
W-4CB
(D-4121)



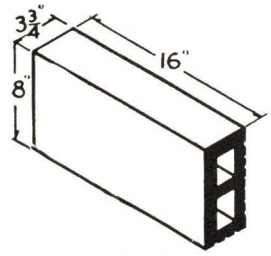
W-4QB
(D-4126)



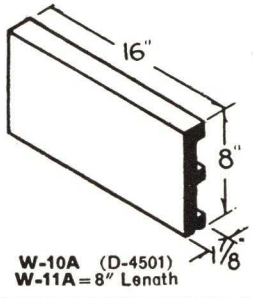
W-4CA
(D-2312)



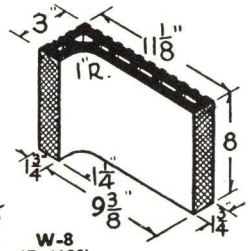
W-4QA
(D-234)



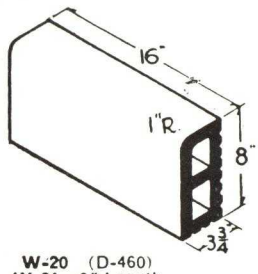
W-10 (D-450)
W-11 = 8" Length



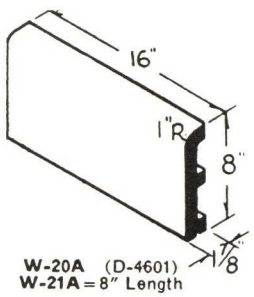
W-10A (D-4501)
W-11A = 8" Length



W-8
(D-4122)

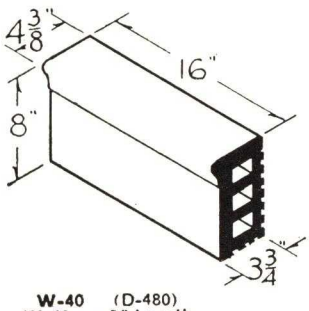


W-20 (D-460)
W-21 = 8" Length

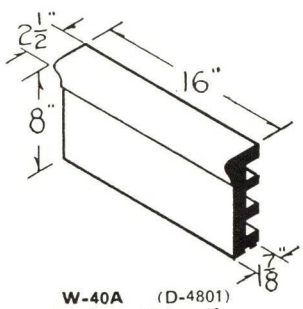


W-20A (D-4601)
W-21A = 8" Length

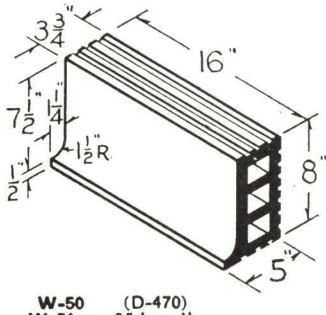
Cove Base and Wainscot Cap Group—Class No. 2



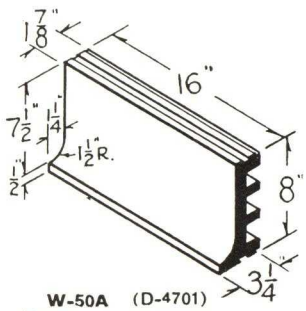
W-40 (D-480)
W-41 = 8" Length



W-40A (D-4801)
W-41A = 8" Length



W-50 (D-470)
W-51 = 8" Length

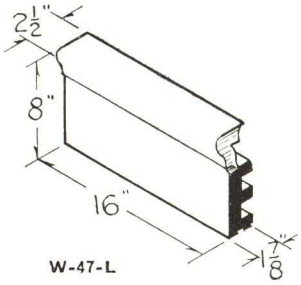


W-50A (D-4701)
W-51A = 8" Length

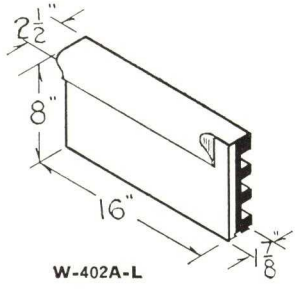
Note—Bold figures represent new shape numbers adopted by the Glazed Brick and Tile Institute.
Light figures in parenthesis are old shape numbers.

SHAPE DETAILS, NATCO DECORATA TILE, "W" SERIES

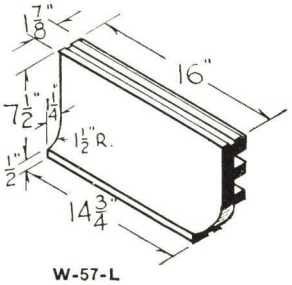
Hand Made Fitting Group—Class No. 4



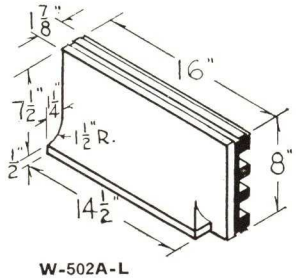
W-47-L



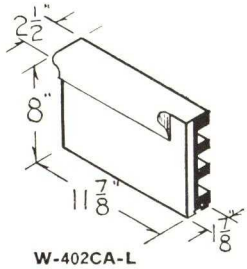
W-402A-L



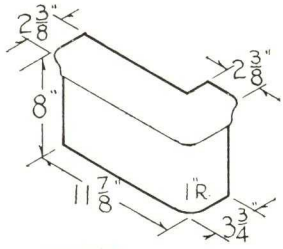
W-57-L



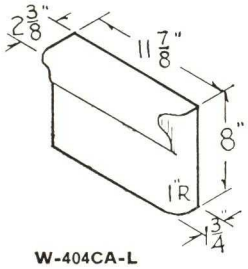
W-502A-L



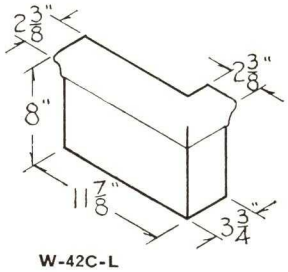
W-402CA-L



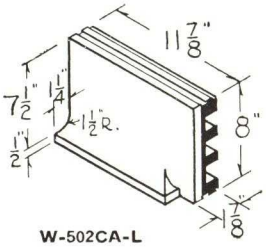
W-44C-L



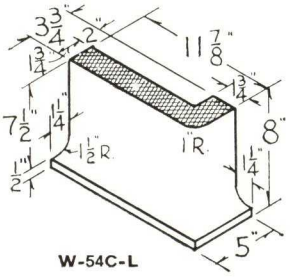
W-404CA-L



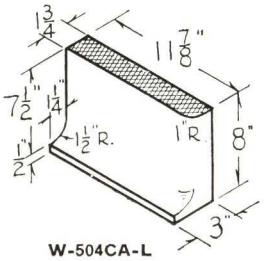
W-42C-L



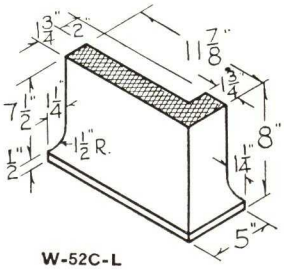
W-502CA-L



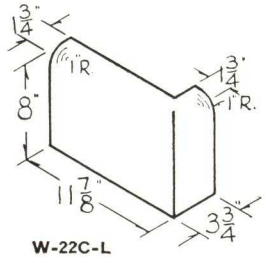
W-54C-L



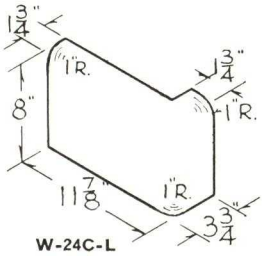
W-504CA-L



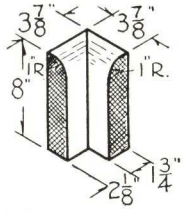
W-52C-L



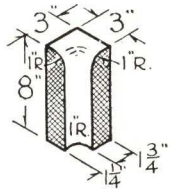
W-22C-L



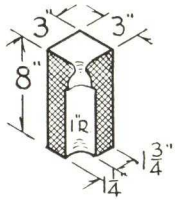
W-24C-L



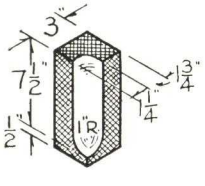
W-27



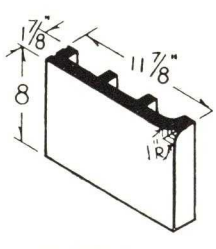
W-28



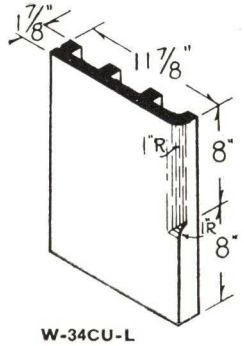
W-48



W-58



W-34CA-L



W-34CU-L

Note: All Hand Made Fittings are funrnished both right and left hand as required.

DETAILS OF WALL SECTIONS

Fig. 1
Two faced 3¾" Vitritile wall showing use of double-cove base.

Fig. 2
Two faced 3¾" Vitritile wall showing double cove base and double wainscot cap. Also method of adjusting tile heights to ceiling heights without cutting.

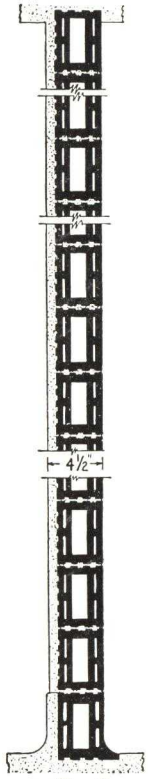


Fig. 3
3¾" Vitritile wall plastered one side, showing single Vitritile cove base and terrazzo base opposite.

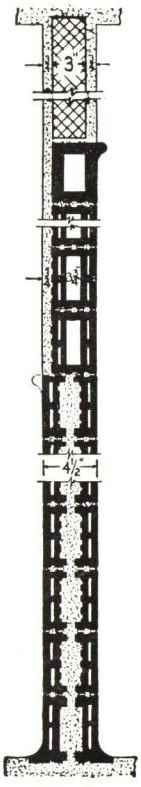


Fig. 4
4½" Vitritile two faced wall, illustrating the adaptability of Vitritile where plaster above begins at different elevations on opposite sides.

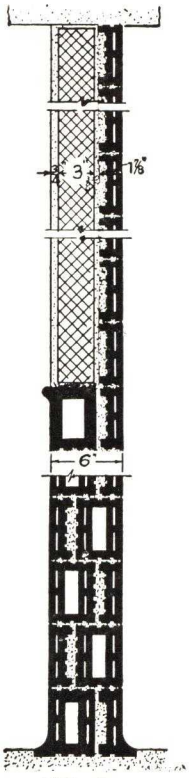


Fig. 5
Two faced 6" Vitritile bonded wainscot wall showing use of furring carried to ceiling on one side and wainscot cap with plaster above on opposite side.

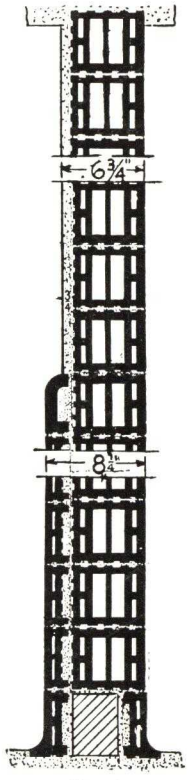


Fig. 6
6" Vitritile wall with addition of furring on one side of wainscot showing use of bull-nose cap.

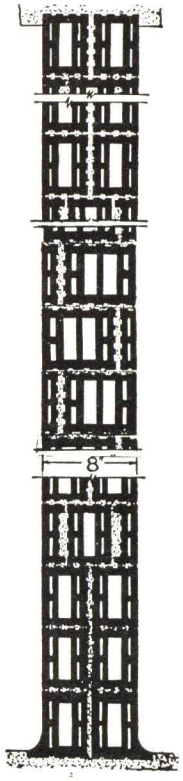


Fig. 7
Two faced 8" Vitritile bonded wall showing various types of bonding.

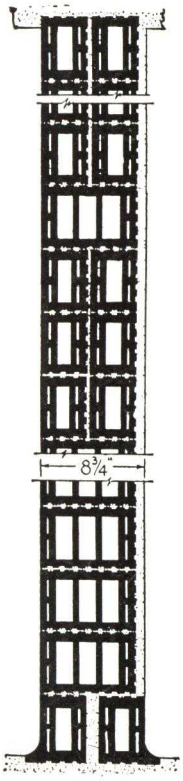
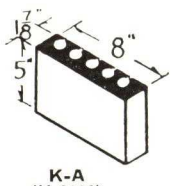


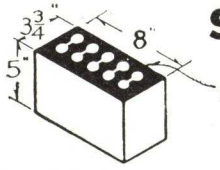
Fig. 8
One faced 8" Vitritile bonded wall showing use of single cove base in connection with plastered walls.

SHAPE DETAILS, NATCO VITRIBRIK "K" SERIES

Stretcher Group

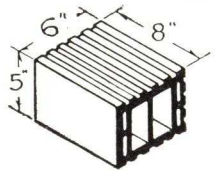


K-A
(K-2000)

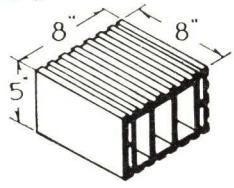


K-D Smooth 2 Sides
(K-400)

K-Sm—Unfinished Smooth Back (Scored Ends)



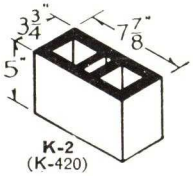
K-60
(K-6000)



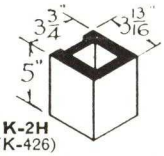
K-80
(K-8000)

K- {Smooth 1 Side / Scored 1 Side} (K-4000)

Quoin Group



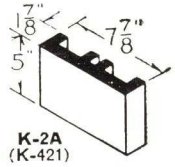
K-2
(K-420)



K-2H
(K-426)

Note—Bold figures represent new shape numbers adopted by the Glazed Brick and Tile Institute.

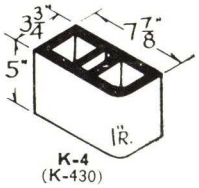
Light figures in parenthesis are old shape numbers.



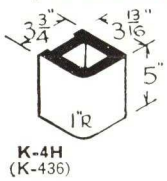
K-2A
(K-421)

K-2AH
(K-427)

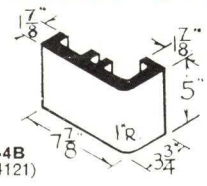
Machine Made Group—Class No. 1



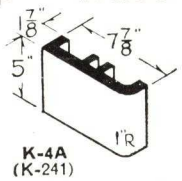
K-4
(K-430)



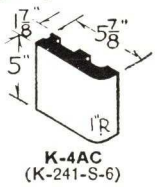
K-4H
(K-436)



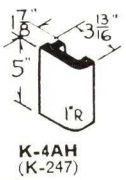
K-4B
(K-4121)



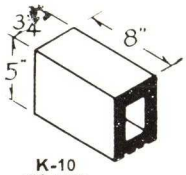
K-4A
(K-241)



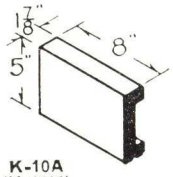
K-4AC
(K-241-S-6)



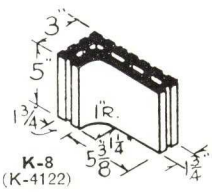
K-4AH
(K-247)



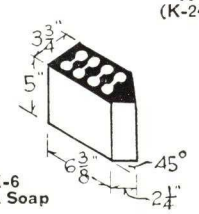
K-10
(K-450)



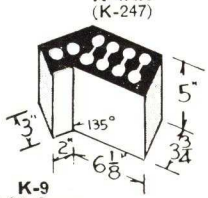
K-10A
(K-4501)



K-8
(K-4122)

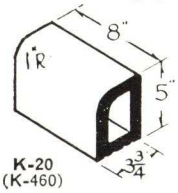


K-6
K-6A Soap

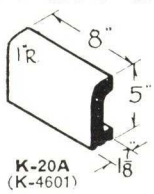


K-9
K-9A Soap

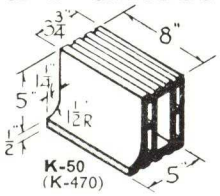
Cove Base and Wainscot Cap Group—Class No. 2



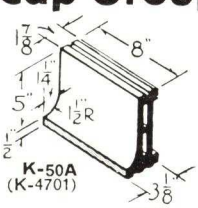
K-20
(K-460)



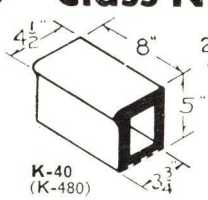
K-20A
(K-4601)



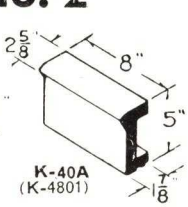
K-50
(K-470)



K-50A
(K-4701)

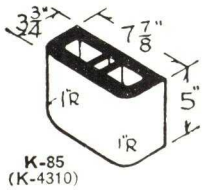


K-40
(K-480)

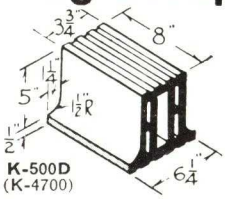


K-40A
(K-4801)

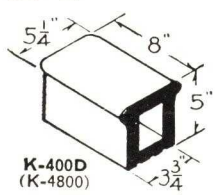
Two Face Fitting Group—Class No. 3



K-85
(K-4310)

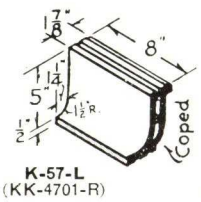


K-500D
(K-4700)

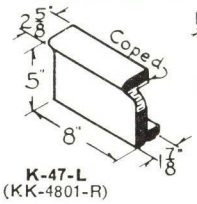


K-400D
(K-4800)

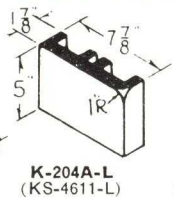
Hand Made Fitting Group—Class No. 4



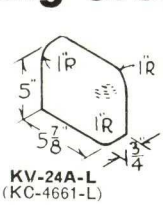
K-57-L
(KK-4701-R)



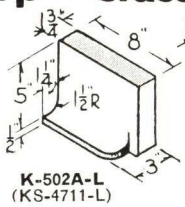
K-47-L
(KK-4801-R)



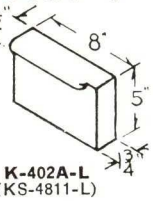
K-204A-L
(KS-4611-L)



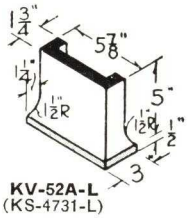
KV-24A-L
(KC-4661-L)



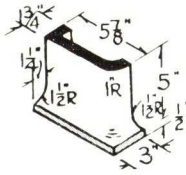
K-502A-L
(KS-4711-L)



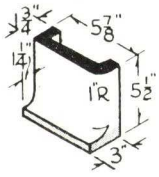
K-402A-L
(KS-4811-L)



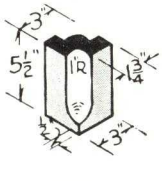
KV-52A-L
(KS-4731-L)



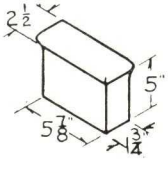
KV-54A-L
(KS-4751-L)



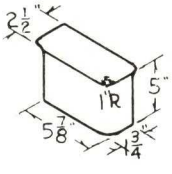
KV-504A-L
(KS-4761-L)



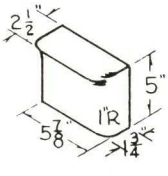
K-58
(KC-4722)



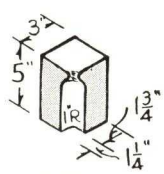
KV-42A-L
(KS-4831-L)



KV-44A-L
(KS-4852-L)



KV-404A-L
(KS-4812-L)



K-48
(KC-4822)

Tables for Determining Heights and Lengths of Walls

These tables have been prepared as a ready reference and will be found very helpful. The height tables determine the heights of walls from the finished floor line which will best lay up without cutting tile. When cove base is used, be sure to provide for height of cove base course. The length tables show the length of walls and pilasters which will best lay up without cutting tile. To find width of openings, add two mortar joints or ½ in. to each dimension given. Joints for 5-in. heights and 8 and 12-in. lengths are ¼ in., for 8-in. heights and 16-in. lengths, ⅜ in.

HEIGHT TABLE

Course Number	5″ Heights ¼″ Joints	8″ Heights ⅜″ Joints
1	5¼″	8⅜″
2	10½″	1′ 4¾″
3	1′ 3¾″	2′ 1⅛″
4	1′ 9″	2′ 9½″
5	2′ 2¼″	3′ 5⅞″
6	2′ 7½″	4′ 2¼″
7	3′ 0¾″	4′ 10⅝″
8	3′ 6″	5′ 7″
9	3′ 11¼″	6′ 3⅜″
10	4′ 4½″	6′ 11¾″
11	4′ 9¾″	7′ 8⅛″
12	5′ 3″	8′ 4½″
13	5′ 8¼″	9′ 0⅞″
14	6′ 1½″	9′ 9¼″
15	6′ 6¾″	10′ 5⅝″
16	7′ 0″	11′ 2″
17	7′ 5¼″	11′ 10⅜″
18	7′ 10½″	12′ 6¾″
19	8′ 3¾″	13′ 3⅛″
20	8′ 9″	13′ 11½″
21	9′ 2¼″	14′ 7⅞″
22	9′ 7½″	15′ 4¼″
23	10′ 0¾″	16′ 0⅝″
24	10′ 6″	16′ 9″
25	10′ 11¼″	17′ 5⅜″
26	11′ 4½″	18′ 1¾″
27	11′ 9¾″	18′ 10⅛″
28	12′ 3″	19′ 6½″
29	12′ 8¼″	20′ 2⅞″
30	13′ 1½″	20′ 11¼″
31	13′ 6¾″	21′ 7⅝″
32	14′	22′ 4″
33	14′ 5¼″	23′ 0⅜″
34	14′ 10½″	23′ 8¾″
35	15′ 3¾″	24′ 5⅛″
36	15′ 9″	25′ 1½″
37	16′ 2¼″	25′ 9⅞″
38	16′ 7½″	26′ 6¼″
39	17′ 0¾″	27′ 2⅝″
40	17′ 6″	27′ 11″
41	17′ 11¼″	28′ 7⅜″
42	18′ 4½″	29′ 3¾″
43	18′ 9¾″	30′ 0⅛″
44	19′ 3″	30′ 8½″
45	19′ 8¼″	31′ 4⅞″
46	20′ 1½″	32′ 1¼″
47	20′ 6¾″	32′ 9⅝″
48	21′	33′ 6″
49	21′ 5¼″	34′ 2⅜″
50	21′ 10½″	34′ 10¾″
51	22′ 3¾″	35′ 7⅛″
52	22′ 9″	36′ 3½″
53	23′ 2¼″	36′ 11⅞″
54	23′ 7½″	37′ 8¼″
55	24′ 0¾″	38′ 4⅝″
56	24′ 6″	39′ 1″
57	24′ 11¼″	39′ 9⅜″
58	25′ 4½″	40′ 5¾″
59	25′ 9¾″	41′ 2⅛″
60	26′ 3″	41′ 10½″

LENGTH TABLE

Number of Tile	8″ Lengths ¼″ Joints	12″ Lengths ¼″ Joints	16″ Lengths ⅜″ Joints
1	8″	1′ 0″	1′ 4″
1½	1′ 0⅛″	1′ 6⅛″	2′ 0¼″
2	1′ 4¼″	2′ 0¼″	2′ 8⅜″
2½	1′ 8⅜″	2′ 6⅜″	3′ 4⅝″
3	2′ 0½″	3′ 0½″	4′ 0¾″
3½	2′ 4⅝″	3′ 6⅝″	4′ 9″
4	2′ 8¾″	4′ 0¾″	5′ 5⅛″
4½	3′ 0⅞″	4′ 6⅞″	6′ 1⅜″
5	3′ 5″	5′ 1″	6′ 9½″
5½	3′ 9⅛″	5′ 7⅛″	7′ 5¾″
6	4′ 1¼″	6′ 1¼″	8′ 1⅞″
6½	4′ 5⅜″	6′ 7⅜″	8′ 10⅛″
7	4′ 9½″	7′ 1½″	9′ 6¼″
7½	5′ 1⅝″	7′ 7⅝″	10′ 2½″
8	5′ 5¾″	8′ 1¾″	10′ 10⅝″
8½	5′ 9⅞″	8′ 7⅞″	11′ 6⅞″
9	6′ 2″	9′ 2″	12′ 3″
9½	6′ 6⅛″	9′ 8⅛″	12′ 11¼″
10	6′ 10¼″	10′ 2¼″	13′ 7⅜″
10½	7′ 2⅜″	10′ 8⅜″	14′ 3⅝″
11	7′ 6½″	11′ 2½″	14′ 11¾″
11½	7′ 10⅝″	11′ 8⅝″	15′ 8″
12	8′ 2¾″	12′ 2¾″	16′ 4⅛″
12½	8′ 6⅞″	12′ 8⅞″	17′ 0⅜″
13	8′ 11″	13′ 3″	17′ 8½″
13½	9′ 3⅛″	13′ 9⅛″	18′ 4¾″
14	9′ 7¼″	14′ 3¼″	19′ 0⅞″
14½	9′ 11⅜″	14′ 9⅜″	19′ 9⅛″
15	10′ 3½″	15′ 3½″	20′ 5¼″
15½	10′ 7⅝″	15′ 9⅝″	21′ 1½″
16	10′ 11¾″	16′ 3¾″	21′ 9⅝″
16½	11′ 3⅞″	16′ 9⅞″	22′ 5⅞″
17	11′ 8″	17′ 4″	23′ 2″
17½	12′ 0⅛″	17′ 10⅛″	23′ 10¼″
18	12′ 4¼″	18′ 4¼″	24′ 6⅜″
18½	12′ 8⅜″	18′ 10⅜″	25′ 2⅝″
19	13′ 0½″	19′ 4½″	25′ 10¾″
19½	13′ 4⅝″	19′ 10⅝″	26′ 7″
20	13′ 8¾″	20′ 4¾″	27′ 3⅛″
20½	14′ 0⅞″	20′ 10⅞″	27′ 11⅜″
21	14′ 5″	21′ 5″	28′ 7½″
21½	14′ 9⅛″	21′ 11⅛″	29′ 3¾″
22	15′ 1¼″	22′ 5¼″	29′ 11⅞″
22½	15′ 5⅜″	22′ 11⅜″	30′ 8⅛″
23	15′ 9½″	23′ 5½″	31′ 4¼″
23½	16′ 1⅝″	23′ 11⅝″	32′ 0½″
24	16′ 5¾″	24′ 5¾″	32′ 8⅝″
24½	16′ 9⅞″	24′ 11⅞″	33′ 4⅞″
25	17′ 2″	25′ 6″	34′ 1″
25½	17′ 6⅛″	26′ 0⅛″	34′ 9¼″
26	17′ 10¼″	26′ 6¼″	35′ 5⅜″
26½	18′ 2⅜″	27′ 0⅜″	36′ 1⅝″
27	18′ 6½″	27′ 6½″	36′ 9¾″
27½	18′ 10⅝″	28′ 0⅝″	37′ 6″
28	19′ 2¾″	28′ 6¾″	38′ 2⅛″
28½	19′ 6⅞″	29′ 0⅞″	38′ 10⅜″
29	19′ 11″	29′ 7″	39′ 6½″
29½	20′ 3⅛″	30′ 1⅛″	40′ 2¾″
30	20′ 7¼″	30′ 7¼″	40′ 10⅞″
30½	20′ 11⅜″	31′ 1⅜″	41 7⅛″

Color Reproductions

The Color Reproductions shown, are printed from process plates, made direct from actual, full size Natco Structural Face Tile units. This gives the most authentic reproduction possible. It must be borne in mind that printers ink on paper cannot exactly portray the rich beauty of a vitrified clay product, also that the reduction in size affects the appearance. The color reproductions, while they do give a close approximation of the colors furnished, must not therefore be considered as absolute duplicates.

In the Hand Made Fitting Groups of all types of Natco Facing Tile, both right and left hand shapes are furnished where required.

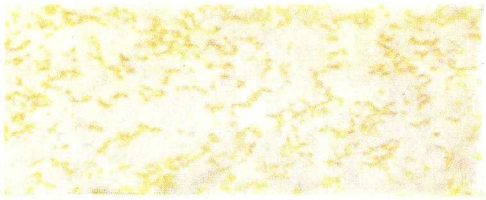
Standard Shapes

All stretcher units and fittings shown are Standard Natco Shapes. They are the result of many years experience in furnishing glazed ware and will adequately take care of practically all structural conditions encountered. To insure the most economical construction, as well as the most attractive appearance in the finished work, an electrical abrasive saw, either of the portable or table type, should be used to cut short sections as required. When desired, we can also manufacture, on short notice, shapes as shown by the Glazed Brick and Tile Institute.

NATCO CERAMIC GLAZE MOTTLES

(See paragraph headed "Color Reproductions")

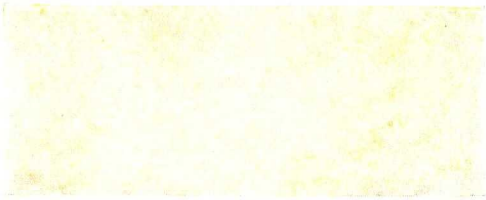
8575—White and Gray Mottle



8525—White and Brown Mottle

8585—Gray and Buff Mottle

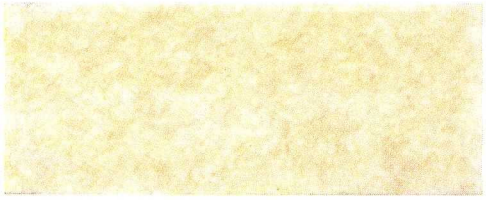
1000—Light Buff Mottle



8540—Cream and Light Green Mottle

On this page we show mottles which have met with the approval of the building industry. Information on additional shades available will be sent upon request.

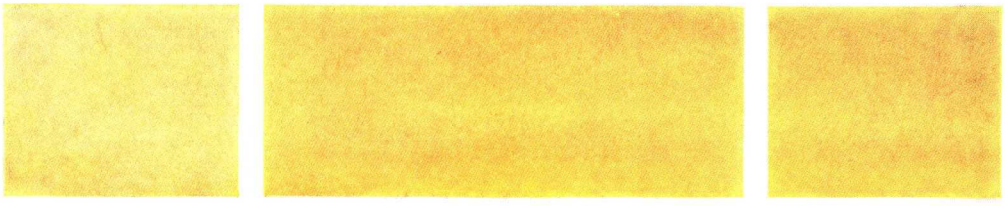
8550—Buff and Green Mottle



8565—Brown and Cream Mottle

NATCO LITESHADE

A light shade range in natural salt glaze finish



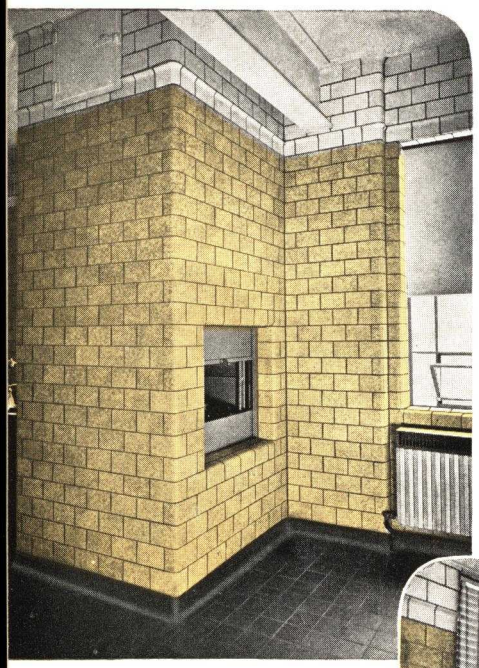
FOR NATCO CERAMIC GLAZE COLORS
SEE INSIDE FRONT COVER

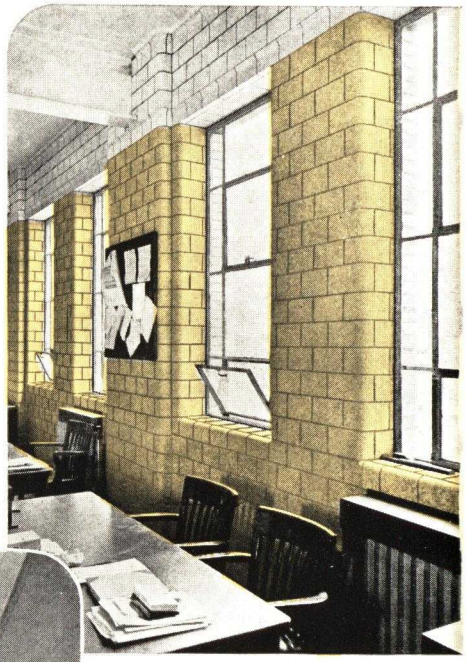
NATIONAL FIREPROOFING CORPORATION GENERAL OFFICES PITTSBURGH

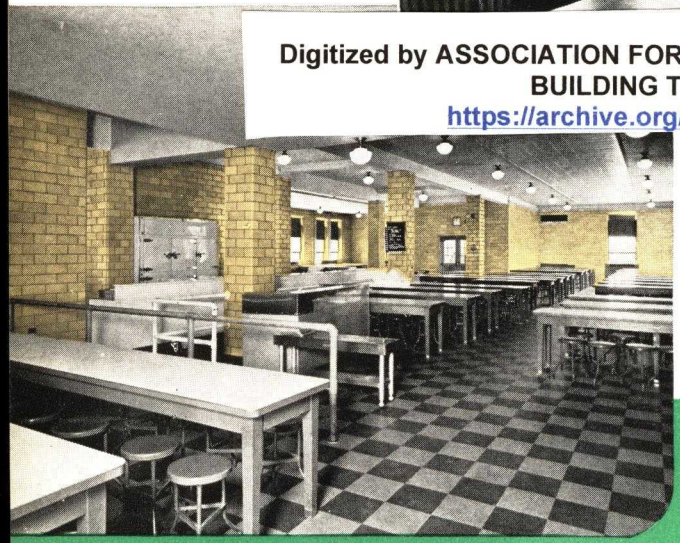
FOR EVERY TYPE OF BUILDING

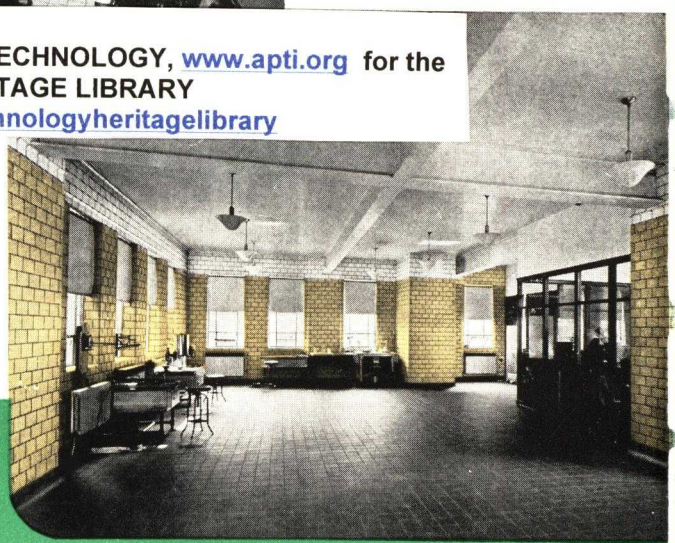
Natco Structural Facing Tile has an application somewhere in every building, everywhere in some buildings. It is ideal for the walls, partitions and wainscots in laboratories, schools, airports, restaurants, gymnasiums, corridors, lavatories, shower rooms, garages, abattoirs, breweries, distilleries, hotel kitchens and supply rooms, hospitals, power houses, auto service and filling stations, dairies, creameries, army barracks, auditoriums and recreational buildings, food product plants, post offices, meat packing plants, offices, chemical plants, natatoriums, waiting rooms and similar applications.

Natco Structural Facing Tile is manufactured by a corporation established in 1889, which has been in that particular line of business continuously since that time.









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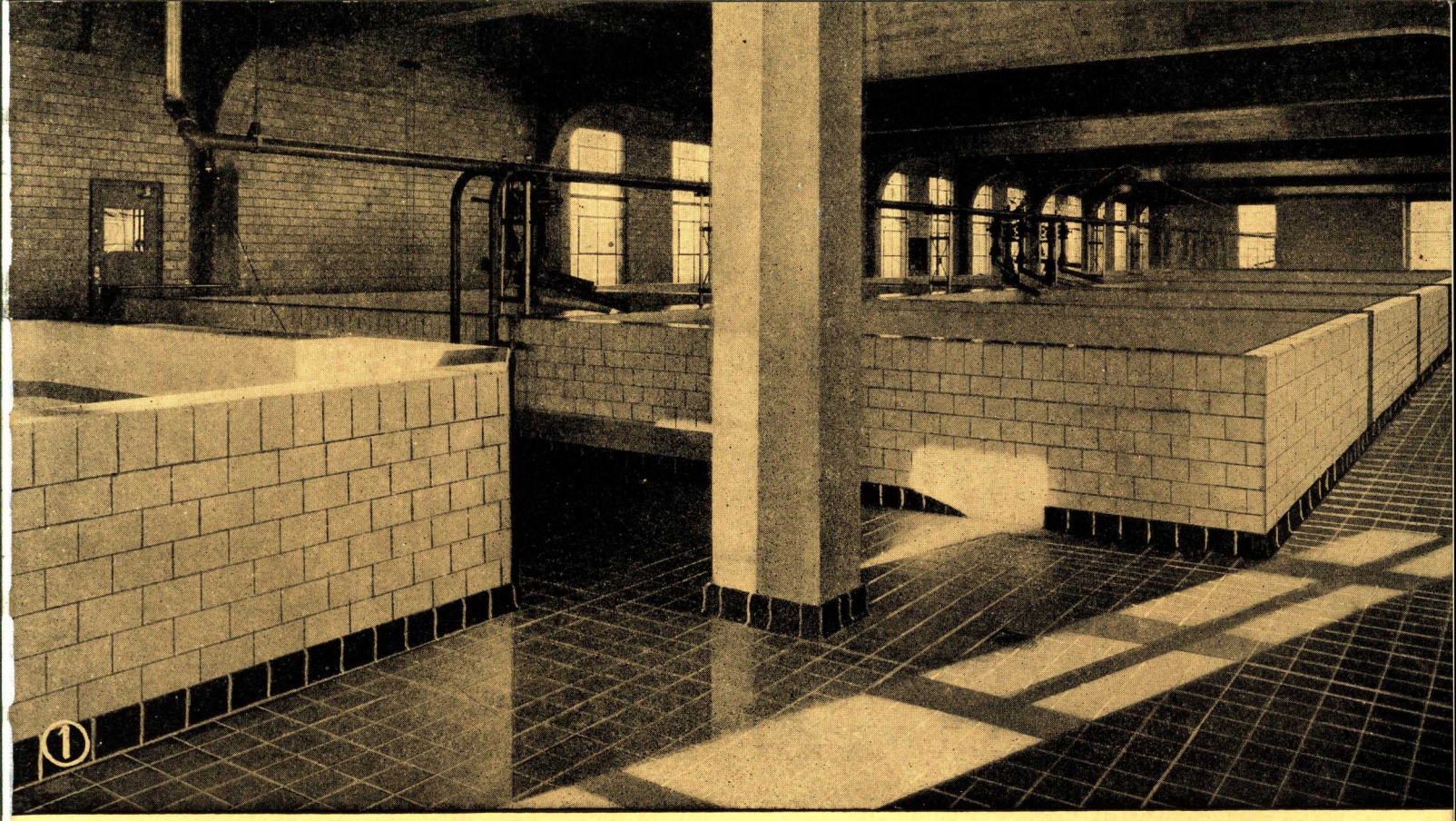
SINCE 1889

NATIONAL FIREPROOFING CORPORATION

GENERAL OFFICES: PITTSBURGH, PA.

Branches: New York, 205-17 E. 42nd St. Chicago, Morton Building Philadelphia, Architects Building
Detroit, 5737 Commonwealth Ave. & N. Y. C. R. R. North Birmingham, Ala.
In Canada: National Fire Proofing Company of Canada, Ltd., Toronto, Ontario



STARK

GLAZED PRODUCTS

THE STARK BRICK CO.
CANTON, OHIO.

THE STARK BRICK COMPANY

CANTON, OHIO

THE BELDEN-STARK BRICK CORPORATION, 15 East 26th Street, New York City, N. Y.
THE BELDEN-STARK BRICK COMPANY, 14305 Livernois Ave., Detroit, Michigan
THE STARK BRICK COMPANY, 228 N. LaSalle Street, Chicago, Illinois

REPRESENTATIVES IN PRINCIPAL CITIES

The Stark line of facing and flooring products and special usage units is most complete. The permanence, beauty, economy, and quality of Stark units have made them a standard for over a quarter century.

The wide variety of sizes, types, and finishes offers to the Architect the widest latitude in design and the ability to work out practically any architectural motif.

The many finishes and colors of Stark products are given on page four hereof. Four face sizes are offered in four wall depths and two floor depths.

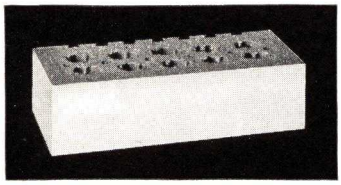
Shape and structural details showing all standard and special shapes and their typical usage are illustrated and described upon the following pages.

Three plants equipped with the most modern of machinery and manned by a personnel with years of experience in quality manufacture assure satisfactory service and high quality upon projects of any size.

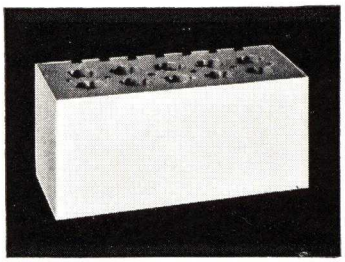
All Stark products (except waterstruck) are deaired. Stark was the pioneer manufacturer to adopt deairing and today have the largest deairing installation. Deairing removes all air from the clay body, producing ware free from blisters, cracks and lamination, with extremely smooth close textured faces.

Stark *glazed* products are all produced in vertical void construction to enable the securing of a full head joint and have mortar lock coring for the bed joint to prevent floating in the wall.

Loadbearing requirements of Federal, State, and Municipal Codes are fully met by all units of the Stark line.

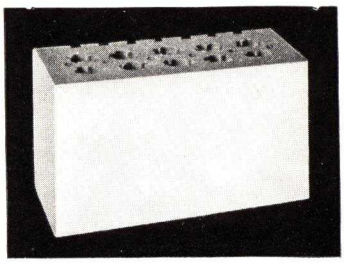


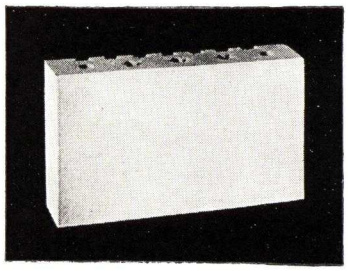
BRICK 2¼″ x 8″ face; Made by Stark since 1911 and the standard for many years. Produced in standard 3⅞″ bed depth, and soap 1¾″ furring, or veneering bed depth. *Available in all finishes.*

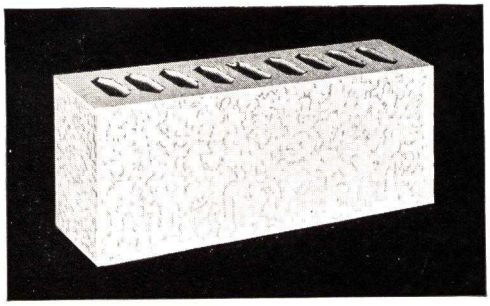


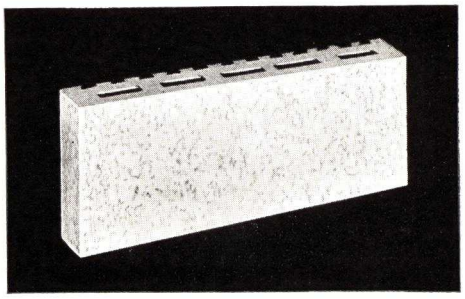
FLATTER 3⅞″ x 8″ face; Rowlock or soldier construction units desirable for many architectural effects. Produced in standard 3⅞″ bed depth, and soap 1¾″ furring, or veneering bed depth. *Available in ceramic "Colorglaze" and salt glaze finishes.*

"BRICTILE" 5″ x 8″ face; A trademarked unit introduced by Stark in 1927 and today the largest selling glazed unit. Produced in standard 3⅞″ bed depth, soap 1¾″ furring or veneering bed and 5⅞″ and 8″ bonding wall depth units. *Available in all finishes.*

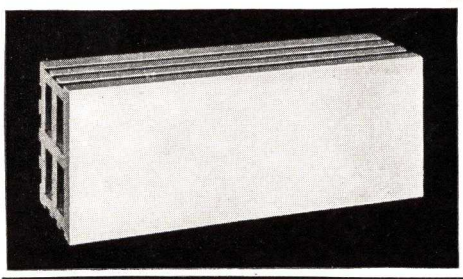




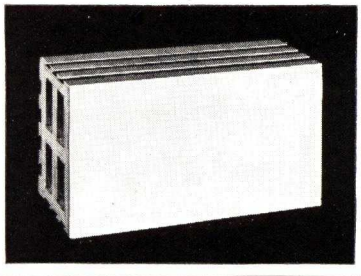




"TRIBRIC" 5″ x 12″ face; A recent Stark introduction featuring vertical void construction, eliminating all washboarding. Produced in 3¾″ bed depth, and soap 1¾″ furring or veneering bed depth and 5⅞″ and 8″ bonding bed depth units. *Available in ceramic "Colorglaze," "Sanicot," and Unglazed finishes.*



FACE TILE 5″ x 8″ and 5″ x 12″ face; A lightweight unit, economical in cost, free from blisters, ragged edges, corners, and as straight and true as careful manufacturers can produce. Produced in standard 3¾″ bed depth, soap 1¾″ furring or veneering bed depth and bonding 5⅞″ and 8″ bed depth units. Also produced smooth two face in the 3⅞″, 5⅞″ and 8″ bed depths. *Available in unglazed finishes only.*



ONLY STARK MAKES "BRICTILE"

COPYRIGHTED 1937, THE STARK BRICK CO.

SANITARY FLOOR BRICK

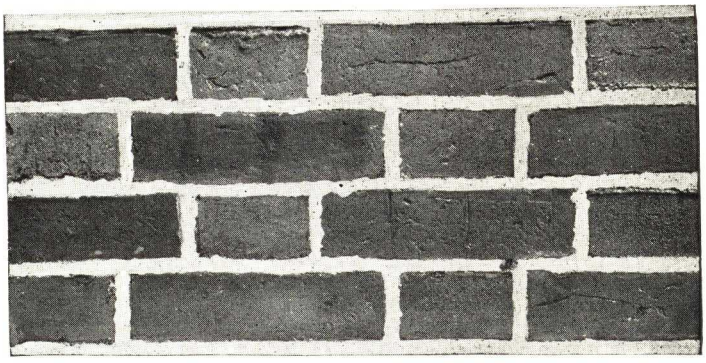
3⅞" x 8" face; Highly vitrified, deaired vertical fibre units burned to a blue carbon manganese body from high grade fireclays. Extreme strength and abrasive resistant and practically non-absorption are inherent qualities.

Produced in Standard 1⅜" and "Heavy Duty" 2¼" depths. The Heavy Duty units have received wide usage as a superior acid resisting brick for many types of construction.

The surface is wire cut to give an anti-skid surface. The hard-as-steel, blue carbon manganese specially treated body and glazed surface will resist severe traffic and stand up where exposed to acids (except hydrofluoric), brines, milk, blood, grease and oils. They have long life and economy of upkeep as compared to practically any other flooring material. This caused their adoption as standard by many of the largest food processing plants and dairies as well as other industries where enduring, acid resisting, non-skid floorings are required.

Available in carbon-manganese glaze finish only.

WATER STRUCK 2⅛" x 8" x 3¾" bed depth; A hand mould water struck colonial brick reproducing the Early American with complete fidelity of color texture, size and finish.



These hand mould water struck brick are produced in traditional blends as follows: "Harvards" Blend of dark and medium reds. "Radcliffes" Blends of rose, light red and saffron shades found in many early American buildings of distinction. "Malvernes" Blend of dark, medium and light reds with brown and tans. Includes a percentage of dark flashed headers.

The New England size units to enable the Architect to reproduce the detail of outstanding colonial structures. All requisite shapes for exterior work are available. *Available in Brick only.*

See following pages for additional information as to Finishes, Colors, Shades, Grading, Uses, Shapes, Laying Details, and other pertinent facts.

USES AND ADVANTAGES

Each type and finish of Stark products has certain special advantages, but all have the advantages of: High degree of sanitation; Walls impervious to moisture; Surfaces that resist fire, acids, and grease; Ease of cleaning; High light reflection or diffusion varying with each type; Permanent beauty and colors; Great facility in architectural design.

INTERIORS. Any type of Stark wall units may be specified where a loadbearing or veneering wall with a sanitary, permanent facing is desired. Colorglaze, Salt Glaze or Sanicote are particularly adaptable to interiors where color and light reflection or diffusion are desired, together with sanitation, permanency, and low eventual cost of upkeep.

Unglazed units are a lower priced natural finish particularly adapted to usage above a wainscot of Stark glazed or Sanicote units to replace plaster.

EXTERIORS. Ceramic "Colorglaze" with a glossy, satin or matt finish are the finest of materials for exterior facing in any type or size of building. Sanicote at lower cost gives color and cleanliness without glare. Unglazed units offer a colorful, permanent exterior of high grade materials at lowest cost.

Water struck brick is a traditional material for buildings designed in the colonial manner.

All will give long and satisfactory service with a minimum of upkeep when installed in keeping in good practice as to flashing, coping, and mortar. See page 16 for construction recommendations.

USAGES. For walls and floors of all types of buildings and such special usages as acid, brewing and distilling vats, pickling tanks and swimming pools.

Stark products are being currently used in the construction of the following and other types of buildings:

Hotels, apartments, and residences.
Schools, Post offices, Orphanages, and other public buildings.
Railroad and bus terminals, airports and docks.
Churches, armories, hospitals, and other semi-public buildings.
Distilleries, breweries and bottling plants.
Canneries, packing houses, abattoirs, and other food processing plants.
Factories, steel mills, and warehouses.
Dairies, bakeries, service stations, and retail stores.

GENERAL

CLEANING. It is unnecessary to use acid to clean Stark Glazed walls. The acid will not harm the hard glazed surface, but it does damage the mortar joint. Masons should be provided with burlap or cloths to remove mortar as the work progresses. After the wall is finished, clean by scrubbing with a bristle brush, soap and water.

CRUSHING STRENGTH. Loadbearing requirements of Federal, State and Municipal Codes are fully met by units of the Stark line.

SERVICE. Three plants and 65 kilns, plus a yard stock of from ten to twelve million units, allow normal prompt service on orders of any size.

PACKING AND SHIPPING. Super quality in all wall units and all shapes will be packed in patented containers. Other qualities of the above and other types of ware will be carefully loaded in straw, properly bonded and braced. Units regularly shipped in straw will be packed in containers at an extra cost.

ENGINEERING. Our engineering department is glad to cooperate with and recommend to architects and engineers the most economical and practical adaption of our products to any common or unusual condition.

SAMPLES. Samples will be sent to architects, engineers, contractors, and owners on request, without charge.

FINISHES, COLORS AND SHADES

WALL TYPES

CERAMIC COLORGLAZE The finest type of glazed ware, having a vitreous coated face. These are compounded of well-known chemicals, thoroughly ground together, then sprayed on a previously formed fire clay body. The sprayed unit is then burned at over 2000° F. which fuses the glaze to the body in such a fashion that it is impossible to separate the two, as their co-efficients of expansion are identical, and the glaze becomes an integral part of the body. Furnished in Field and Trim shades; in smooth, mottled or stippled textures; and in gloss, satin or matt finishes as set forth below.

FIELD SHADES

Smooth (GL)
520—White
535—Cream
540—Ivory
550—Yellow
560—Gray
585—Peach

Mottle or Stipple (GM)
681—White and White
680—Buff and White
682—Buff and Cream
683—White and Tan
685—Cream and Brown
684—Cream and Maroon
620—Black and White

GLOSS SHADES, SMOOTH (GB)

510—White Lustre
530—Ivory Lustre

TRIM SHADES (GT)

570—Azure Blue (Light)
571—Aster Blue (Medium)
572—Yale Blue (Dark)
596—Antique Green (Light)
598—Hunter Green (Dark)
586—Golden Tan
581—Maroon
580—Granada Brown
590—Gloss Black
690—Black Mottle

Available in Brick, Brictile, Flatter and Tribric
Graded, Super, or "A"; Court, or "B"; Commercial, or "C"; Qualities

SANICOTE A vitreous clay coating fully covering the face, burned at a high temperature and similar in appearance to the highest grade smooth face brick manufactured from fire clay. The ideal product where a maximum of light reflection without glare and clean colorful non-absorbent walls are desired. Furnished in Field and Trim shades in the following colors:

LIGHT SHADES (S)

730—Cream
760—Gray Limestone
761—Blue Gray

TRIM SHADES (ST)

796—Green
798—Dark Green
771—Blue
780—Brown
790—Black

Available in Brick, Brictile and Tribric, **graded, super, or "A"; Court, or "B"; Commercial, or "C"; qualities.**

UNGLAZED Structural units of the highest type produced from the same materials and with the same workmanship as Stark glazed products. A quality product adaptable to any structure where face brick would be used. As a loadbearing material, compares favorably with the cost of plastered walls. Furnished in grades and shades as follows:

Select Quality (A Grade) A blend of buff shades.
Standard Quality (B Grade) A blend of buff and grey shades.
Industrial Quality (C Grade) No color selection.

Available in Brick, Brictile, Tribric, and Face Tile.

STARK SALT GLAZE A glossy Stark salt glaze directly upon the clay body. The heavy glaze (a sodium alumina silicate) upon a semi-vitrified body of quality clay, becomes an integral part of the body and having the same expansion and contraction. This smooth lustrous (image reflecting) finish has been the standard of the country for a quarter of a century for light, sanitary, enduring, and economical interior walls. Furnished in shade ranges and mingled shades as follows:

SUPER QUALITY "A" GRADE

Shade Ranges (GSS)
50—Creamy Gray
55—Cream
60—Light Buff
75—Medium Buff

Mingled Shades (G)
Gratone—A blend of Gray shades
Creamtone—A blend of Cream shades
Buftone—A blend of Buff shades

COURT AND COMMERCIAL QUALITIES
"B" AND "C" GRADES

Gray Mingle—A mingle of Gray and Cream shades.
Light Mingle—A mingle of Cream and Buff shades.

Available in Brick and Brictile

WATER STRUCK Hand mould water struck Colonial brick, reproducing the Early American with complete fidelity of color, texture, size and finish. All required shapes for exterior work are available. Furnished in shades as given below:

"Harvards" Blend of dark and medium reds in shades characteristic of New England products.
"Radcliffes" Blends of rose, light red and saffron shades found in many early American buildings of distinction.
"Malvernes" Blend of dark, medium and light reds with browns and tans. Includes a percentage of dark flashed headers.

Available in Brick only

FLOOR TYPES

CARBON MANGANESE GLAZE A salt, carbon and manganese glaze burned into a high grade fire clay body. The resultant vitrified blue body is low-absorbent, non-abrasive and acid resistant. Produced in full glazed and semi-glazed types.

Dairy Type Full glazed units selected for a rich blend of maroon shades.
Packer Type Blue bodied semi-glazed units having a maximum of non-skid qualities in maroon and brown shades.
Acid Type Blue bodied fully glazed units, resistant to all acids (except hydrofluoric). No color selection.

Graded, First "A", and Second "B" Qualities.

Available in Standard and Heavy Duty sizes

Court, Commercial, Standard, Backup and Common qualities or B and C Grades are offered subject to stock only.

DEFINITIONS ON GRADING

GLAZED OR SANICOTE WALL TYPES

SUPER QUALITY (A GRADE) Units of the highest structural and mechanical perfection consistent with the manufacturing process employed.

The variation in dimensions from standard dimensions shown on page 2 and 3 shall not exceed the maximums shown below:

	Brick	Flatter	Brictile	Tribric
Length	1/8"	1/8"	1/8"	3/16"
Height	1/16"	3/32"	3/32"	3/32"
Depth	1/8"	1/8"	1/8"	1/8"

Maximum tolerance for distortion of the plane and for the edge of the face shall be 1/16", and only a reasonable percentage shall approach the maximum.

COURT QUALITY (B GRADE) Units having slight mechanical and/or glaze or coating defects, including small handling chips. Variations in dimensions greater than the tolerances for "A" Grade are permissible.

COMMERCIAL QUALITY (C GRADE) Units having larger defects: including handling chips, glaze or coating defects, factory and kiln marks, or with dimensional variation beyond that for "A" or "B" Grades.

UNGLAZED WALL TYPES

SELECT QUALITY (A GRADE) As true and mechanically perfect as careful manufacture can produce.

The variations in dimensions from standard dimensions shall not exceed the maximum shown below:

	Brick	Brictile	Tribric	8" Tile	12" Tile
Length	5/32"	5/32"	1/4"	3/32"	5/16"
Height	1/16"	1/8"	1/8"	5/32"	3/32"
Depth	3/16"	3/16"	3/16"	3/16"	3/16"

Maximum tolerance for distortion of the plane and/or the edge of the face shall be 3/32".

STANDARD QUALITY (B GRADE) Wider shade variation with some mechanical defects, including small handling chips and slight flashing, but meeting all requirements of loadbearing, structural units. Variations in dimensions greater than the tolerance for "A" Grade are permissible.

INDUSTRIAL QUALITY (C GRADE) Loadbearing units, either imperfect mechanically; dusted, stained or chipped, or with dimensional variations beyond the limits for "A" and "B" Grades.

FLOOR TYPES

FIRST QUALITY (A GRADE) As true and mechanically perfect with as uniform a glaze and color as possible in the type of product.

SECOND QUALITY (B GRADE) Slight mechanical imperfections and distortions, overglaze, handling and glazing defects. Not selected for color.

SHAPES EXPLANATORY NOTES

The shapes illustrated and noted upon pages following are the most complete line ever offered by THE STARK BRICK COMPANY and cover all normal construction requirements. All have been revised for proper bonding and relation to each other and shapes of several series may now be successfully used together. The shape number and nomenclature shown in **Black Face** type under each illustration is that of the shape shown and those in light face type are variants thereof.

SYMBOLS. Symbols in circles or ovals superimposed upon shape drawing indicate the shape group and price class thereof as follows:

Glazed and Sanicote	UNGLAZED TILE Horizontal Void 5x8	Horizontal Void 5x12	Vertical Void 5x8	Vertical Void 5x12	
S	2H	3H	2A	3A	**Stretcher** group with 3⅞″ (or 3¾″) bed width
S2	2H2	3H2	2A2	3A2	**Soap Stretcher** group with 1¾″ bed width
S6	2H6	3H6	2A6	3A6	6″ **Bonding Stretcher** group with 5⅞″ bed width
S8	2H8	3H8	2A8	3A8	8″ **Bonding Stretcher** group with 8″ bed width
SQ					**Quoin group** (stretcher plus quoin differential)
S2Q					**Soap Quoin** group (soap stretcher plus quoin differential)
SD	2HD	3HD	2AD	3AD	**Two Face Stretcher** group (stretcher plus two face differential)
	2H6D	3H6D	2A6D	3A6D	**Two Face 6″ Stretcher** group (6″ stretcher plus two face differential)
	2H8D	3H8D	2A8D	3A8D	**Two Face 8″ Stretcher** group (8″ stretcher plus two face differential)
1			2A3	3A3	**Group I Shapes;** Bullnose, Octagon, Square Sill
2			2A5	3A5	**Group II Shapes;** Caps, Coves, Bullnose Sill
3			2A7	3A7	**Group III Shapes;** Lintel, Radial and Double Radius stretcher and additional faced Group I and II Shapes
4			2A9	3A9	**Group IV Shapes;** Corner Fittings and Arches
5			2A11	3A11	**Group V Shapes;** Radial Fittings and Group IV Shapes with additional finished faces

All shapes shown Right Hand are Available in Left Hand. In Ordering Replace the Letter R with the Letter L. Example: D22R Bn. Sill Quoin Right. D22L Bn. Sill Quoin Left.

NUMBERING SYSTEM. Numbering system employed herein is a new and simplified system now standard in the industry. The first letter symbol denotes the face size; the numbers, the type; and the suffixed letters, wall depth, return or reveal, two face, half or fractional length, and right or left.

SCORING AND CORING. Stretchers may be shipped with scored back and/or end or smooth back and/or end or a mixture unless "Stretcher Smooth Back" is specifically ordered. Bonding 6″ and 8″ Stretchers in Salt Glaze will take the Two Face differential when ordered Smooth Back. Shaded Faces not shown as "Finished" on all other units may be smooth, scored or cored at option of manufacturer.

DIMENSIONS. Units are furnished only in dimensions given on shape detail pages. Lengths, Returns, and Reveals listed as 2″, 4″ and 6″ are actually 1¾″, 3⅞″ (or 3¾″), and 5⅞″ respectively. Dimensions shown on details are overall, except cap units are shown to face of wall and projection extends beyond dimensions.

WALL DEPTH. Stretcher units are regularly 3⅞″ (or 3¾″) wall depth except Cap and Cove which are regularly 1¾″ wall depth. See shape details for stretchers available in 1¾″, 5⅞″ or 8″ wall depth.

Internal corners are regularly 1¾″ wall depth unless shown differently upon shape details.

Cap and Cove External Corners and Starters are regularly 1¾″ wall depth with 1¾″ or 3⅞″ (or 3¾″) return. Other External Corners including Quoin, Bullnose and Starter are regularly 3⅞″ (or 3¾″) wall depth and return. Quoin, Bullnose and Starters are available in 1¾″ wall depth as shown on details.

RETURNS. The depth of the finished head on a Quoin (square corner) or Bullnose (round corner). The return will regularly be 3⅞″ (or 3¾″). See shape details for units available with 1¾″, 5⅞″ or 8″ returns.

REVEALS. The depth of the top face of a Sill or Cap or bottom face of a Lintel. Glazed back the full depth of the reveal on Sills or Lintels and ½″ as shown upon shape details on Caps.

LENGTHS. Units in S, F and D series are regularly 8″ in length, and in T series are 12″ in length. Internal corners and octagons in all series are regularly half bonding. Half length and fractional length units are not carried in stock and must be manufactured. Short lengths not shown or noted upon shape details are cut on job by contractor.

QUOINS. It is unnecessary to order Quoins in Salt Glaze unless more than 20% of the total stretcher order is required with finished head and face. No extra charge is made for Quoins in Sanicote unless quantity exceeds 20%.

BULLNOSE RADIUS. 1″ Bullnose radius is standard. All other radii are manufactured on special order only at an extra charge.

COVE RADIUS. 1¼″ Radius is standard with ½″ depth below finished floor. Cove shapes previously made with 1¾″ radius will be furnished without extra charge until stock is exhausted.

RADIAL AND ARCH BRICK. Made on special order only. Radial stretchers (plane profile) are Group III Shapes. Arch brick are Group IV Shapes. Radial fittings are Group V Shapes. Radials and Arches which do not come within regular stretcher dimensions will be priced specially upon submission of drawings.

DESIGN CAPS, BANDS AND INSERTS

Stark is here presenting a new departure in Cap and Band Course treatment and a line of decorative wall inserts. All units here shown are made with recessed false mortar joints outlining the designs and details. After being set in the wall, recesses are filled with the regular mortar used, giving the appearance shown in the photographs on this page.

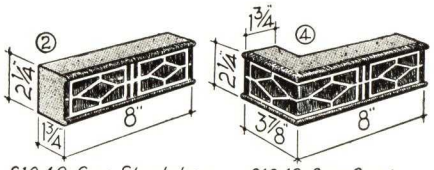
CAPS AND BANDS. Brictile units are designed for band course or flush plastering. If a protruding cap is desired for plastering, use S-40 shown on page 8, set out ¼" from face of wall above either D-1040 or D-2040. The bead upon brick size units (S-1040) is intended to set out ¼" from the wall, making the face in the same plane as the field of the wall. They are glazed back ½" on both top and bottom reveal for setback plastering and wall finish. *Furnished in "Colorglaze" Trim Shades only.*

INSERTS. Furnished in a variety of designs in sizes from 5" x 8" to 20¾" x 78". Each unit is hand painted in two to six Sanicote colors before final burning. The large size units are furnished in two or more pieces, which after being fitted together in the wall and pointed up, cannot be distinguished from one piece.

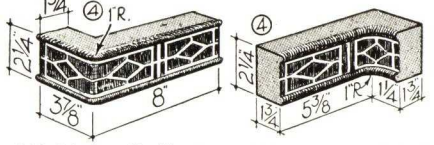
A special catalog of designs available will be furnished upon request.

BRICK GEOMETRIC CAP DESIGN

BRICK GEOMETRIC SHAPES
"S" SERIES 2¼"x8" FACE

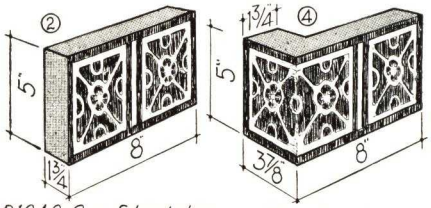


S1040-Cap Stretcher S1042-Cap Quoin

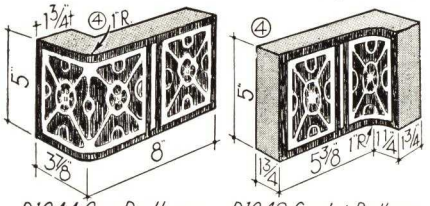


S1044-Cap Bullnose S1048-Cap Int Bullnose

BRICTILE GEOMETRIC SHAPES
D SERIES 5"x8" FACE



D1040-Cap Stretcher D1042-Cap Quoin



D1044-Cap Bullnose D1048-Cap Int Bullnose

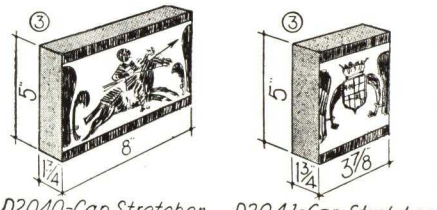
BRICTILE INDIVIDUAL BORDER DESIGNS

58C OAK LEAVES 5"x8"

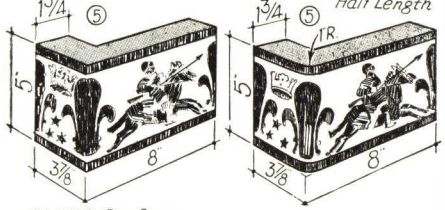
BRICTILE GEOMETRIC CAP DESIGN

BRICTILE ENGLISH CAP DESIGN

BRICTILE ENGLISH SHAPES
"D" SERIES 5"x8" FACE

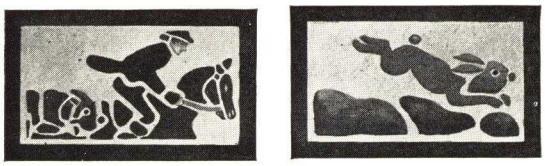


D2040-Cap Stretcher D2041-Cap Stretcher Half Length

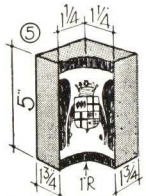


D2042R-Cap Quoin D2044R-Cap Bullnose

BRICTILE INDIVIDUAL BORDER DESIGNS



58A HORSEMAN 5"x8" 58B RABBIT 5"x8"



D2048-Cap Int Bullnose

INSERTS

2540A The Fox Chase 26"x41"

128D Bookworm
12½"x8"

1228A Solitary Bowler
12½"x28½"

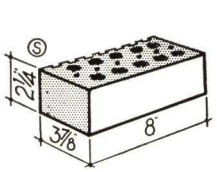
1024B Old King Cole 10¼"x24½"

128G Miss Muffet
12½"x8"

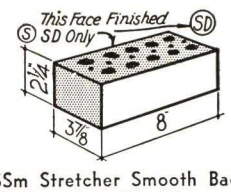
BRICK SHAPE DETAILS AND SIZES

"S" SERIES—2¼" x 8" FACE—ONE {BRICK / EQUIVALENT} UNITS

NATIONAL STANDARDIZATION - BRICK AND TILE SHAPES

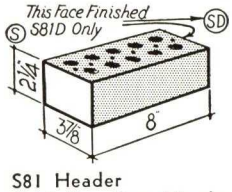


S Stretcher

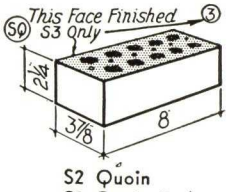


SSm Stretcher Smooth Back
SD Two Face Stretcher

SA Soap Stretcher
S2A Soap Quoin (2" Ret.)

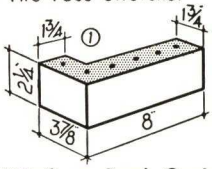


S81 Header
S81D Two Face Header

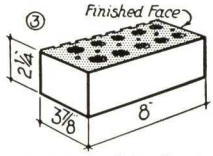


S2 Quoin
S3 Quoin End

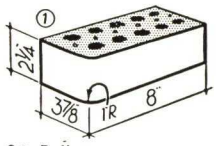
S2H Quoin 4" Length
S3H Quoin End 4" Length



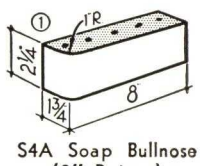
S2B Soap Bond Quoin
4" Return



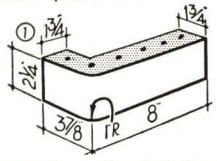
S83H Double Quoin



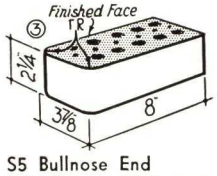
S4 Bullnose
S4H Same, 4" Length



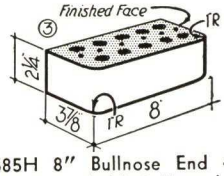
S4A Soap Bullnose
(2" Return)



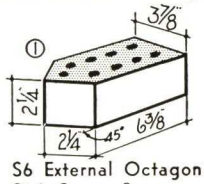
S4B Soap Bond Bullnose
4" Return



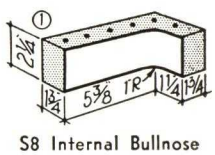
S5 Bullnose End
S5H Same, 4" Length



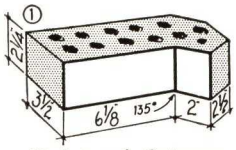
S85H 8" Bullnose End 4"
Length (Dbl. Bullnose)



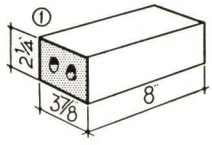
S6 External Octagon
S6A Same, Soap



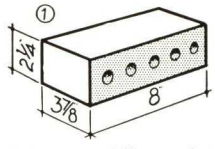
S8 Internal Bullnose



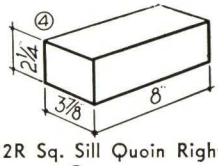
S9 Internal Octagon
S9A Same, Soap



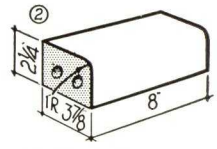
S10 Square Sill
S11 Same, 4" Length



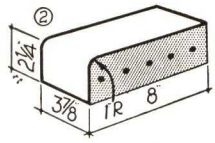
S811 Sq. Sill Header



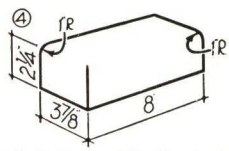
S12R Sq. Sill Quoin Right



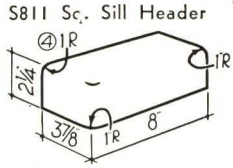
S20 Bullnose Sill
S21 Same, 4" Length
S20A Same, Soap 2" Reveal



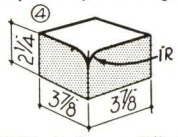
S821 Bullnose Sill Header
8" Reveal



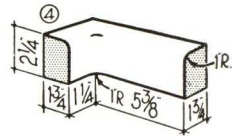
S22R Bullnose Sill Quoin Right
S22H Same, 4" Length



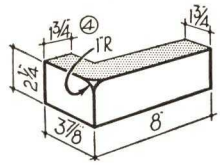
S24R Bullnose Sill Bn. Rt.
S24H Same, 4" Length



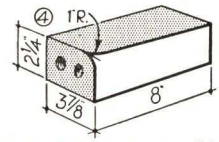
S27H Bullnose Sill Int.
Corner Square



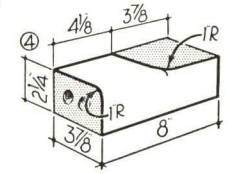
S28R Bn. Sill Int. Bn. Rt.
S28H Same 4" Length



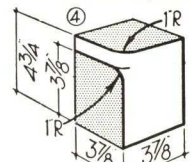
S204BR Soap Bn. Starter
4" Return Right
S204AR Same, 2" Return



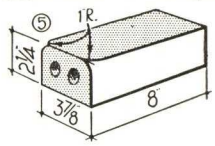
S34R Bullnose Mitre Right
S34HR Same, 4" Length
S34AR Same, Soap



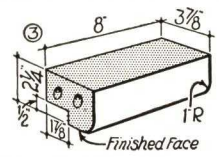
S34JR Bullnose Sill
Jamb Mitre Right



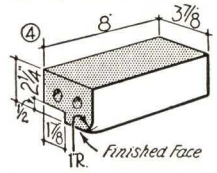
FS34R Rowlock Bullnose
Sill Mitre Right



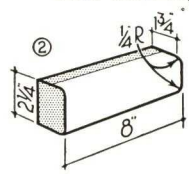
S35 Bn. Coping Mitre
S35H Same, 4" Length



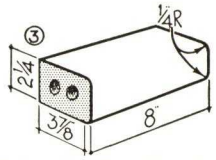
S720 Bullnose Lintel
S710 Same, Square



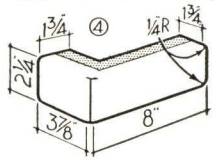
S734R Bn. Lintel Mitre Right



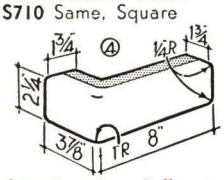
S40 Box Cap Stretcher
2" Reveal



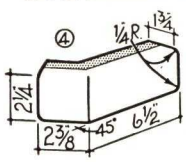
S40M Box Cap Stretcher
4" Reveal
S41M Same, 4" Length



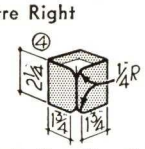
S42 Box Cap Quoin
S42H Same, 4" Length



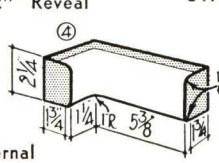
S44 Box Cap Bullnose
S44H Same, 4" Length



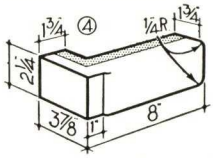
S46 Box Cap External Octagon
S49 Same, Internal (not shown)



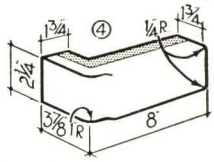
S47H Box Cap Internal
Corner Square



S48 Box Cap Int. Bn.
S48H Same, Half Length



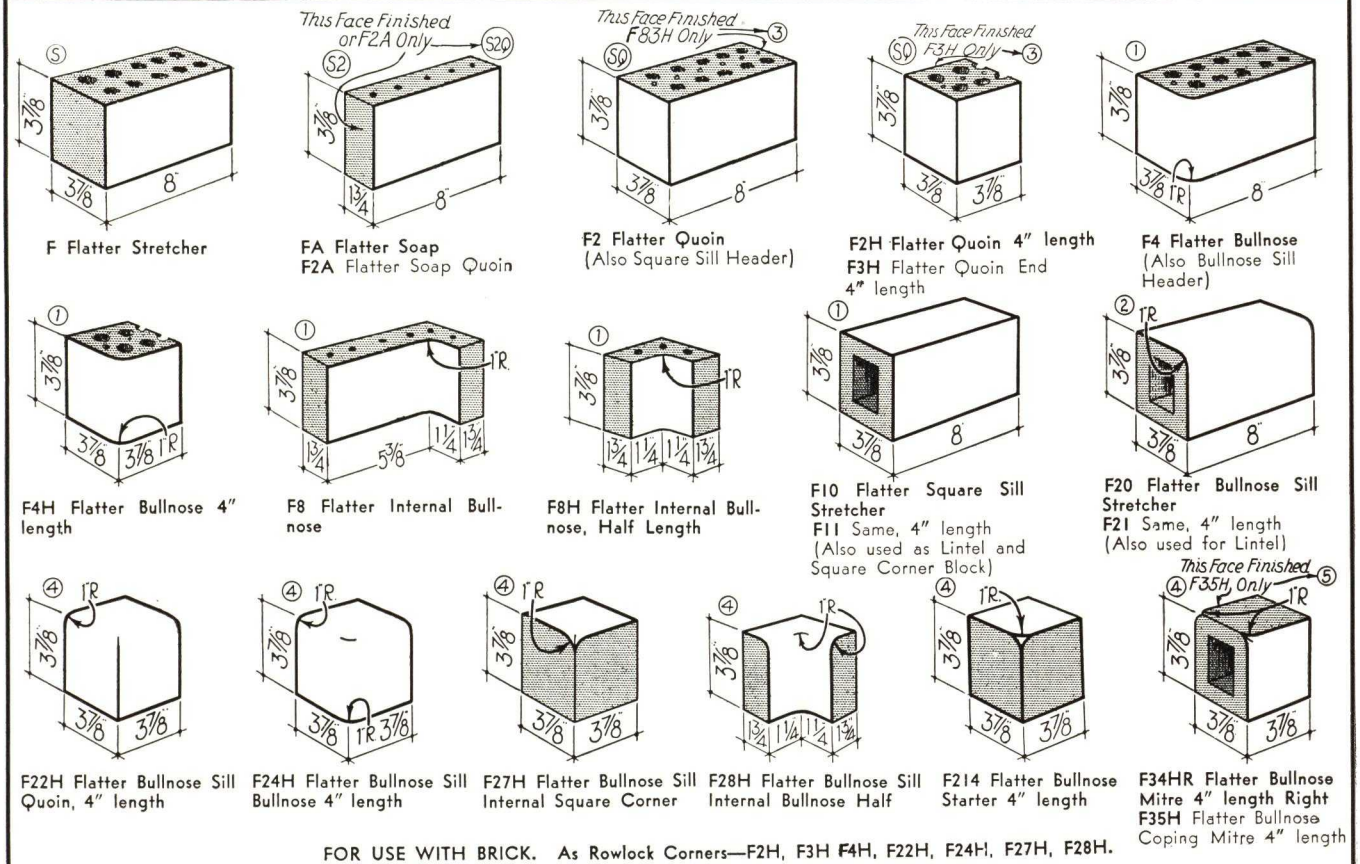
S402 Box Cap Starter
Quoin
S402A Same, Soap
2" Ret



S404 Box Cap Starter
Bullnose
S404A Same, Soap 2" Ret.

See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

FLATTER SHAPE DETAILS AND SIZES



F Flatter Stretcher

FA Flatter Soap
F2A Flatter Soap Quoin

F2 Flatter Quoin
(Also Square Sill Header)

F2H Flatter Quoin 4" length
F3H Flatter Quoin End 4" length

F4 Flatter Bullnose
(Also Bullnose Sill Header)

F4H Flatter Bullnose 4" length

F8 Flatter Internal Bullnose

F8H Flatter Internal Bullnose, Half Length

F10 Flatter Square Sill Stretcher
F11 Same, 4" length
(Also used as Lintel and Square Corner Block)

F20 Flatter Bullnose Sill Stretcher
F21 Same, 4" length
(Also used for Lintel)

F22H Flatter Bullnose Sill Quoin, 4" length

F24H Flatter Bullnose Sill Bullnose 4" length

F27H Flatter Bullnose Sill Internal Square Corner

F28H Flatter Bullnose Sill Internal Bullnose Half

F214 Flatter Bullnose Starter 4" length

F34HR Flatter Bullnose Mitre 4" length Right
F35H Flatter Bullnose Coping Mitre 4" length

FOR USE WITH BRICK. As Rowlock Corners—F2H, F3H F4H, F22H, F24H, F27H, F28H.
As Rowlock Sills—F2H, F4H, F11, F21. As Soldier Corners—F10, F20.

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

DATA RELATIVE TO JOBS ILLUSTRATED

(1) **FRONT COVER ILLUSTRATION.**
SEAGRAMS DISTILLERY, Louisville, Ky.
Owner: Jos. A. Seagram & Sons, Louisville, Ky.
Architect: Joseph & Joseph, Louisville, Ky.
General Contractor: J. & E. Warm Co., Cincinnati, Ohio.
Interior: Stark Salt-Glazed Brictile.
Vats: Shade 585 Ceramic Colorglaze Brictile Soaps.
Representative: William E. Whaley, Louisville, Ky.

(2) **THE HECHT WAREHOUSE, Washington, D. C.**
Owner: The Hecht Company, Washington, D. C.
Architect: Abbott, Merkt & Co., New York City.
General Contractor: Consolidated Engineering Co., Baltimore, Md.
Exterior: Shade 535 Ivory Ceramic Colorglazed Brick with 590 Trim.
Representative: Hydraulic Press Brick Company, Washington, D. C.

(3) **COLONIAL BEACON OIL STATION, Brookline, Mass.**
Owner: Colonial Beacon Oil Co., New York City.
Architect: Company Architect.
General Contractor: Frankini Construction Co., Medford, Mass.
Exterior: Ceramic Colorglaze 520 Brictile.
Interior: Shade 50 Brictile, with 950 Trim.
Representative: Parry Brick Company, Boston, Mass.

(4) **SCHOFIELD FILLING STATION, Peoria, Illinois.**
Owner: Harry Schofield.
General Contractor: A. R. Lang Company, Peoria, Ill.
Exterior: Ceramic Colorglaze 520 Brictile.
Interior: Buftone Salt-Glazed Brictile.
Representative: Peoria Brick & Tile Company, Peoria, Ill.

(5) **THORNTON TOWNSHIP HIGH SCHOOL, Calumet City Illinois.**
Architect: W. S. Hutton, Hammond, Ind.
General Contractor: Patrick Warren Construction Company, Chicago, Ill.
Interior: Unglazed Face Tile.
Representative: Moulding-Brownell Corporation, Chicago, Ill.

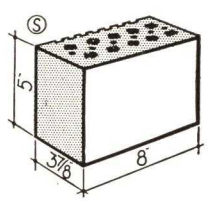
(6) **MINNEAPOLIS ARMORY, Minneapolis, Minn.**
Architect and Engineer: Major P. C. Bettenburg.
Consulting Architect and Engineer: Walter H. Wheeler.
General Contractors: Paul Steenburg Construction Co., and C. H. Peterson Company.
Interior: Unglazed Brictile.
Representative: Twin City Brick Company, Minneapolis, Minn., and St. Paul, Minn.

(7) **RIVERSIDE HIGH SCHOOL, Hodge, Texas.**
Architect: Wyatt C. Hedrick, Ft. Worth, Texas.
General Contractor: Harry B. Friedman, Hodge, Texas.
Interior: Creamtone Brictile with Shade 590 Gloss Black Trim.
Representative: Acme Brick Company, Fort Worth, Texas.

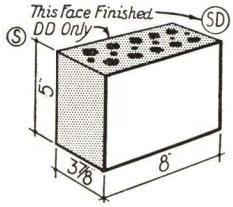
BRICTILE SHAPE DETAILS AND SIZES

"D" SERIES—5" x 8" FACE—TWO {BRICK / EQUIVALENT} UNITS

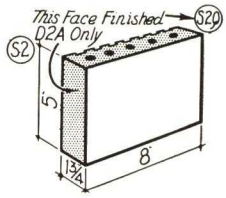
NATIONAL STANDARDIZATION - BRICK AND TILE SHAPES



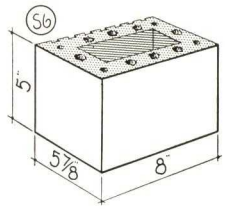
D Stretcher



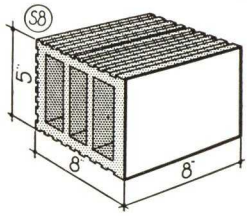
DSm Stretcher Smooth Back
DD Two Face Stretcher



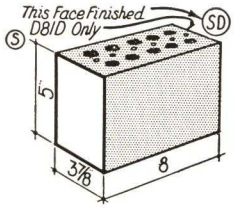
DA Soap Stretcher
D2A Soap Quoin



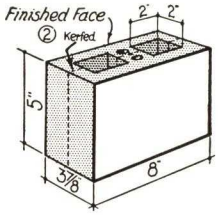
D60 6" Bonding Stretcher



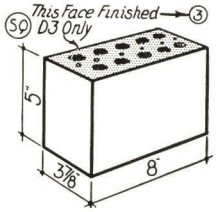
D80 8" Bonding Stretcher



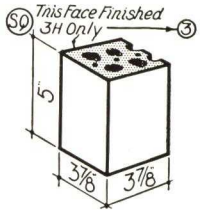
D81 Header
D81D Two Face Header



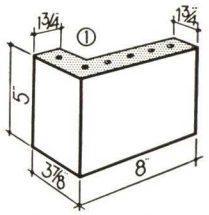
DV Kerfed Conduit Stretcher



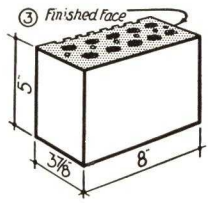
D2 Quoin
D3 Quoin End



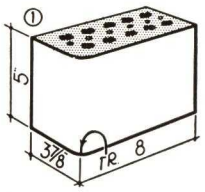
D2H Quoin 4" Length
D3H Quoin End 4" Length



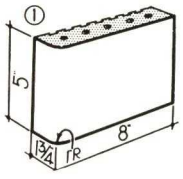
D2B Soap Bond Quoin
(4" Return)



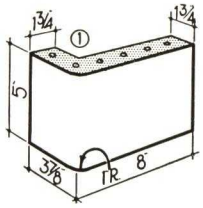
D83H 8" Quoin End 4"
Length (Double Quoin)



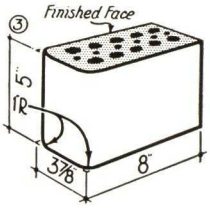
D4 Bullnose
D4H Same, 4" Length



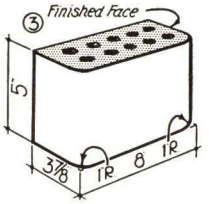
D4A Soap Bullnose
(2" Return)



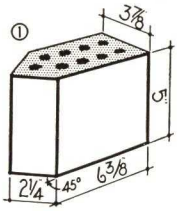
D4B Soap Bond Bullnose
4" Return



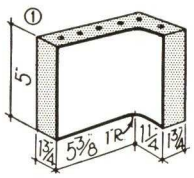
D5 Bullnose End
D5H Same, 4" Length



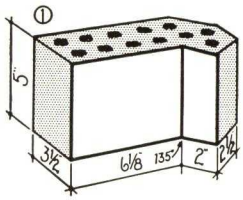
D85H 8" Bullnose End
4" Length (Double Bn.)



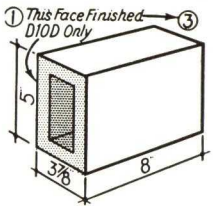
D6 External Octagon
D6A Same, Soap



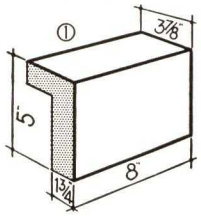
D8 Internal Bullnose



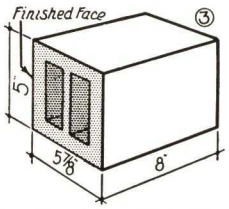
D9 Internal Octagon
D9A Same, Soap



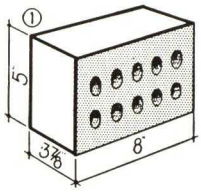
D10 Square Sill
D11 Same, 4" Length
D10D Square Coping



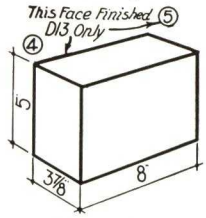
D10B Soap Square Sill
4" Reveal



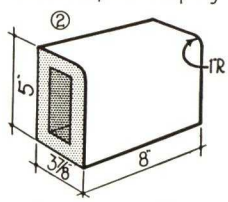
D610D 6" Square Coping
(Also 6" Lintel)



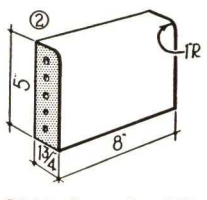
D811 8" Sq. Sill 4" Length
(Square Sill Header)



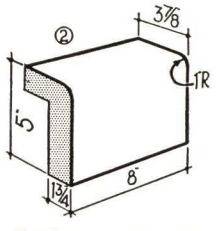
D12R Sq. Sill Quoin Rt.
D13 Sq. Coping End
D13H Same, 4" Length



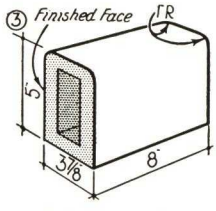
D20 Bullnose Sill
D21 Same, 4" Length



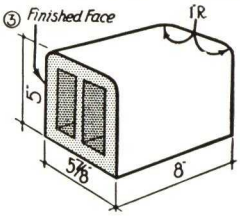
D20A Soap Bn. Sill
2" Reveal



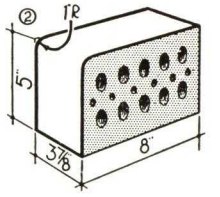
D20B Soap Bn. Sill
4" Reveal



D20D Bullnose Coping
D21D Same, 4" Length



D620D 6" Bullnose Coping
(Also 6" Lintel)

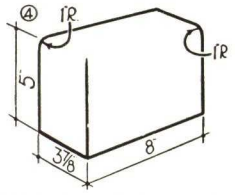


D821 8" Bullnose Sill 4"
Length (Bn. Header)

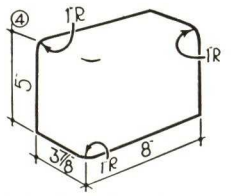
See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

BRICTILE SHAPE DETAILS, SHEET 2

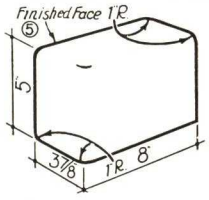
"D" SERIES—5" x 8" FACE—TWO {BRICK / EQUIVALENT} UNITS



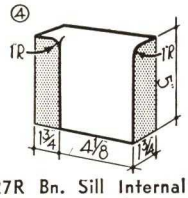
D22R Bn. Sill Quoin Rt.
D22H Same, 4" Length
D22AR Same, Soap 2" Ret



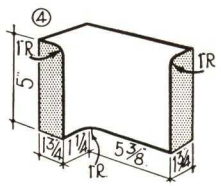
D24R Bn. Sill Bullnose Rt.
D24H Same, 4" Length
D24AR Same, Soap, 2" Ret



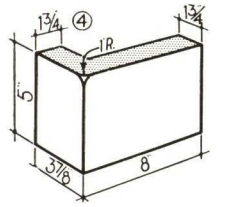
D25 Bullnose Coping Bullnose End
D25H Same 4" Length



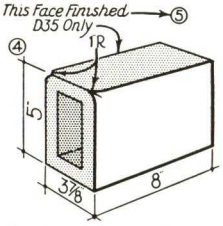
D27R Bn. Sill Internal Square Right
D27H Same, Half Length



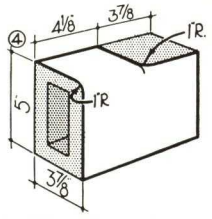
D28R Bn. Sill Internal Bullnose Right
D28H Same, Half Length



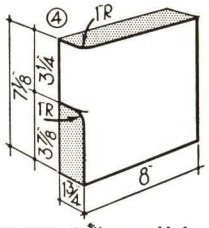
D204BR Soap Bn. Starter 4" Return Right
D204AR Same, 2" Return



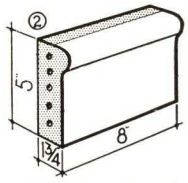
D34R Bn. Mitre Rt.
D34AR Same, Soap
D35 Bn. Coping Mitre



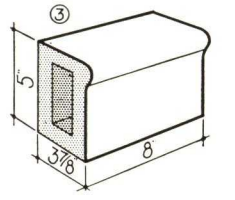
D34JR Bullnose Sill & Jamb Mitre Right



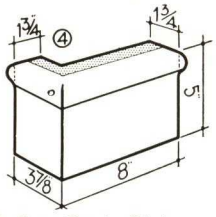
D34XR Bullnose Universal Mitre Right



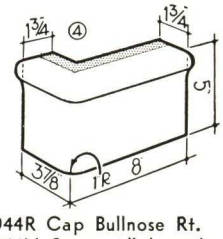
D40 Cap Stretcher 2" Reveal



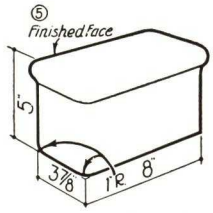
D40M Cap Stretcher 4" Reveal
D41M Same 4" Length



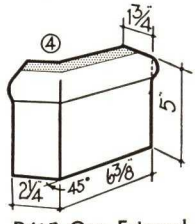
D42R Cap Quoin Right
D42H Same, 4" Length
D42AR Same, Soap 2" Ret.



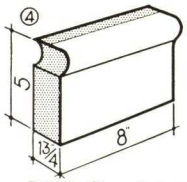
D44R Cap Bullnose Rt.
D44H Same, 4" Length
D44AR Same, Soap 2" Ret.



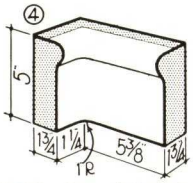
D45 Cap Bullnose End
D45H Same, 4" Length



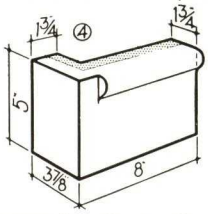
D46R Cap External Octagon Right
D49R Same, Internal (not shown)



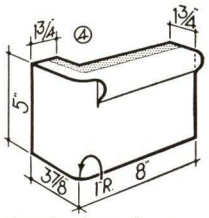
D47R Cap Internal, Coped Right



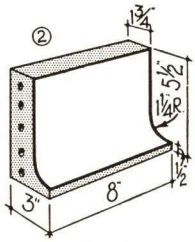
D48R Cap Internal Bullnose Right
D48H Same, Half Length



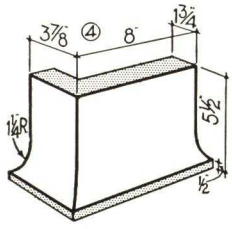
D402R Cap Starter Quoin Right
D402AR Same, Soap 2" Ret.



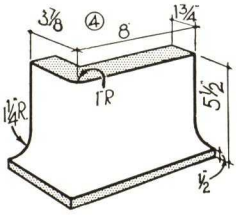
D404R Cap Starter Bullnose Right
D404AR Same, Soap 2" Ret.



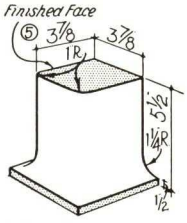
D50 Cove Stretcher



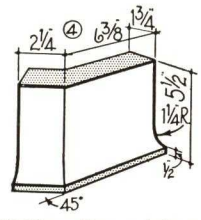
D52R Cove Quoin Rt.
D52H Same, 4" Length
D52AR Same, Soap 2" Ret.



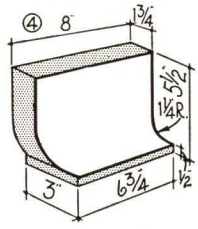
D54R Cove Bullnose Rt.
D54H Same, 4" Length
D54AR Same, Soap 2" Ret.



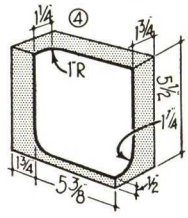
D55H Cove Bullnose End 4" Length



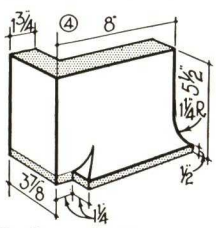
D56R Cove External Octagon Rt.
D59R Same, Internal (not shown)



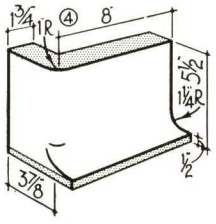
D57R Cove Internal Coped Right



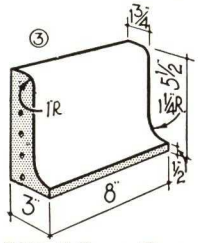
D58R Cove Internal Bullnose Right



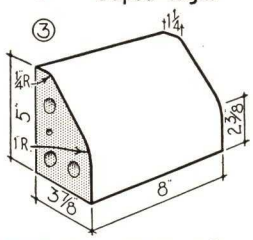
D502R Cove Starter Quoin Right
D502AR Same, Soap 2" Ret.



D504R Cove Starter Bullnose Right
D504AR Same, Soap 2" Ret



D520 Bullnose Cove Stretcher



D160 Slope Sill Stretcher

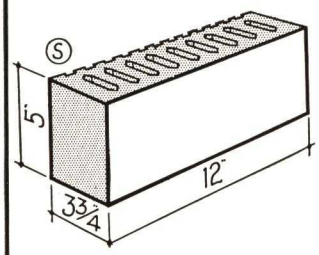
Corners and Starters furnished for the two above shapes.

See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

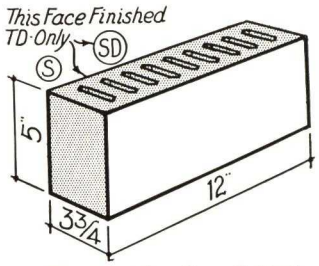
TRIBRIC SHAPE DETAILS AND SIZES

"T" SERIES—5" x 12" FACE—THREE {BRICK / EQUIVALENT} UNITS

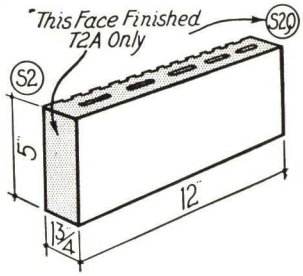
NATIONAL STANDARDIZATION - BRICK AND TILE SHAPES



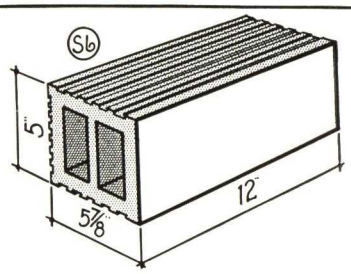
T Stretcher
T1 Stretcher 6" Length



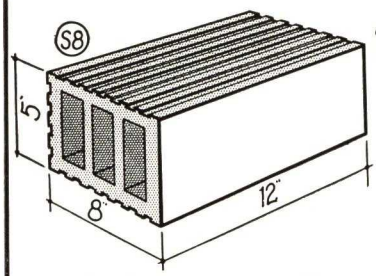
TSm Stretcher Smooth Back
TD Two Face Stretcher
TID Two Face, 6" Length



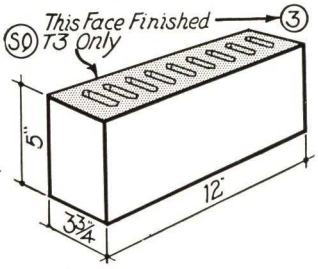
TA Soap Stretcher
T2A Soap Quoin 2" Return
T2AH, Same 6" Length



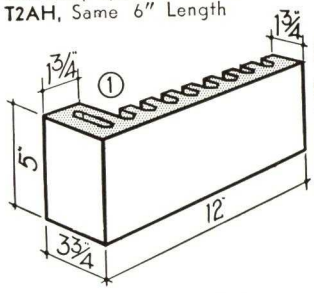
T60 6" Bonding Stretcher
T61 Same, 6" Length



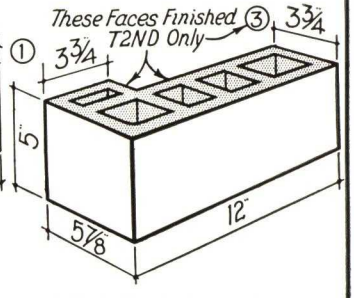
T80 8" Bonding Stretcher
T81 Same, 6" Length



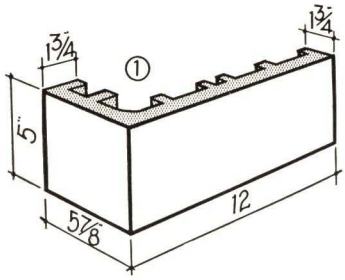
T2 Quoin
T2H Same, 6" Length
T3 Quoin End
T3H Same, 6" Length



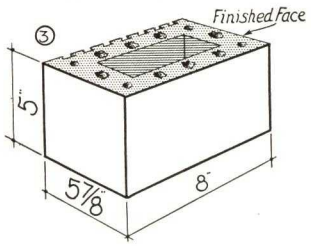
T2B Soap Bond Quoin 4" Return
T2BH Same 6" Length



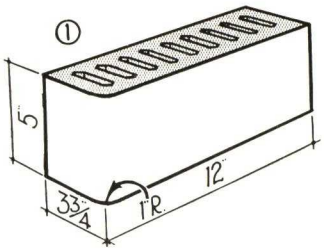
T2N Bond Quoin 6" Return
T2ND Same Two Face



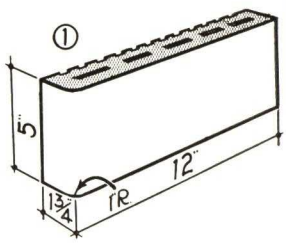
T2E Soap Bond Quoin 6" Return
T2EH Same, 6" Length



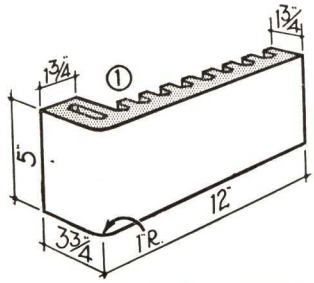
T83H 8" Quoin End 6" Length
(Double Quoin)



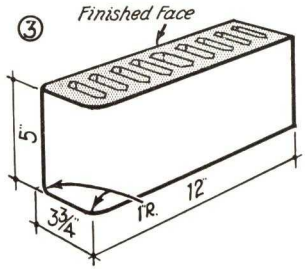
T4 Bullnose
T4H Same, 6" Length



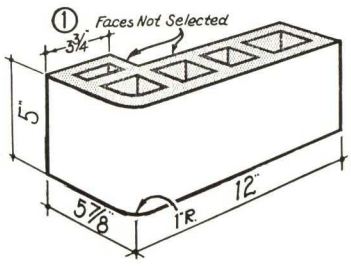
T4A Soap Bullnose 2" Return
T4AH Same, 6" Length



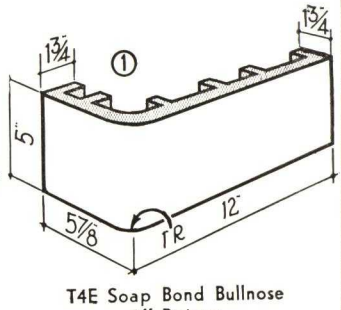
T4B Soap Bond Bullnose 4" Return
T4BH Same, 6" Length



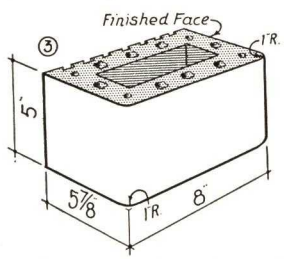
T5 Bullnose End
T5H Same, 6" Length



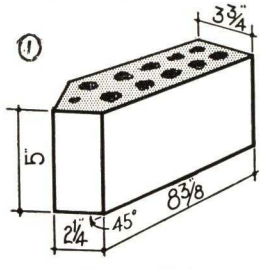
T4N Bond Bullnose
6" Return



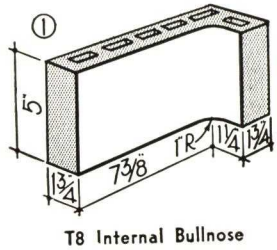
T4E Soap Bond Bullnose
6" Return
T4EH Same, 6" Length.



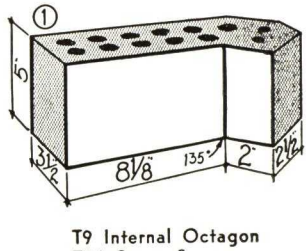
T85H 8" Bullnose End 6"
Length (Double Bullnose)



T6 External Octagon
T6A Same, Soap



T8 Internal Bullnose

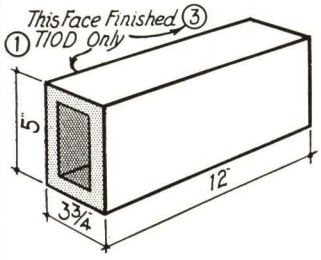


T9 Internal Octagon
T9A Same, Soap

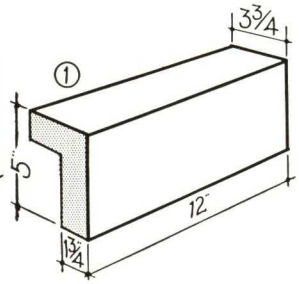
See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

TRIBRIC SHAPE DETAILS, SHEET 2

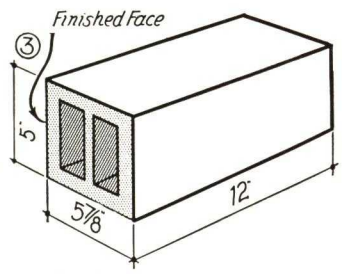
"T" SERIES—5" x 12" FACE—THREE {BRICK / EQUIVALENT} UNITS



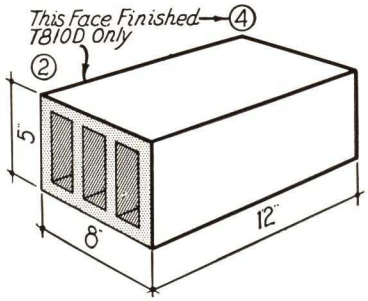
T10 Square Sill
T11 Same, 6" Length
T10D Square Coping



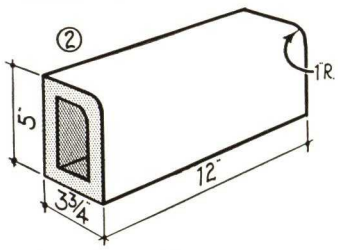
T10B Soap Square Sill
4" Reveal
T11B Same, 6" Length



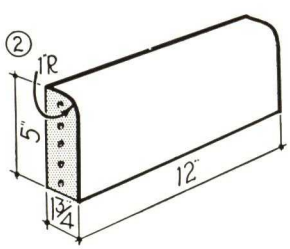
T610D 6" Square Coping
T611D Same, 6" Length



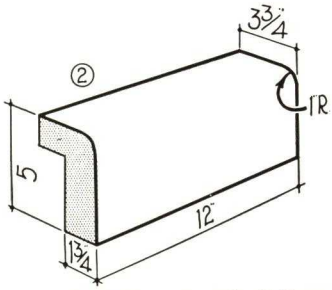
T810 8" Square Sill
T811 Same, 6" Length
T810D 8" Square Coping



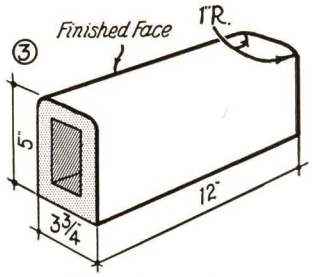
T20 Bullnose Sill
T21 Same, 6" Length



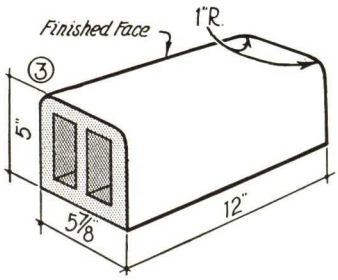
T20A Soap Bn. Sill 2" Reveal
T21A Same, Soap 6" Length



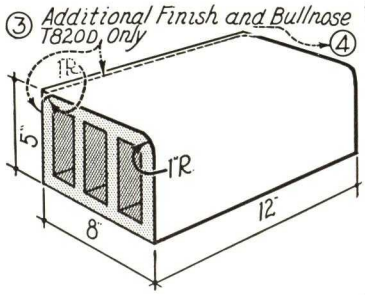
T20B Soap Bn. Sill 4" Reveal
T21B Same, 6" Length



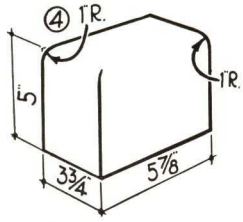
T20D Bullnose Coping
T21D Same, 6" Length



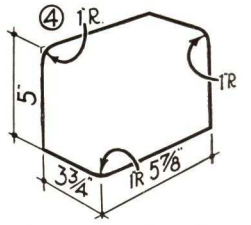
T620D 6" Bullnose Coping
T621D Same, 6" Length



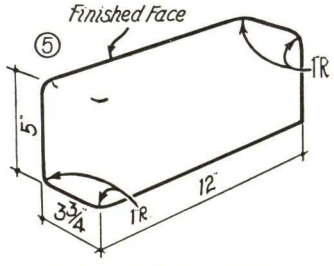
T820 8" Bullnose Sill
T821 Same, 6" Length
T820D 8" Bullnose Coping



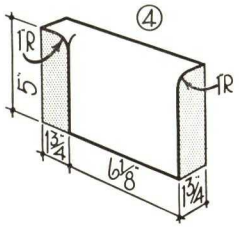
T22R Bn. Sill Quoin Right
T22AR Same, Soap 2" Return



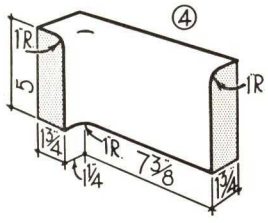
T24R Bn. Sill Bullnose Right
T24AR Same, Soap 2" Return



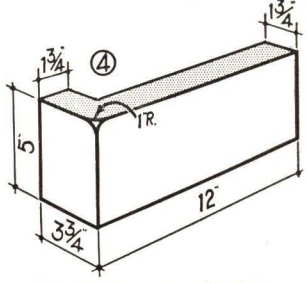
T25 Bn. Sill Bullnose End
T25H Same, 6" Length



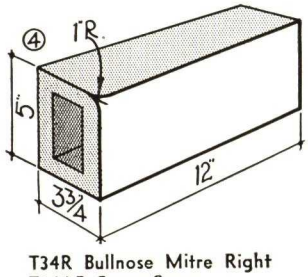
T27R Bn. Sill Internal
Square Right



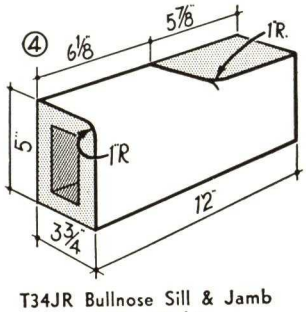
T28R Bn. Sill Internal
Bullnose Right



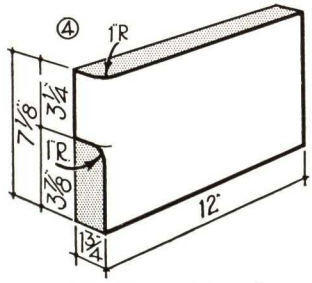
T204BR Soap Bn. Starter
4" Return Right
T204AR Same, 2" Return



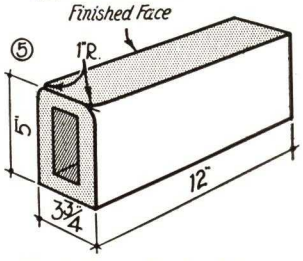
T34R Bullnose Mitre Right
T34AR Same Soap



T34JR Bullnose Sill & Jamb
Mitre Right



T34XR Bullnose Universal
Mitre Right

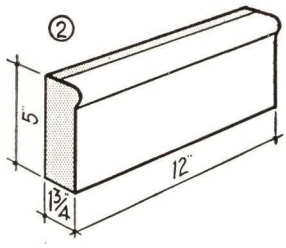


T35 Bullnose Coping Mitre
T35H Same, 6" Length

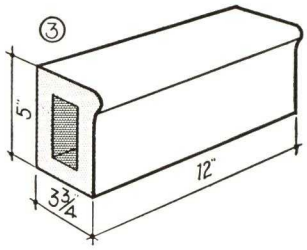
See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

TRIBRIC SHAPE DETAILS, SHEET 3

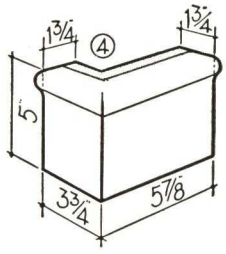
"T" SERIES—5" x 12" FACE—THREE {BRICK / EQUIVALENT} UNITS



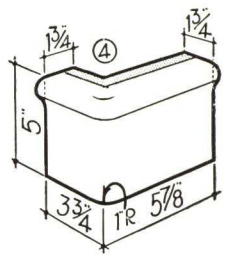
T40 Cap Stretcher 2" Reveal
T41 Same, 6" Length



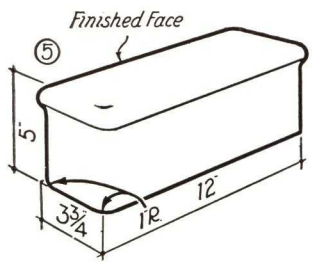
T40M Cap Stretcher 4" Reveal
T41M Same, 6" Length



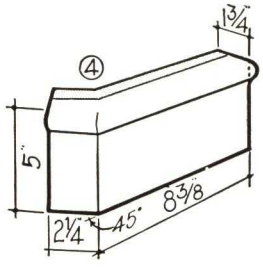
T42R Cap Quoin Right
T42AR Same, Soap 2" Return



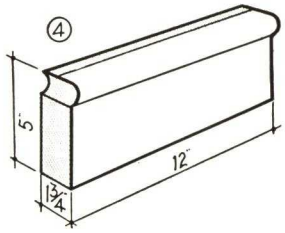
T44R Cap Bullnose Right
T44AR Same, Soap 2" Return



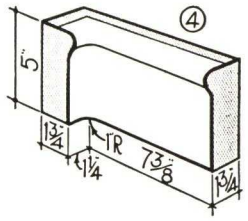
T45 Cap Bullnose End
T45H Same, 6" Length



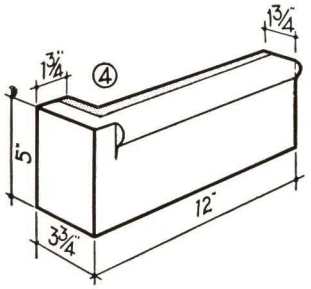
T46R Cap External Octagon Rt.
T49R Same Internal (Not Shown)



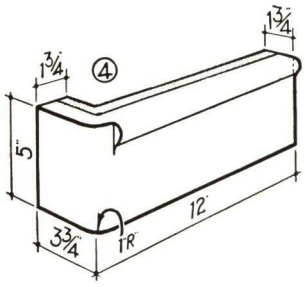
T47R Cap Internal Coped Right



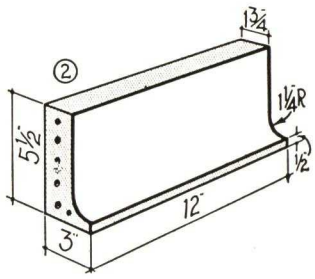
T48R Cap Int. Bullnose Right



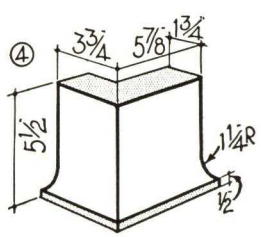
T402R Cap Starter Quoin Rt.
T402AR Same, Soap 2" Return



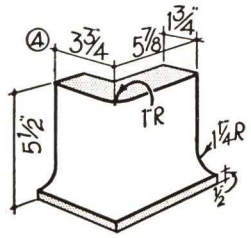
T404R Cap Starter Bullnose Rt.
T404AR Same, Soap 2" Return



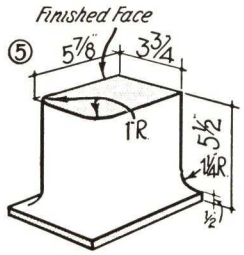
T50 Cove Stretcher
T51 Same, 6" Length



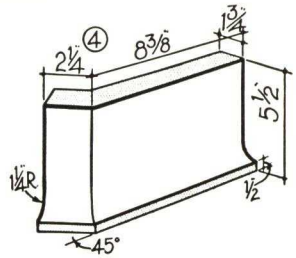
T52R Cove Quoin Right
T52AR Same, Soap 2" Return



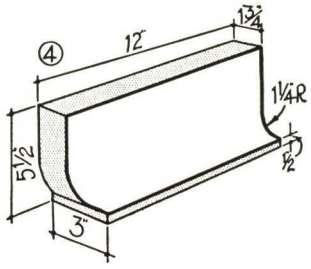
T54R Cove Bullnose Right
T54AR Same, Soap 2" Return



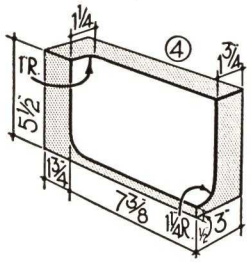
T55H Cove Bullnose End
6" Length



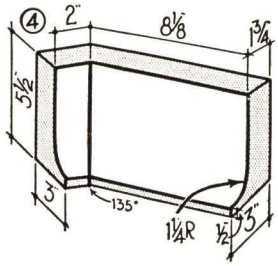
T56R Cove External Octagon Right



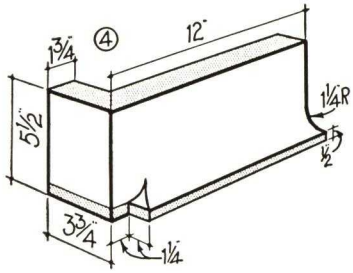
T57R Cove Internal Coped Right



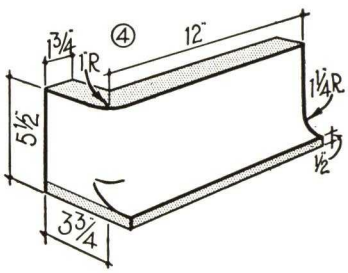
T58R Cove Internal Bullnose Right



T59R Cove Internal Octagon Right



T502R Cove Starter Quoin Rt.
T502AR Same, Soap 2" Return



T504R Cove Starter Bullnose Rt.
T504AR Same, Soap 2" Return

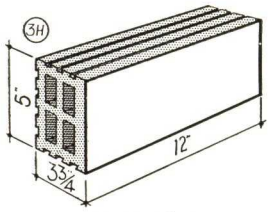
See Accompanying Notes for Explanation of Class Symbols Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

FACE TILE SHAPE DETAILS AND SIZES

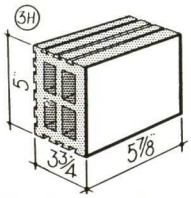
"3H"-"3A" SERIES - 5" x 12" FACE — "2H"-"2A" SERIES - 5" x 8" FACE

NATIONAL STANDARDIZATION - BRICK AND TILE SHAPES

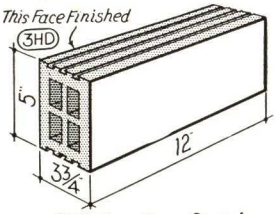
5" x 12" FACE (3H) SERIES



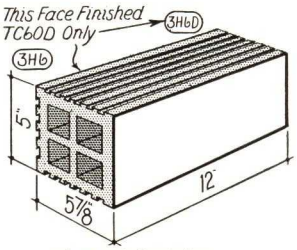
TC Stretcher



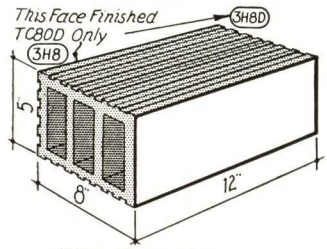
TC1 Stretcher 6" Length



TCD Two Face Stretcher
TC1D Same, 6" Length

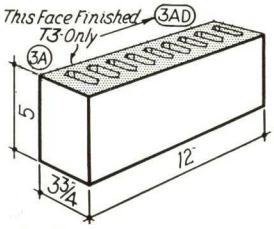


TC60 6" Stretcher
TC61 Same, 6" Length
TC60D Two Face 6" Str.
TC61D Same, 6" Length

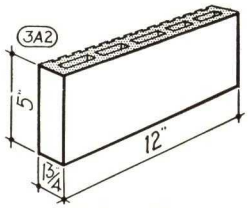


TC80 8" Stretcher
TC81 Same, 6" Length
TC80D Two Face 8" Str.
TC81D Same, 6" Length

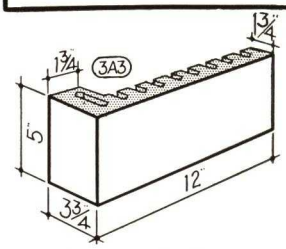
5" x 12" FACE (3A) SERIES



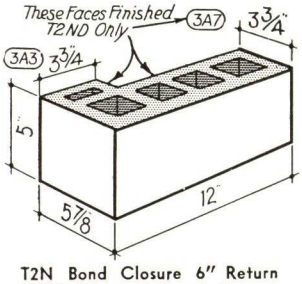
T2 Closure
T2H Half Closure
T3 Two Face Closure
T3H Same, 6" Length



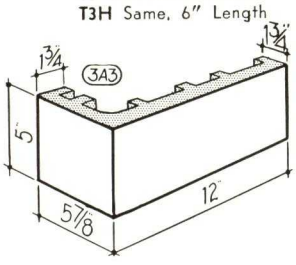
T2A Soap Closure
2" Return



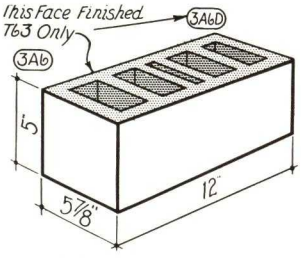
T2B Soap Bond Closure
4" Return



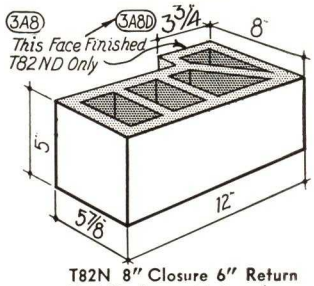
T2N Bond Closure 6" Return
T2ND External-Internal Corner (4" Wall)



T2E Soap Bond Closure 6" Return

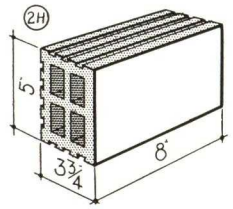


T62 6" Closure
T63 Two Face 6" Closure
T63H Same, 6" Length

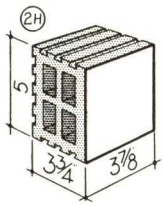


T82N 8" Closure 6" Return
T82ND External-Internal Corner (8" Wall)

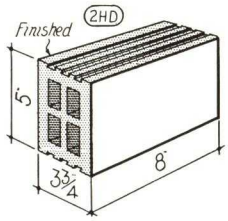
5" x 8" FACE (2H) SERIES



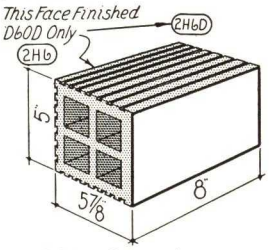
DC Stretcher



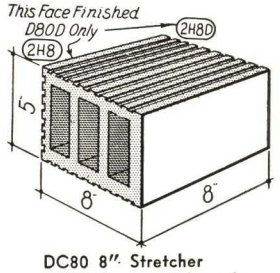
DC1 Stretcher 4" Length



DCD Two Face Stretcher
DC1D Same, 4" Length

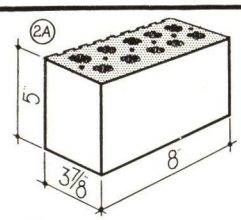


DC60 6" Stretcher
DC61 Same, 4" Length
DC60D Two Face 6" Str.
DC61D Same, 4" Length

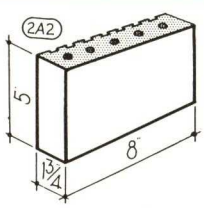


DC80 8" Stretcher
DC81 Same, 4" Length
DC80D Two Face 8" Str.
DC81D Same, 4" Length

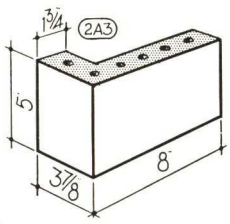
5" x 8" FACE (2A) SERIES



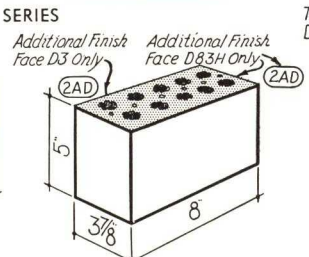
D2 Closure
D2H Same, 4" Length



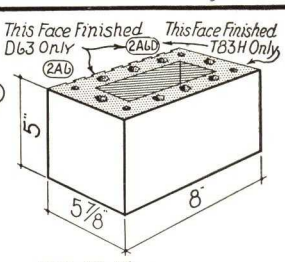
D2A Soap Closure
2" Return



D2B Soap Bond Closure
4" Return



D3 Two Face Closure
D3H Same, 4" Length
D83H Two Face 8" Closure 4" Length



D62 6" Closure
D63 Two Face 6" Closure
D63H Same, 4" Length
T83H Two Face 8" Closure 6" Length

NOTE: Any Brictile or Tribric Shape will be furnished unglazed except cove and cap shapes.

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

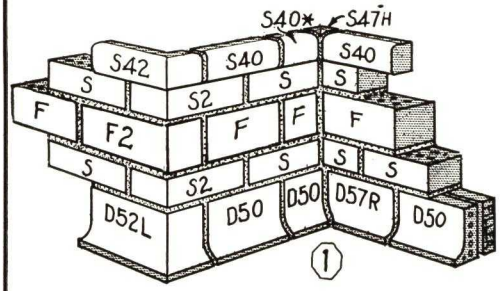
CONSTRUCTION DETAILS

Upon the following pages will be found structural designs for all types of Stark products. Typical details of bonding for various wall thicknesses and conditions are shown. Sill, jamb, lintel, and external and internal corner construction is demonstrated. In all cases the use of two bonded units is recommended for two faced partitions.

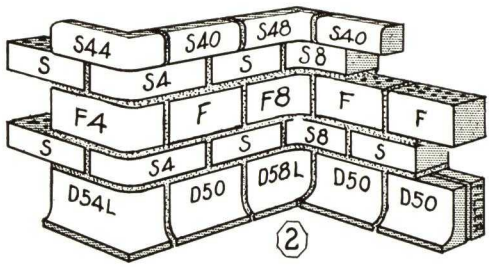
In exterior construction, water at times gets into the masonry through defective or improper coping and flashing or leaky joints caused by improper mortars. This water will work down through the walls and in freezing weather may cause great damage for which the manufacturer can be in no way responsible.

Extensive research has been made by various agencies as to proper and correct coping, flashing, and mortars for practically any condition. These researches are set forth in pamphlet form by the various agencies conducting the tests and are available upon application.

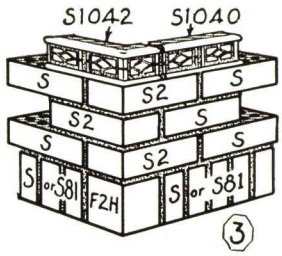
CONSTRUCTIONAL DETAILS — BRICK AND FLATTER



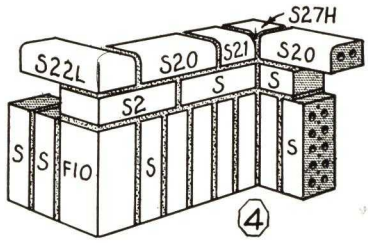
Square corners; Box cap, Flatter rowlock, Brictile cove.



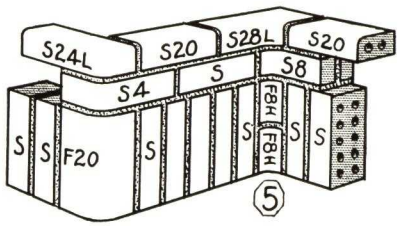
Round corners; Box cap, Flatter rowlock, Brictile cove.



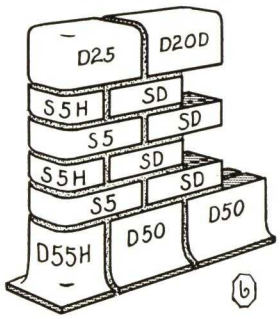
Square corners; Geometric cap, Brick rowlock.



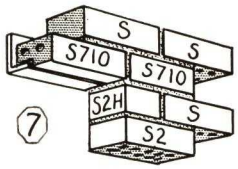
Square corners; Sill as cap, Brick soldier base.



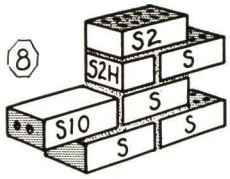
Round corners; Sill as cap, Brick soldier base.



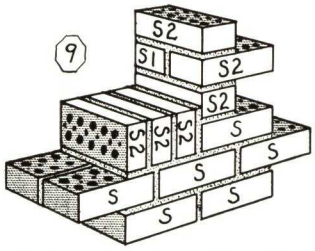
Bullnose end 4" free standing wall; Brictile coping and cove.



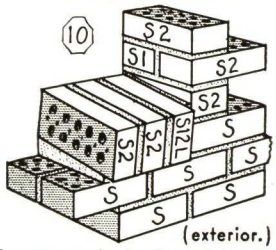
Square jamb and lintel.



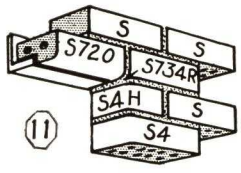
Square stretcher sill and jamb.



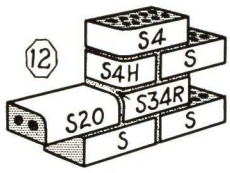
Square rowlock sill and jamb



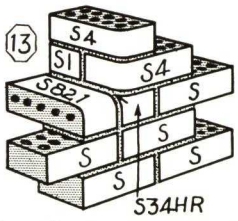
Square rowlock sill and jamb.



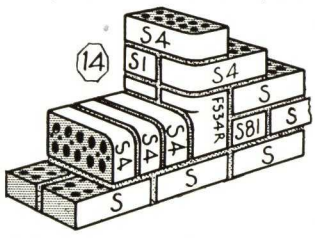
Bullnose jamb and lintel.



Bullnose stretcher sill and jamb.



Bullnose header sill and jamb.

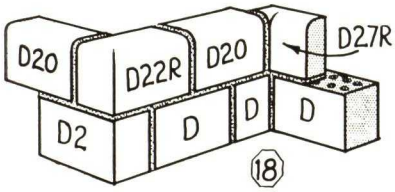


Bullnose rowlock sill and jamb.

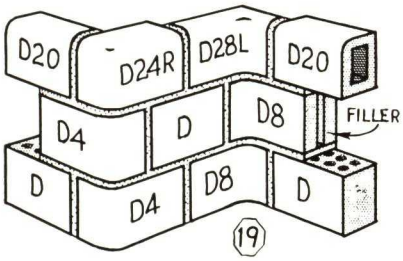
** Cut on job When required*

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

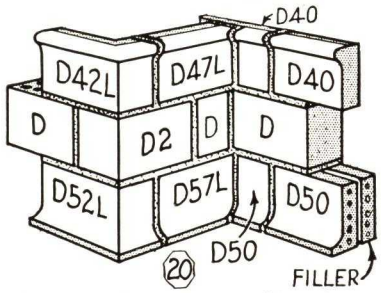
CONSTRUCTIONAL DETAILS — BRICTILE



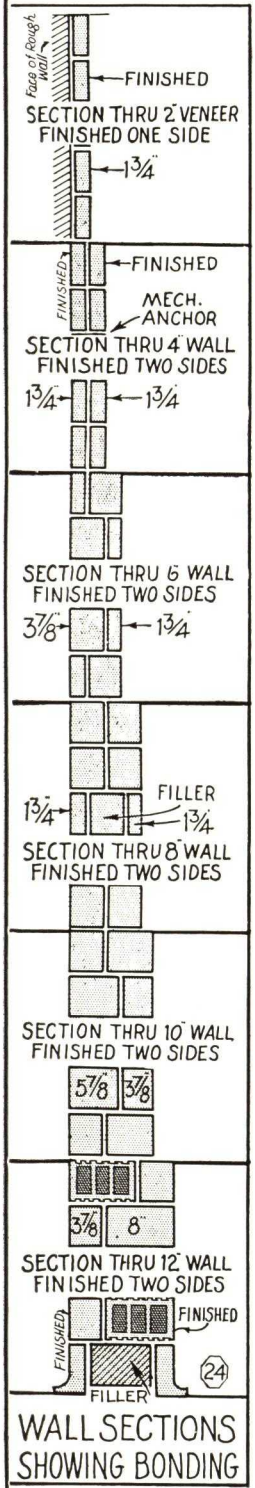
Square corners; sill as cap

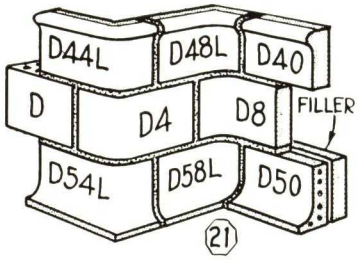


Round corners; sill as cap.

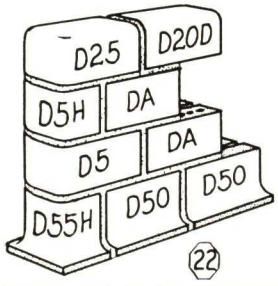


Square corners; cap mould and cove.

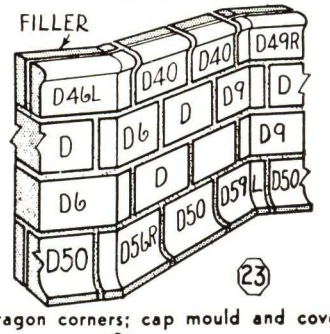




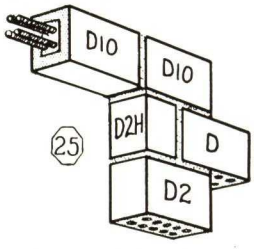
Round corners; cap mould and cove.



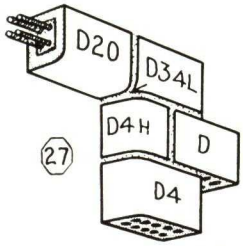
Bullnose end 4" free standing wall coping and cove.



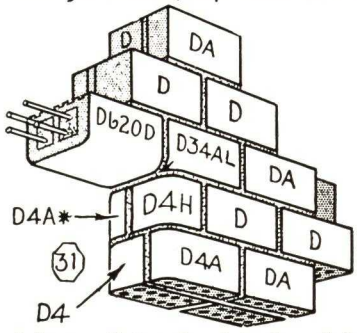
Octagon corners; cap mould and cove.



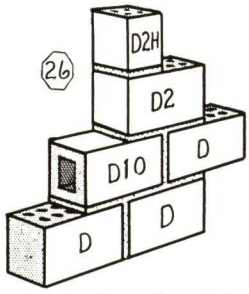
Square jamb and lintel (suspended sill.)



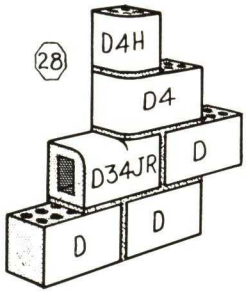
Bullnose jamb and lintel (suspended sill.)



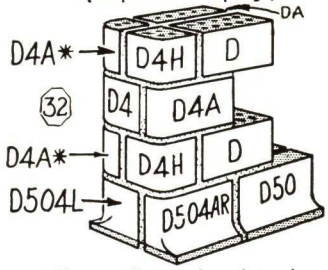
Bullnose 6" two faced jamb and lintel (suspended coping.)



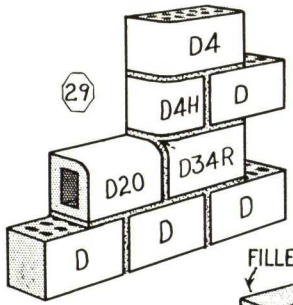
Square stretcher sill and jamb.



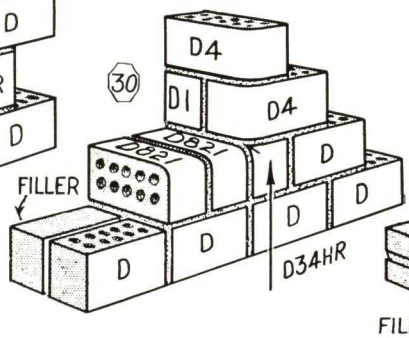
Bullnose jamb and stretcher sill.



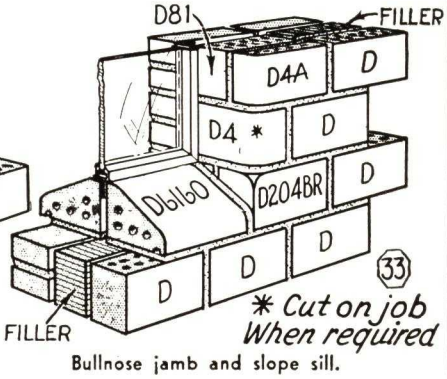
Bullnose 6" two faced jamb; cove base with starters.



Bullnose jamb and stretcher sill.



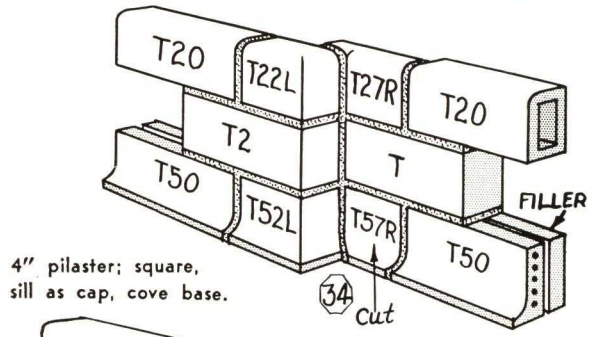
Bullnose jamb and header sill.



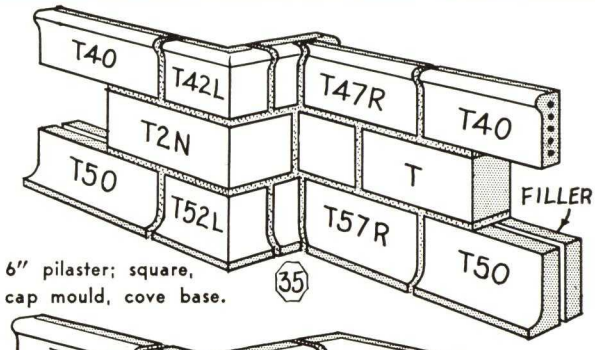
Bullnose jamb and slope sill.

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

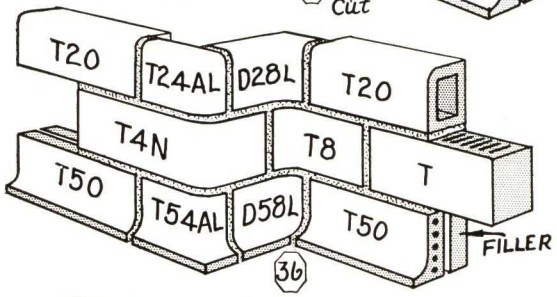
CONSTRUCTIONAL DETAILS — TRIBRIC



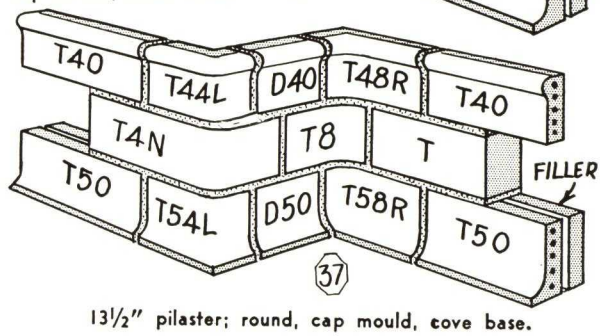
4" pilaster; square, sill as cap, cove base.



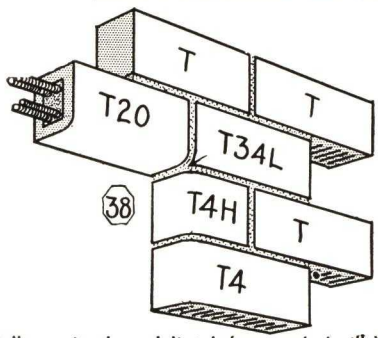
6" pilaster; square, cap mould, cove base.



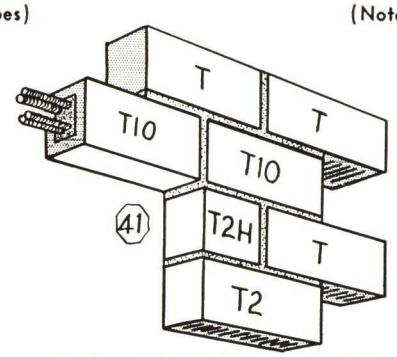
7½" pilaster; round, sill as cap, cove base.
(Note use of "Brictile" internal shapes)



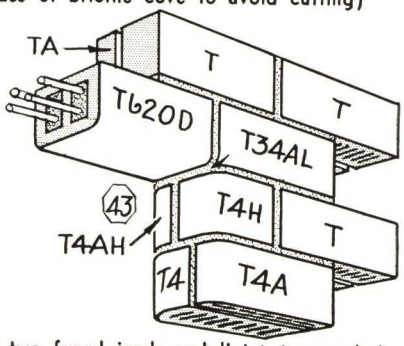
13½" pilaster; round, cap mould, cove base.
(Note use of "Brictile" cove to avoid cutting)



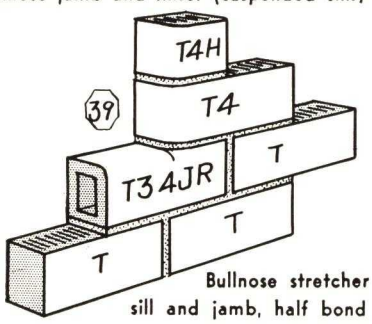
Bullnose jamb and lintel (suspended sill.)



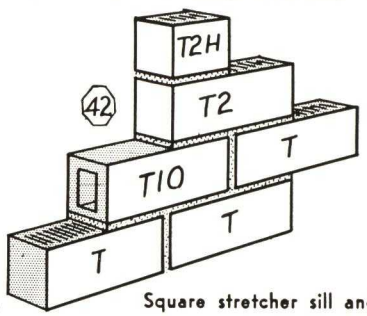
Square jamb and lintel (suspended sill.)



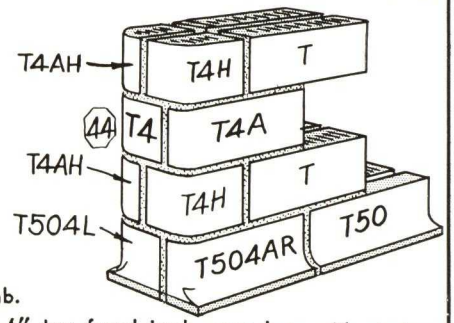
6" two faced jamb and lintel (suspended coping.)



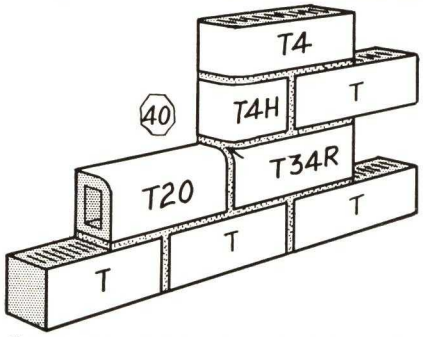
Bullnose stretcher sill and jamb, half bond mitre.



Square stretcher sill and jamb.

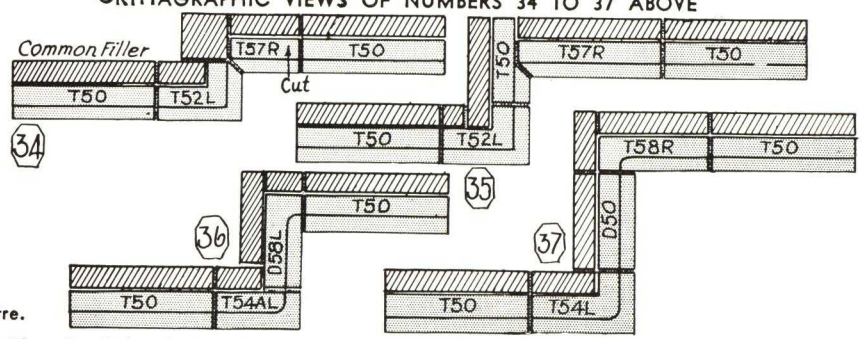


6" two faced jamb, cove base with starters.



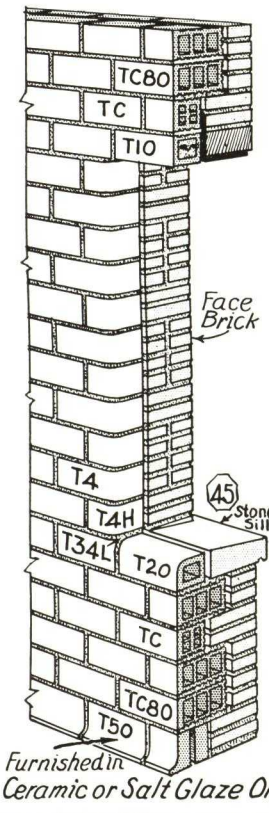
Bullnose stretcher sill and jamb, half bond mitre.

ORTHAGRAPHIC VIEWS OF NUMBERS 34 TO 37 ABOVE

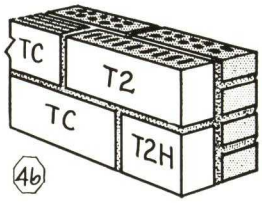


See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

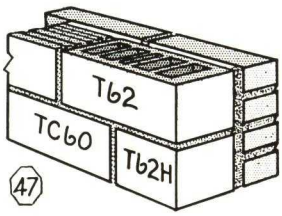
CONSTRUCTIONAL DETAILS — FACE TILE



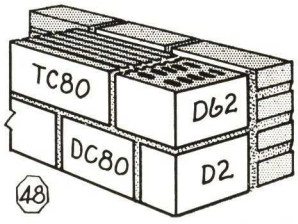
Square lintel, Bullnose jamb and sill, cove base.



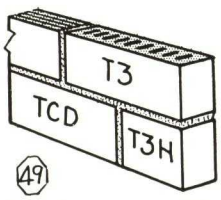
Jamb for one face 8" wall.



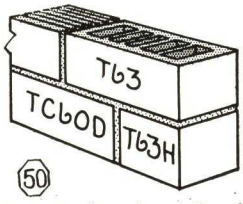
Jamb for one face 10" wall.



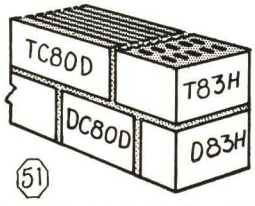
Jamb for one face 12" wall.



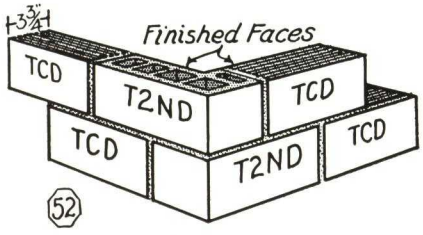
Jamb for two face 4" wall.



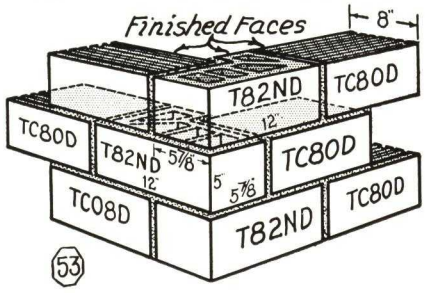
Jamb for two face 6" wall.



Jamb for two face 8" wall.



Corner for two face 4" wall.



Corner for two face 8" wall.

See Accompanying Notes for Explanation of Class Symbols, Shape Numbers, Scoring and Coring, Finished Faces, Fractional Lengths, Quoins, Returns, Reveals, Variants, Tolerances and Other Explanatory Notes.

CONSTRUCTIONAL DETAILS — GENERAL

LAYING DETAILS FOR FLOOR BRICK

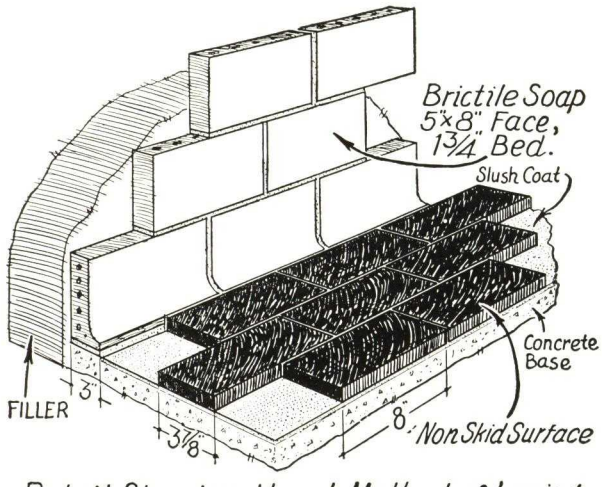
The most important factor in laying a floor with our Sanitary Floor Brick is to tamp the brick well and to continue the work and finish the grouting before leaving the job to set. If the brick are tamped down for a certain area, they should not be allowed to stand overnight, but filled in with grouting before leaving the work.

The bed of concrete varies from 1" to 3", depending on the pitch required. For a bed 1" thick, use one part of cement to two parts of torpedo sand. For a bed 2" thick, use one part of cement to two and one-half parts sand. For a 3" bed, one part of cement to three parts sand.

This mixture should be quite dry and have just enough water to make it workable. As the brick are tamped down, the water will come to the surface and help to cement the brick firmly to the bed. No part of this cement is allowed to form any part of the joints and brick are laid as closely as possible.

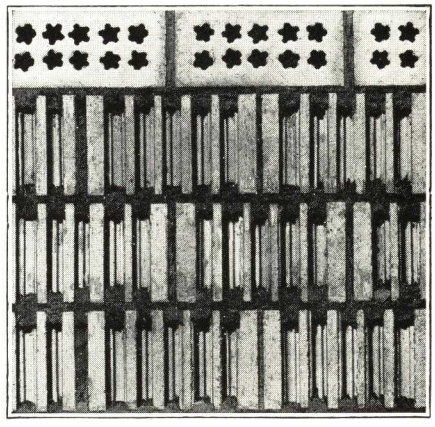
The grouting is then applied, which is composed of very fine, or reground Portland Cement and water. The joints are filled thoroughly before the job is allowed to stand and usually the surface must be worked over several times with a squeegee before the joints are filled. Additional water may be added to the grouting as required.

SHAPES. Any *Brictile* Shape will be furnished burned to match floor brick.



Detail Showing Usual Method of Laying Sanitary Floor Brick

BONDING STRENGTH OF STARK PRODUCTS



The illustration shows a section of a Stark *Brictile* wall cut back to the first row of holes. The bonding strength of the wall is reinforced by a second row of vertical holes behind these.

When the mortar is spread, a portion of it first works downward into the holes below, the extent of which is seen in this illustration. As the next row of *Brictile* is placed, a portion of the mortar is forced upward into the holes above. The location of the holes permits the use of reinforcing rods, if desired, for free standing walls. After mortar sets, this wall is one solid unit. (Brick, *Brictile*, and *Flatters* have the same bonding advantages).

STANDARD SWIMMING POOLS BY STARK

Stark has furnished pools in many outstanding buildings throughout the country over a period of years. The permanent, vitreous, "Colorglaze" finishes and carefully designed fittings have been a factor in their ever increasing specification and use.

In order to give the maximum of service and satisfaction, Stark has designed a standard Super Pool. In this design, consideration was given to the better features in finer pools furnished by us in the past. Many new ideas of master designers contribute to the creation of better pools.

The fine appearance of Stark Pools is improved by bull-nosing all external and coving all internal corners, thus eliminating the square corners on floor and side walls. This makes it easier to clean and does not allow dirt and filth to collect in the corners.

The cove base, jack knife, lane and distance markers are usually assembled in black. This adds decoration to the appearance of the pool and serves as guide lines for under-water swimmers. Sturdy ladder sections are designed with rounded exposed corners and to bond perfectly into side walls. Each ladder section is fitted with drain outlet.

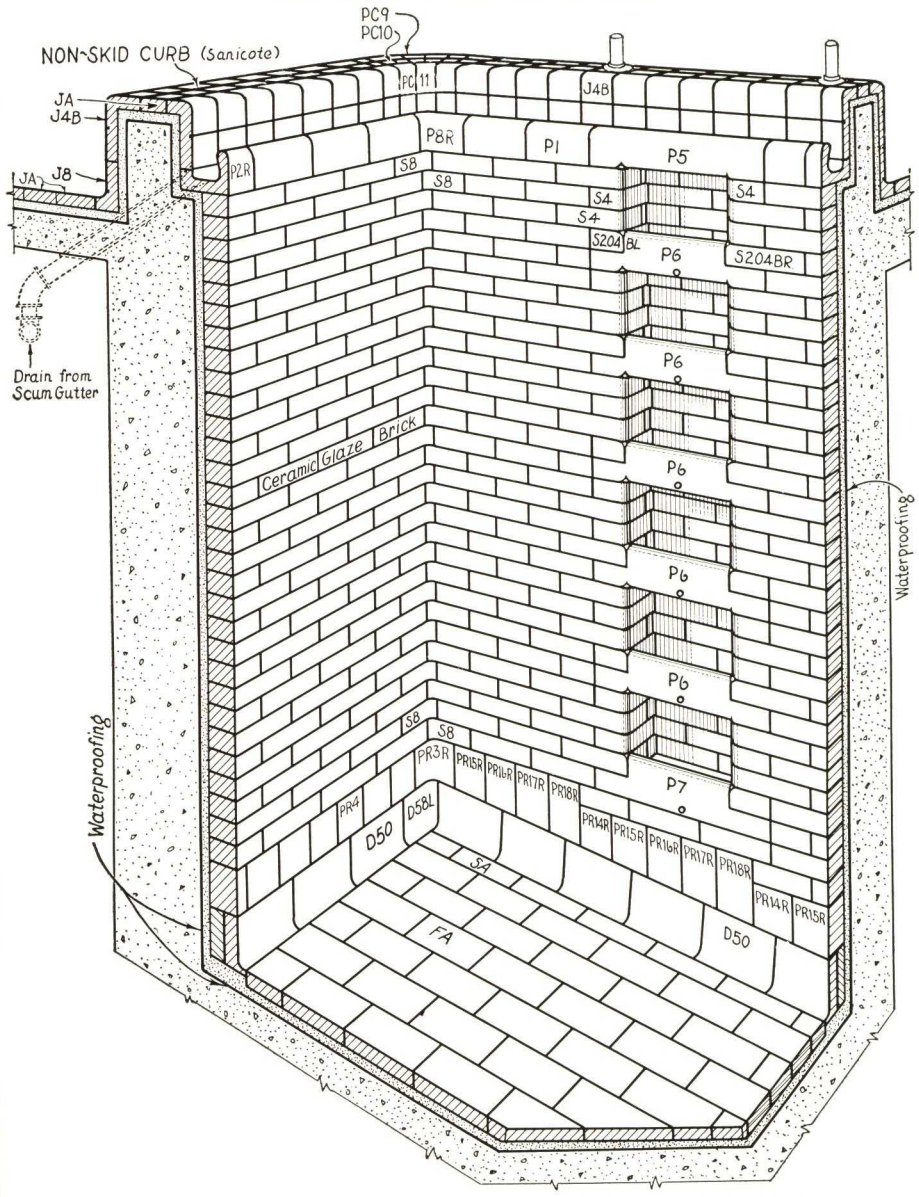
The neatly designed scum gutter at the water line offers a hand hold and is very attractive, efficient and easily cleaned. Special sections are made to fit any type of drain outlet.

Non-skid tile curbing and adjoining floors are Sanicote (See description on page 2) with a false mortar joint separating the units in squares. When pointed up, these units have the appearance of square floor tile. The Sanicote feature will serve as a safety measure and the false mortar joint cuts down the cost considerably without detracting from the inherent beauty of Stark Pools.

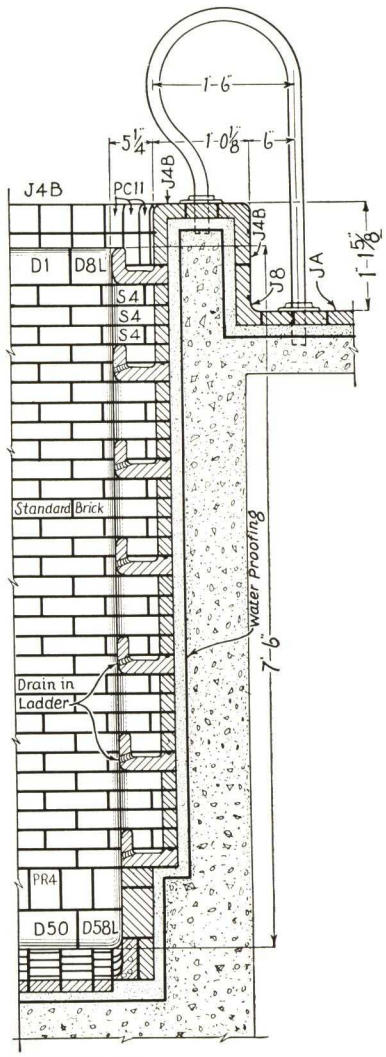
All special shapes including the rake above the cove base are cut by us and come marked ready for installation, which naturally lowers the cost of Stark Pools.

A quantity schedule of material and unit price supplied upon application. A complete set of erection drawings furnished with each pool order.

PERSPECTIVE OF DEEP END OF POOL



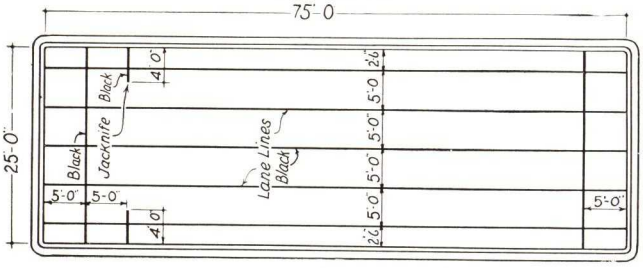
SECTION THROUGH LADDER



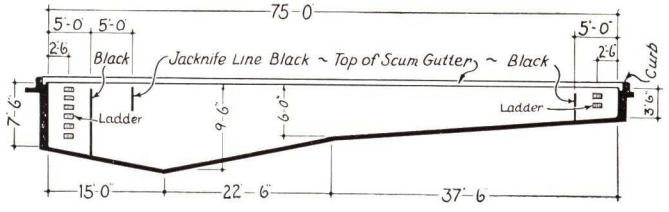
ONLY STARK MAKES "BRICTILE"

SWIMMING POOL DETAILS

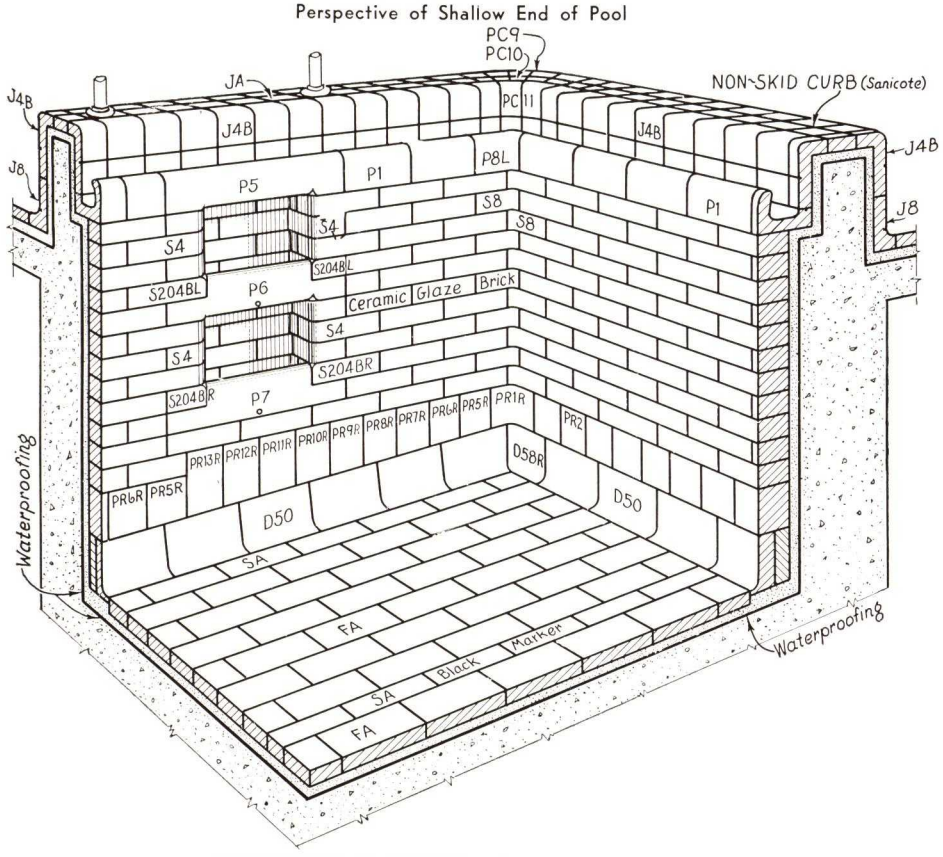
Top Plan View

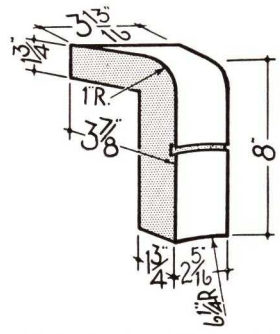


Longitudinal Section

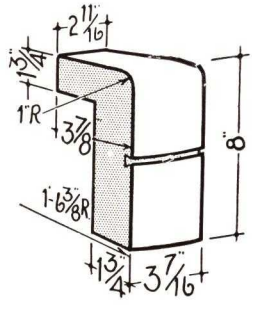


Perspective of Shallow End of Pool



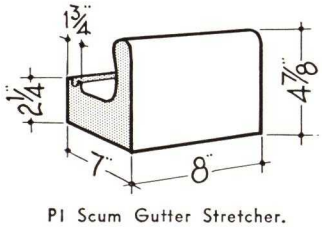


PC11 Curb Internal Radial

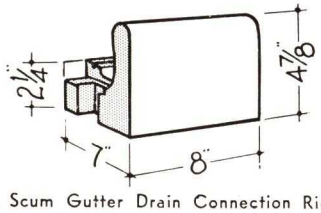


PC9 Curb External Radial

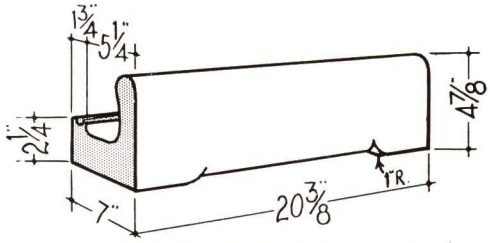
Pool Shape Details



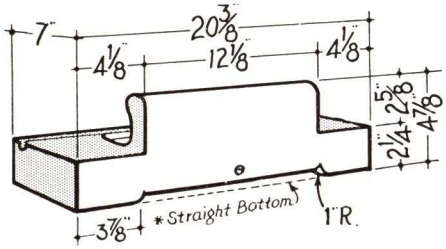
P1 Scum Gutter Stretcher.



P2R Scum Gutter Drain Connection Right

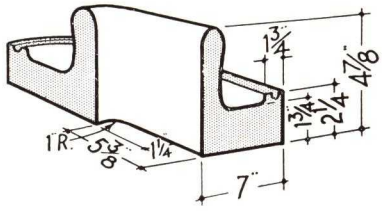


P5 Ladder Section in Scum Gutter.

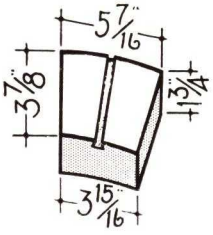


P6 Ladder Section Bullnose Bottom.

* P7 Ladder Section Straight Bottom.



P8R Internal Bullnose Scum Gutter.

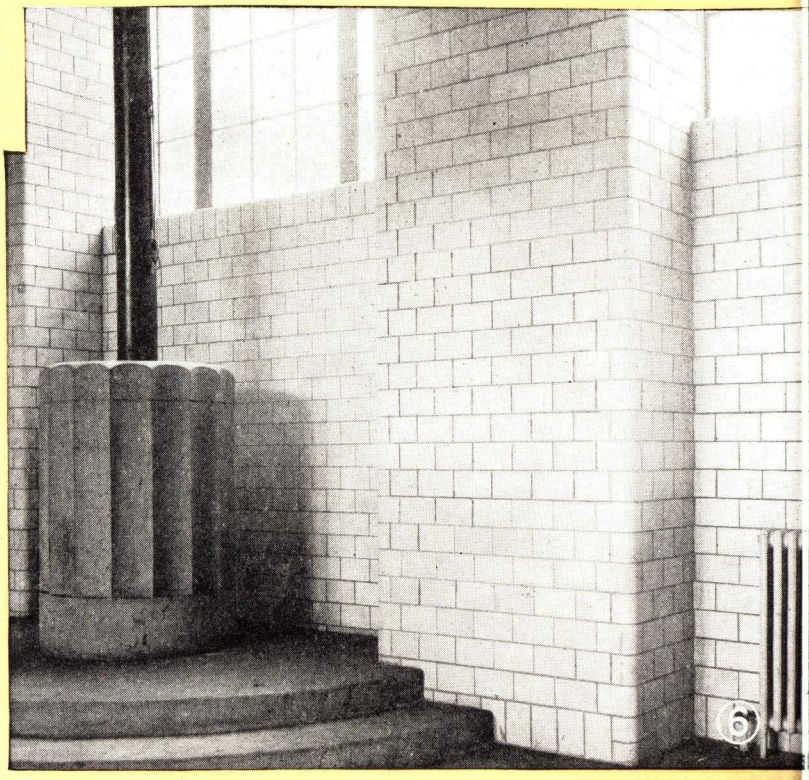


PC10 Curb Top Radial

2

5

3



6

7

4

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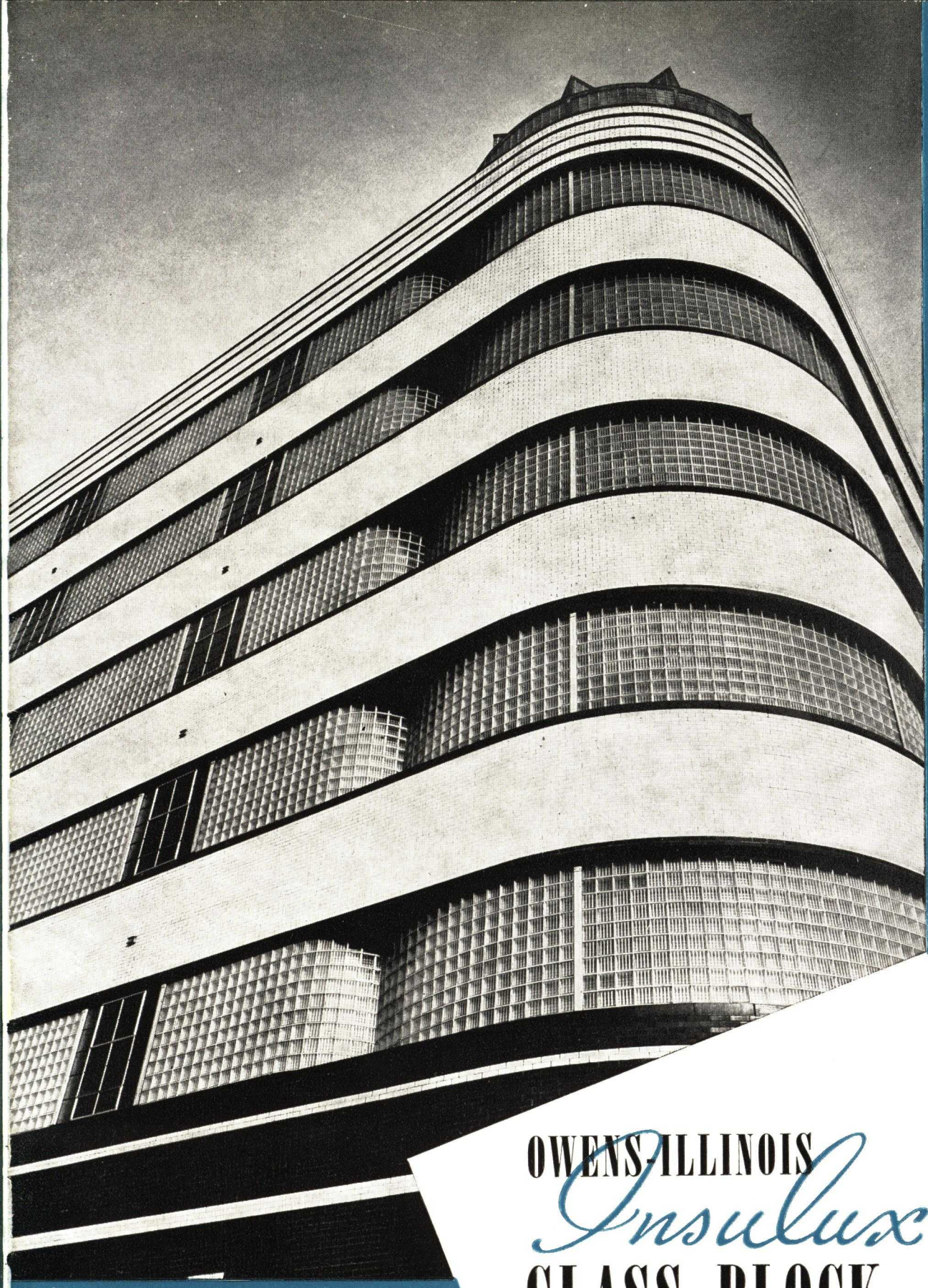


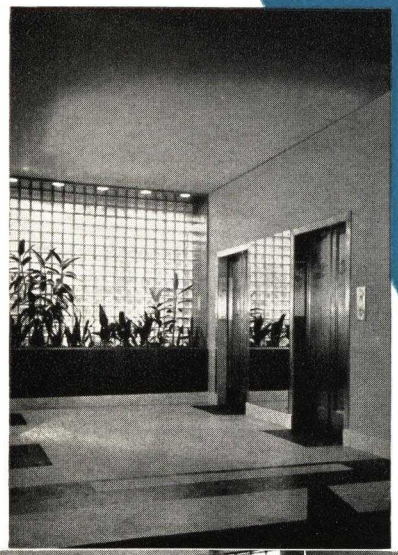
IMPORTANT—This catalog supersedes all previous printings of the Owens-Illinois section of Sweet's Architectural Catalog and all reprints from same covering Insulux Glass Block.

OWENS-ILLINOIS *Insulux* GLASS BLOCK

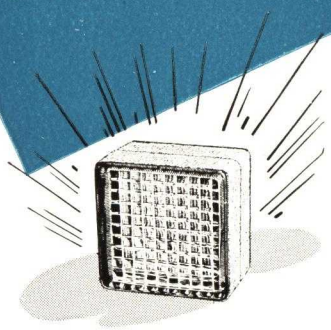
ADMITS LIGHT, RETARDS HEAT

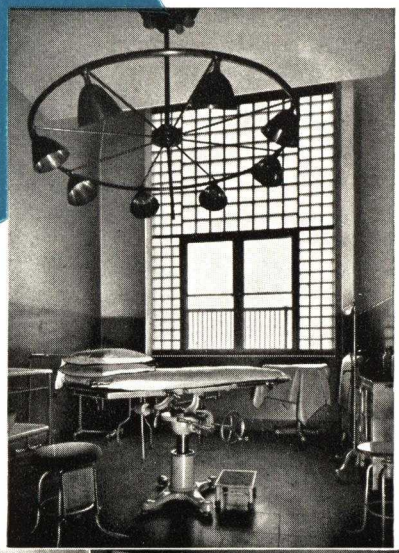
A PRODUCT OF OWENS-ILLINOIS GLASS COMPANY, INDUSTRIAL AND STRUCTURAL PRODUCTS DIVISION, TOLEDO, OHIO

Light
THE MODERN WAY . . .

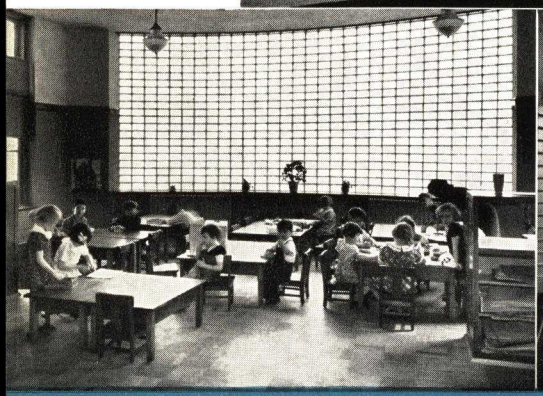


IN HOTELS
Shoreland Hotel
Chicago
James F. Eppenstein
Architect

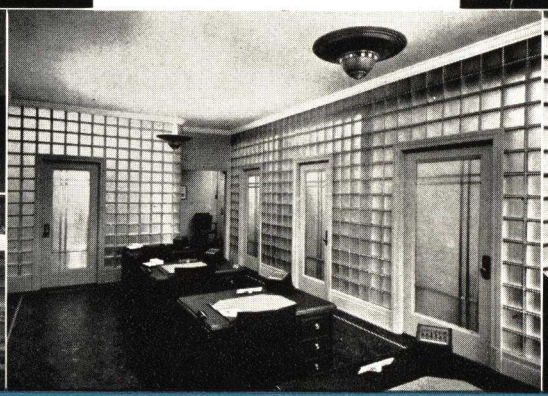




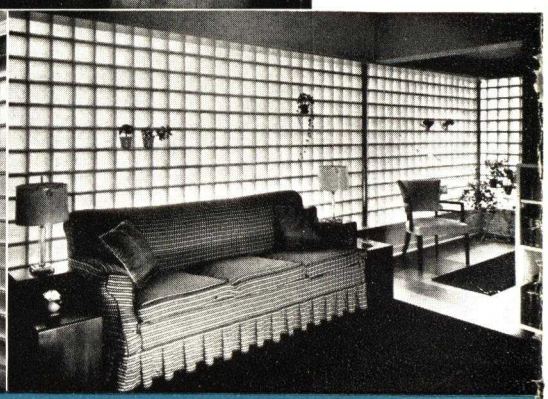
IN HOSPITALS
St. Mary's Hospital
St. Louis
O'Meara & Hills
G. E. Quick
Associate, Architects



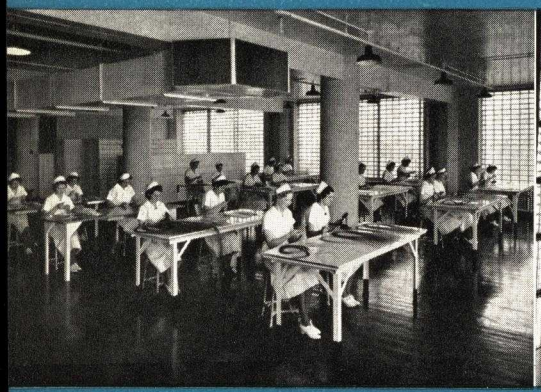
IN SCHOOLS
Tippecanoe School, Milwaukee
G. E. Wiley, Architect



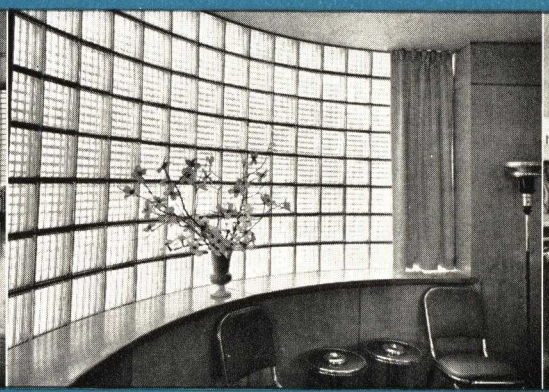
IN OFFICES
Office Building, Milwaukee
Edwin J. Kraus, Architect



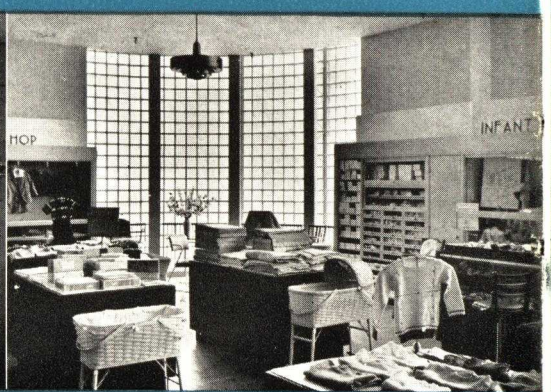
IN HOMES
Residence in Benton Harbor, Mich.
Pasquale Iannelli, Architect



IN FACTORIES
Bauer & Black Plant, Chicago
Designed by own Engineering Department



IN THEATERS
Landis Theater, Vineland, N. J.
Wm. H. Lee, Architect



IN STORES
Weiboldt Department Store, Oak Park, Ill.
Holabird & Root, Architects

OWENS-ILLINOIS

Insulux A PRACTICAL BUILDING MATERIAL

USED TO TRANSMIT LIGHT... PROVIDE INSULATION ... AND AID IN CREATING INTERESTING DESIGN

A HOLLOW GLASS BLOCK

Owens-Illinois Insulux is a hollow, partially evacuated block made of water-clear pressed glass. It is hermetically sealed at the time of manufacture, and is finished on the mortar-bearing surfaces with a permanent, gritty mortar bond. This permits it to be laid up in mortar to create attractive, light-transmitting panels with high insulating value. It is translucent, but not transparent, and it is highly resistant to the transmission of sound.

SERVES MANY USES

These basic features have made it practical for use in virtually all types of construction. Industry uses it for its light transmission, insulation value and low maintenance. The home uses it as a new design element, as a source of greater light without undue heat loss, and as a means of obtaining privacy—from view and from noise. Commercial structures use it as a design element, and as a feature in interesting lighting effects to attract public patronage.

THE RESULT OF EXTENSIVE RESEARCH

Insulux is in its fifth year as a practical building unit. It is the object of extensive research both within the company and in the laboratories of outside agencies. Architects will be especially interested in knowing that this research has not only gone into the physical characteristics of the material itself, but also into its application and use under average conditions in the field. A part of this program has been a constant checking of panels, over a period of years, in representative installations —panels in actual service under a variety of conditions, some subjected to conditions much more severe than standard specifications permit.

ERECTED BY MASON AND BRICKLAYER

It is this field experience with Insulux that has developed the standard method for erection of Glass Block. Insulux is laid up by the mason and bricklayer using a Portland-cement-lime-sand mortar. Thus, it is in the hands of one of the oldest and best established building trades.

SOLD BY DEALERS

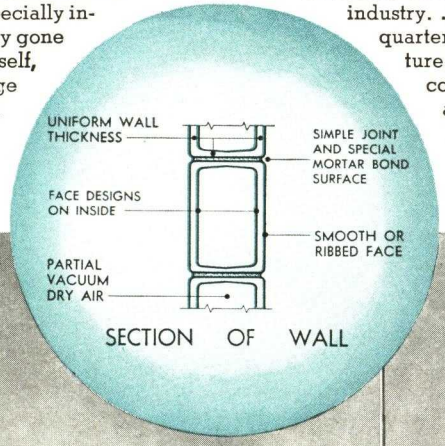
Insulux Glass Block is sold by dealers. It is stocked in different sizes and designs to permit efficient delivery service in any quantity desired.

STOCKED IN ALL PRINCIPAL MARKETS

Insulux dealers have been established in every state in the union, and in all principal markets. Many hundreds of them, located to provide efficient coverage, constitute the Owens-Illinois Dealer organization. Each has a genuine interest in the success of Insulux and is ready to be helpful in any way he can to those who contemplate its use

MANUFACTURED BY OWENS-ILLINOIS GLASS COMPANY

Insulux is manufactured by Owens-Illinois Glass Company, manufacturers also of Fiberglas Insulation, Fiberglas Power Products, Red Top Insulating Wool, Dust-Stop Replacement-Type Air Filters, and Dust-Stop Enclosed Units for the building and construction industry. . . Owens-Illinois has a history of nearly three-quarters of a century in glass research and manufacture. It is not only the leading manufacturer of glass containers, but its laboratories have developed to a practical state two of the most promising of today's building materials . . . glass fiber and glass block.



The Home of the Press-Citizen, Iowa City, Iowa—Kruse & Klein, Architects

SPECIAL FEATURES AND
of Owens-Illinois INSULUX

DESIGNS AND SIZES

● Insulux Glass Block are available in standard sizes and designs as shown on pages 12 and 13 following. They not only include rectangular blocks for simple panel construction, but corner and radial blocks to permit the introduction of variety into the design, and to permit finished corner construction.

BUILDING CODE APPROVAL

For their recommended uses, Insulux Glass Block have met with gratifying acceptance by and approval of state and municipal building commissioners, including the Pacific Coast Building Officials Conference. The strength of individual units and panels, their wind resistance, their fire and hose stream resistance, and other essential physical properties have been demonstrated at Purdue, Columbia and Leland Stanford, Jr. Universities, the National Bureau of Standards, and at the Underwriters' Laboratories, Chicago. These tests have been conducted in the presence of and to the satisfaction of numerous building code authorities. Official approvals conform to Owens-Illinois Glass Company's Basic Specifications, see page 19.

West Coast approvals, however, due to local demands, require smaller maximum panel sizes and additional reinforcement. Existing local requirements for the use of glass block are available on request.

CONTROLLED LIGHT TRANSMISSION

The intensity of light transmitted by Insulux is controlled by face design selected. The amount of incident light transmitted by the various designs ranges from 27.6 per cent to 86.5 per cent. Thus, interior light may be controlled within a wide range of practical limits.

CONTROLLED LIGHT DIFFUSION

From the standpoint of light transmission and light diffusion, Insulux face designs or patterns should be considered in two classes:

1. When large glass areas for daylight transmission are necessary, particularly in factories, schoolrooms and other similar types of structure where close work is done, the following patterns have found the best acceptance—

No. 1, ribbed face, 78.5% transmission
No. 7, smooth face, 84.0% transmission
No. 11, ribbed face, 86.5% transmission

2. Where the decorative qualities of the block are paramount, or where the block are used principally on the north exposure, the following patterns have found the best acceptance—

No. 2, ribbed face, 73.4% transmission
No. 16, smooth face, 84.4% transmission
No. 17, smooth face, 84.0% transmission

(Complete information on each block is available on pages 12 and 13.)

HIGH THERMAL INSULATION

The high resistance of Insulux to heat loss by conduction, due largely to the dead air trapped at a partial vacuum within the block, materially reduces the cost of air conditioning and artificial heating—both in initial and maintenance cost.

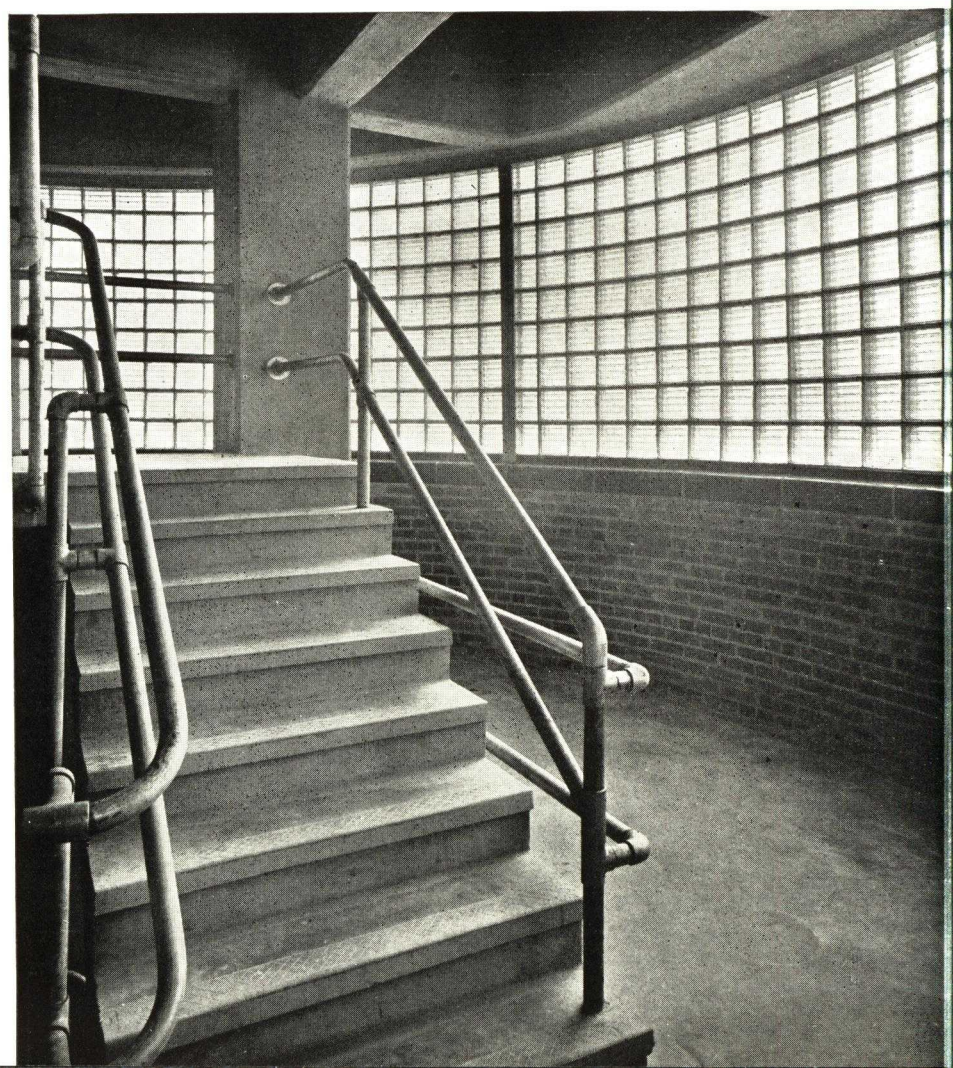
CONDUCTIVITY

The average coefficient of heat transmission in Btu's per hour per square foot per degree F. difference in temperature for Insulux is extremely low—.29—and compares favorably with other materials many times the thickness of an Insulux wall.

ELIMINATION OF CONDENSATION

Condensation on the inside of windows during cold weather causes deterioration of sash. It is particularly prevalent in buildings where a high degree of humidity is maintained, such as tobacco factories, dairies, food plants, textile and paper mills, etc. Insulux, because of its high insulating value, will under most conditions, eliminate this condensation and resulting deterioration. At the conclusion of extensive tests, Purdue University reported the following outside temperatures as necessary to produce condensation on the inside of the building with the inside air at 70 degrees and a relative humidity of 40 per cent:

Insulux.....—16.4 degrees F.
Steel Sash.....+36.0 degrees F.



● Insulux light in The Hecht Company Warehouse, Washington, D.C. Abbott, Merkt and Company, Architects.

ADVANTAGES..
Glass Block

REDUCED AIR INFILTRATION

Because the standard method of erecting Insulux is to lay it up in mortar with caulked expansion joints at jambs and head, air infiltration is reduced to a minimum. This reduction aids materially in reducing heat loss and maintaining desirable interior conditions of temperature and humidity.

RESISTANCE TO MOISTURE PENETRATION

At the direction of Purdue University authorities, a panel of INSULUX Glass Block was constructed according to standard specifications and laid horizontally for one week under a head of three inches of water. No trace of moisture was found on the underside of the mortar joints at any time. Other panels in actual buildings, which had been exposed to the weather for a period of one year, were subjected to water sprays designed to simulate a driving rain. This test was run for 27 hours without the appearance of moisture on the reverse side of the panel.

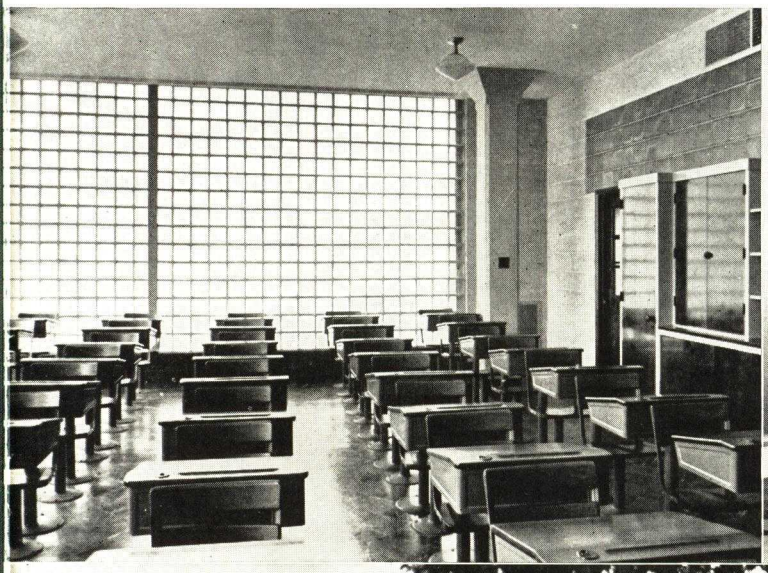
RESISTANCE TO SOLAR HEAT TRANSMISSION

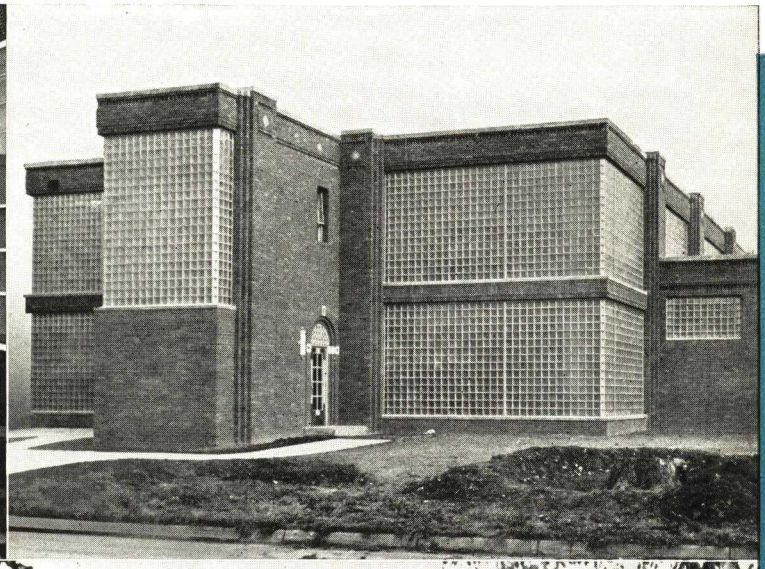
Because of their variable values of controlled light transmission, due to the variety of available face patterns, INSULUX Glass Block can be employed to reduce materially solar heat transmission. Purdue University authorities, at the conclusion of elaborate tests on the solar heat transmission of INSULUX as compared with steel sash (testing equal areas of both materials), say: "The glass block No. 201 (Pattern No. 1) permitted 38.3 per cent less solar heat to pass than did the steel sash when exposed continuously to the sun; 37.7 per cent less when exposed to the east, 51.5 per cent less when exposed to the south; and 48 per cent less when exposed to the west." Comparatively, they further point out that a steel sash eliminates an average of but 20.4 per cent of the solar heat.

RECOMMENDED DESIGN VALUES FOR SOLAR HEAT TRANSMISSION

Exposure	Degree of Shading	Btu per sq. ft. per hr.
East	0	33
East	½	22.5
East	Full	16.3
South	0	50
South	½	34
South	Full	28
West	0	57
West	½	39
West	Full	23

Elkader School, Elkader, Iowa. Oren Thomas, Architect. Extensive use of Insulux increases intensity of natural light in rooms and corridors without excessive heat loss. Insulux in classrooms keeps out dust, dirt and noise. Mechanical ventilation maintains more equable temperature in classrooms.





SPECIAL FEATURES AND ADVANTAGES OF OWENS-ILLINOIS INSULUX GLASS BLOCK

RESISTANCE TO SOUND TRANSMISSION

Tests to determine the sound transmission through INSULUX Glass Block panels were conducted in the Sound Chamber of the National Bureau of Standards, Washington, D. C. The average sound reduction factor over a range of nine frequencies was found to be 40.7. This factor is expressed in decibels, and is known as the transmission loss. It is conclusive proof of the fact that INSULUX compares favorably with the usual type of plastered partition used in fireproof construction. Insulux is now in use adjacent to elevated railways in Chicago and in New York. It aids in reducing sound transmission from room to room, and in outside walls is effective in reducing street noise.

STRONG PRACTICAL MORTAR BOND

Tests on INSULUX panels show an average strength of 63 pounds per square inch in tension, and 200 pounds per square inch in shear at the mortar joints. In comparison with the average mortar bond strength of comparative clay brick work, these values are most favorable. They are the result of the special mortar bond surface that is available only on Owens-Illinois INSULUX Glass Block.

STRUCTURAL STRENGTH

As a result of the exclusive Owens-Illinois method of manufacture, Insulux Glass Block has a uniform wall thickness that makes it possible to anneal the block properly, and to eliminate internal strain. This develops to the utmost the natural strength of the glass. INSULUX is not offered as a load-bearing material, yet it possesses ample compressive strength to be self-supporting within the limits prescribed by the ratio of its thickness to any practical height. Comprehensive tests show that individual units develop a minimum ultimate strength of 1500 pounds per square inch. The ultimate strength of panels of INSULUX Glass Block, laid up in accordance with specifications on page 19, is 400 pounds per square inch. INSULUX panels have successfully withstood, with no visual failure, air pressure up to 120 pounds per square foot. On tests made on an INSULUX panel measuring 7 feet 3 inches wide by 8 feet 7 inches high, loadings up to 80 pounds per square foot pressure, produced deflection of .045 inches. On release of pressure, the panel returned to its original position. This pressure corresponds to a wind velocity of 162 miles per hour. These results show that INSULUX Glass Block walls will withstand, with a more than adequate factor of safety, the usual building code requirements for wind pressure.

COMPARATIVE THERMAL EXPANSION

The accepted coefficient of expansion for brick masonry is 0.0000031, and for broken stone concrete 0.0000067, the coefficient of expansion for INSULUX Glass Block is 0.0000045, which is midway between the two types of masonry mentioned. This coefficient will vary slightly, depending on the type of mortar used. This difference in expansion between INSULUX panels and abutting materials is compensated for by expansion joints as set forth on page 19.

CLEAN—SANITARY

INSULUX Glass Block walls are easy to clean. It is the natural characteristic of glass to be non-absorbent to liquids, odors and grease. Several of the INSULUX patterns have smooth exterior faces, the designs being impressed only on the interior faces of the block. In other blocks or patterns, the faces have simple ribs running vertically on the exposed exterior and horizontally on the interior. The character of these surfaces minimizes the accumulation of surface dirt and facilitates its removal.

LOW MAINTENANCE

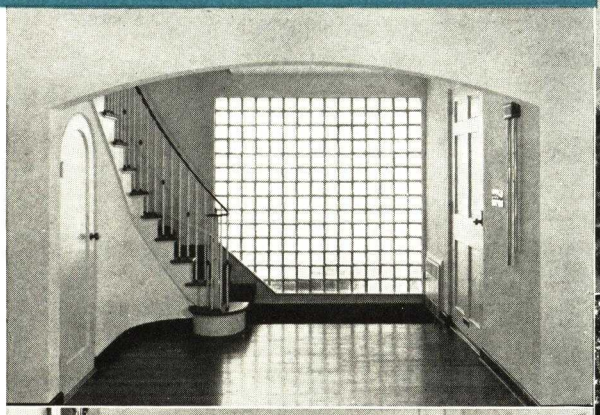
INSULUX Glass Block walls and panels require almost no maintenance other than occasional cleaning. The hard, brilliant surface of the block has the natural permanence and durability of glass. Obviously, INSULUX does not oxidize nor require painting, either inside or out.

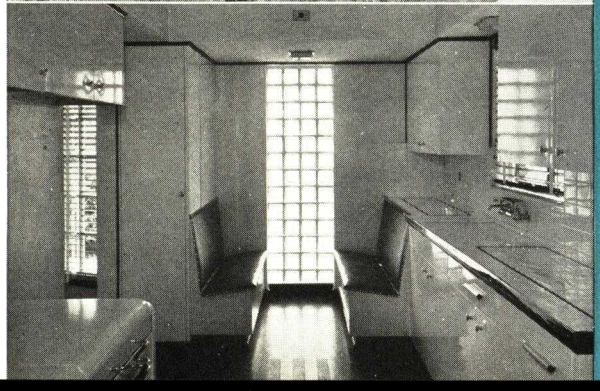
RENEWAL AND REPLACEMENT

A damaged glass block can be removed easily from the wall by chipping out or by drilling holes in the mortar joints at opposite corners, then, with a keyhole saw, sawing out the block. The new block is then buttered with mortar, inserted in place and the job completed by pointing.

Practical

. . . FOR TRADITIONAL DOMESTIC ARCHITECTURE

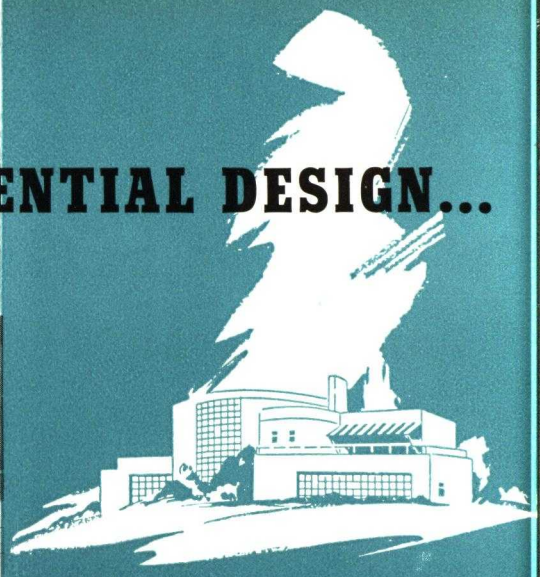




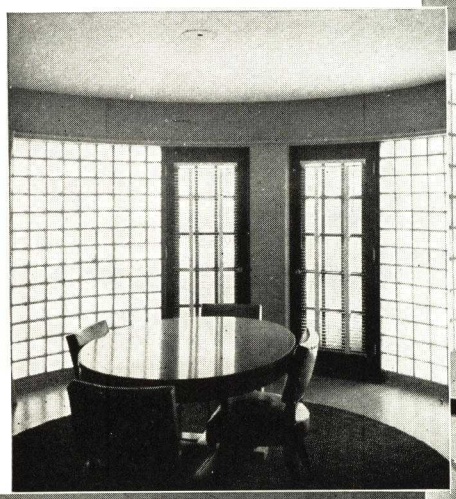
Long Island Homes
Alfred S. Levitt
Designer.

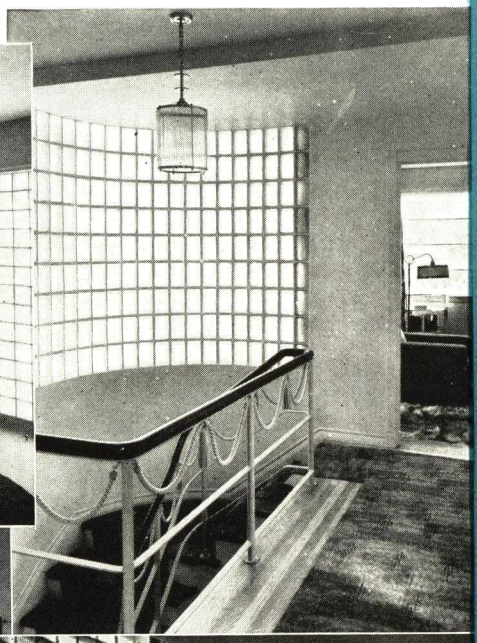
● **Although Owens-Illinois INSULUX Glass Block is a thoroughly modern building material, the illustrations on the page clearly reveal its ready adaptability to traditional house architecture. Here are shown just a few of the many ways that INSULUX is being used to bring new beauty and comfort to both large and small homes.**

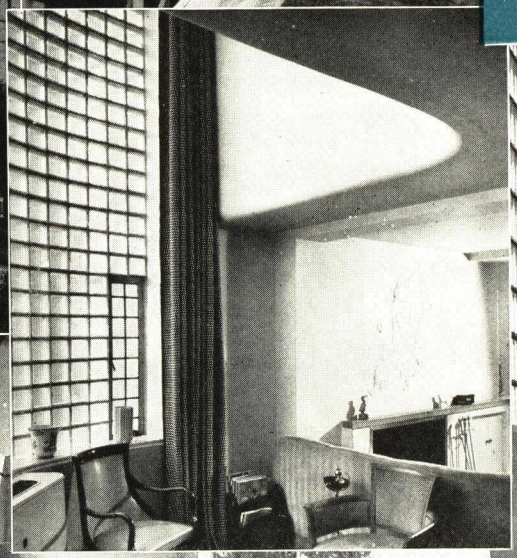
WELL-SUITED TO MODERN RESIDENTIAL DESIGN...

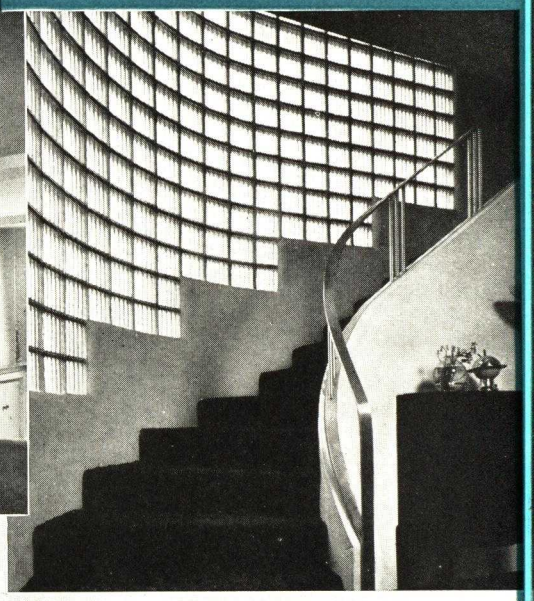


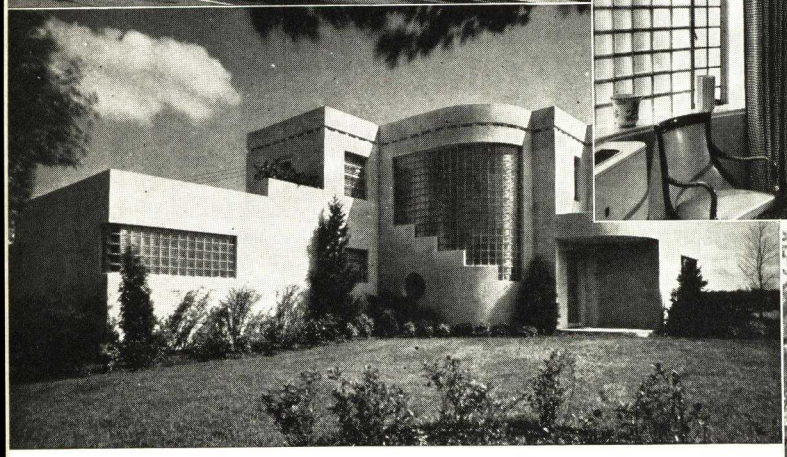
● Here are shown some of the many attractive applications of Owens-Illinois INSULUX Glass Block to modern architectural design. Light The Modern Way, added comfort and arresting beauty are brought to these homes through medium of INSULUX.

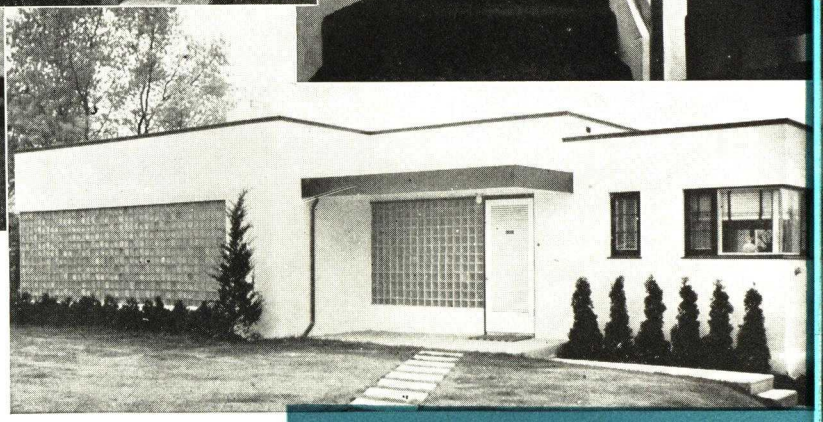












Dining room, residence Dodge City, Kansas... Don G. Purcell, Supervising Architect.

Suburban residence, San Francisco. . . Clemens Friedell, Architect.

St. Louis residence. William P. McMahon and Sons, Architects.

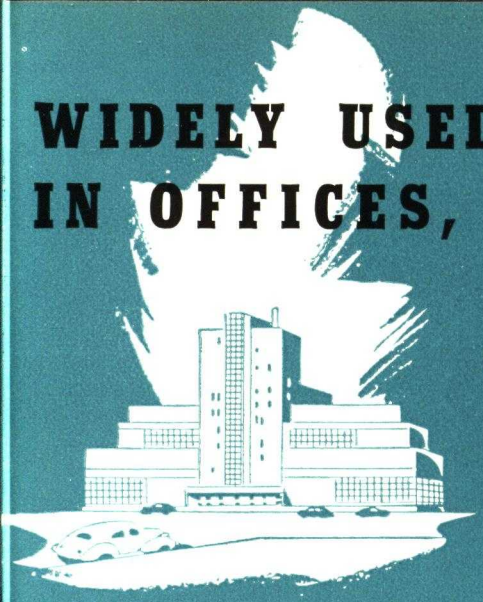
Home, Berkeley, California... John B. Anthony, Architect.

Living room, Fisher Studio Apartments, Chicago. Andrew N. Rebori, Architect. J. Edgar Miller, Artist.

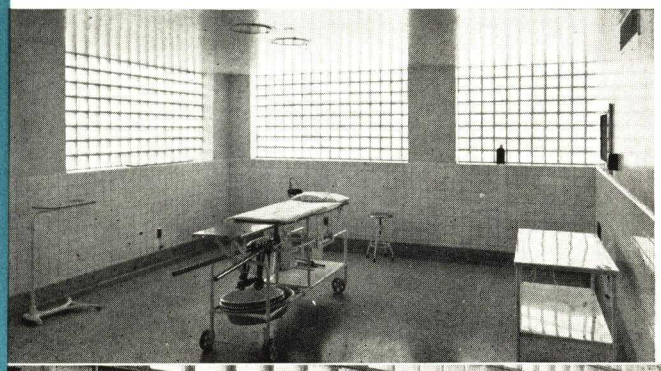
Stairway, St. Louis residence. William P. McMahon and Sons, Architects.

Residence, Benton Harbor, Michigan. Pasquale Iannelli, Architect.

WIDELY USED IN OFFICES, SCHOOLS AND HOSPITALS...



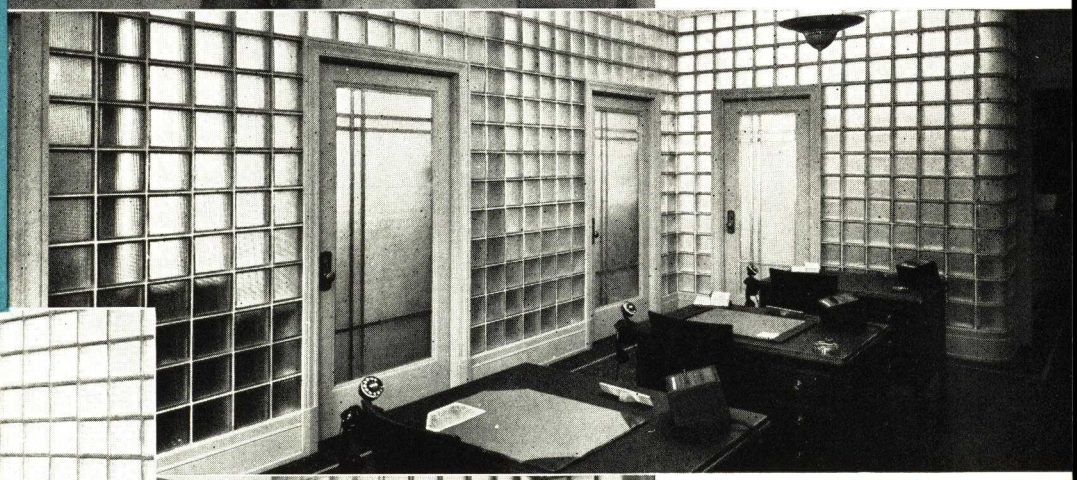
● The wide use of Owens-Illinois INSULUX Glass Block to provide Light The Modern Way is disclosed by the illustrations on this page. Wherever an abundance of diffused daylight is needed for any purpose INSULUX fulfills the requirements.

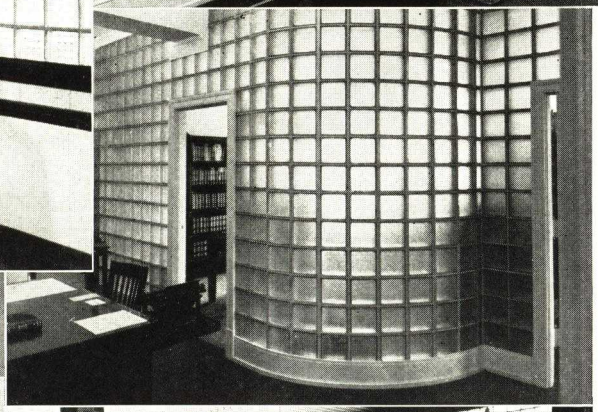


Campbell Clinic, Memphis, Tenn... Furbringer & Ehrman, Architects.

•

Office Building, Milwaukee, Wisconsin... Edwin J. Kraus, Architect.

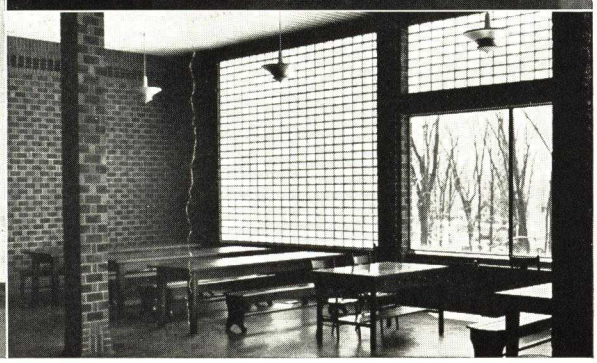




Gay Engineering Corporation, Los Angeles. . . Designed and erected by own staff.

•

Office, First Wisconsin National Bank Building... Edwin J. Kraus, Architect.



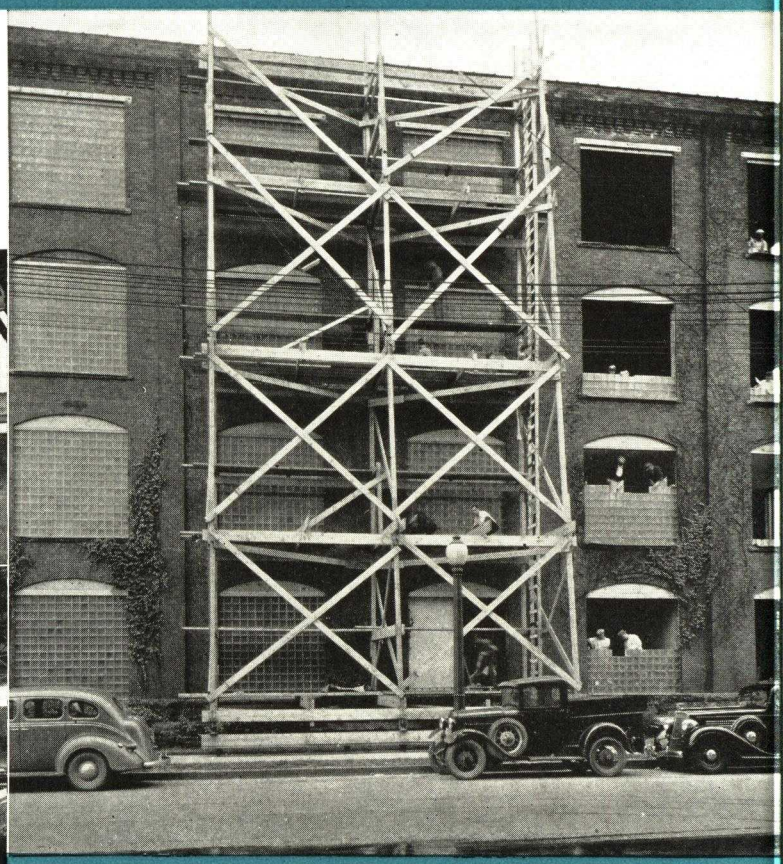
•

Doctor's Office, Clayton, Missouri. . . . Harris Armstrong, Architect.

•

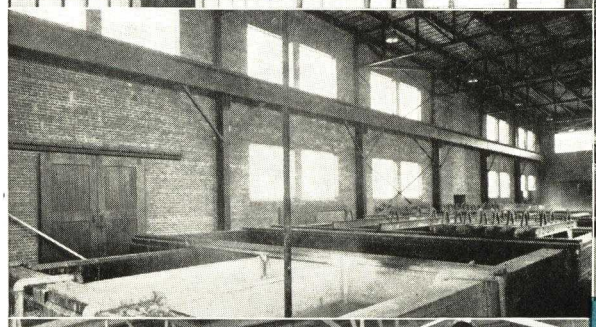
University of Kentucky, Lexington. . . . J. T. Gillig, Architect.

INSULATION . . . LIGHT TRANSMISSION . . . AND LOW



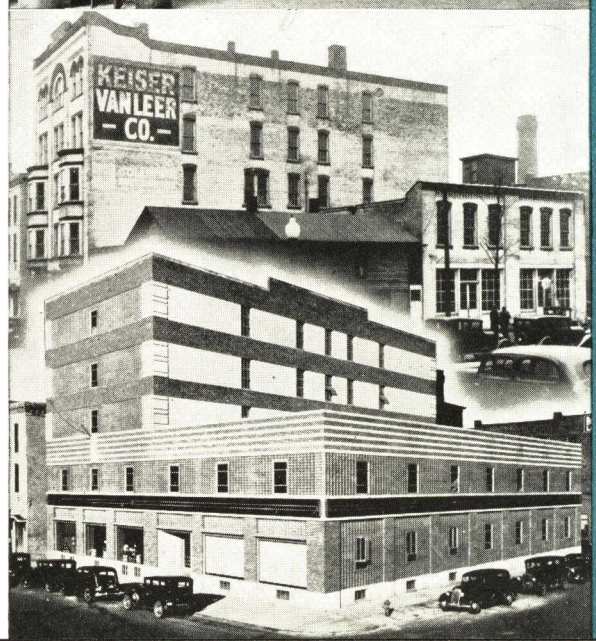
Carrier Corporation, Syracuse, N. Y., uses Insulux in modernization of old building to provide light and to aid in economical air conditioning of structure. Austin Company, Builders.

MEAT PACKING
Cudahy Packing Plant, Albany, Georgia. Designed by own staff.



STEEL
INSULUX in this pickling plant admits ample light yet providesinsulation — resists acid fumes.

MANUFACTURING
Press Building Standard Register, Dayton, Ohio. Designed and built by the Austin Company, Cleveland.



REMODELING
Heavy hardware and mill supplies . . . Schaeffer and Hooton, Architects.

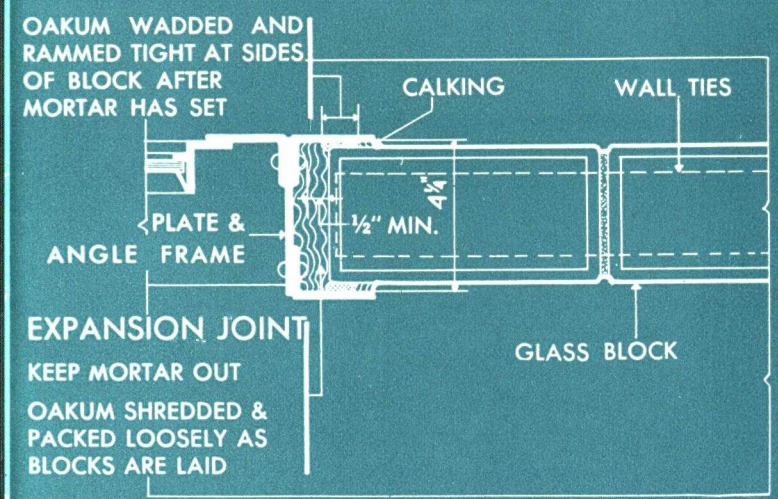
● **Light plus insulation, an outstanding need of industry today, is provided in ideal combination by Owens-Illinois INSULUX Glass Block, the modern building material. A hollow, partially evacuated, light-giving glass unit, laid up in mortar by methods well known to the mason and bricklayer, INSULUX greatly reduces heat loss from infiltration and conductance. This combination of advantages solves many problems for industry—the need for light to create proper working conditions and the increasing necessity of maintaining uniform controllable conditions of temperature and humidity. Organizations benefiting from INSULUX advantages today represent Steel, Tobacco, Rayon, Silk, Paper, Printing, Bottling, Distilling, Meat Packing, Canning, Dairies, Automobiles, Foods, Railroads, Milling, Cans, Electrical, Machine Tool, Films, Glass, Chemicals, research laboratories and many other types of industry.**

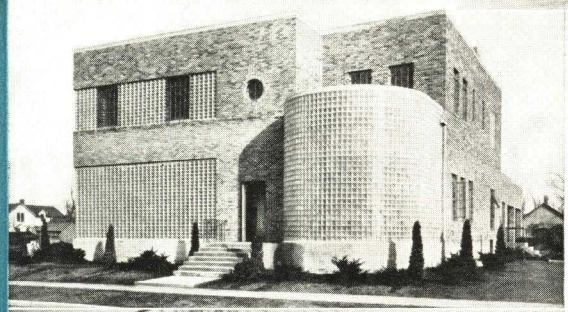
MAINTENANCE ARE ESPECIALLY USEFUL TO INDUSTRY

WAREHOUSE
The Hecht Company Warehouse, Washington, D. C., Abbott, Merkt & Company, Architects.

MILLING
Omar Mills, Inc., Denver, Colorado, Horner-Wyatt Engineering Co., Engineers.

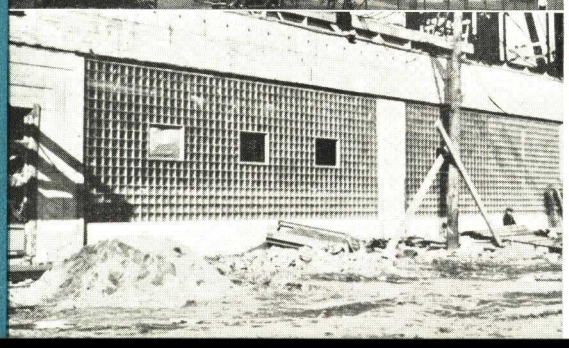
Below: Typical jamb detail for windows in Insulux panels, from Hecht warehouse pictured above.





BOTTLING
Coca-Cola Bottling Co. Plant, Mitchell, So. Dak., Floyd Kings, Architects.

PHARMACEUTICALS
Bristol-Myers Co., Hillside, N. J. Wigton-Abbott Corp., Engineers and Contractors.



RAILROADS
INSULUX panels under construction assure light and insulation. McKim, Mead & White, Architects.

PATTERNS, SIZES AND DESCRIPTION OF

RECTANGULAR BLOCKS

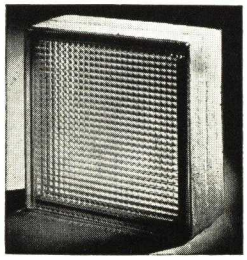
HOW BLOCKS ARE NUMBERED

For convenience of and at the request of dealers and contractors, individual Insulux Blocks are numbered in four series, 100, 200, 300 and 400, each of which designates size. The last two digits of each series are used to designate pattern or design. A 302 block is a 300 series (size) and a No. 2 design. The factory designation, where it varies from this numbering, is retained in light face type within brackets for our convenience in manufacture and for identification in invoicing. The letter H indicates half blocks. Designs, shapes, and sizes are subject to change without notice.

LOW LIGHT TRANSMISSION BLOCK

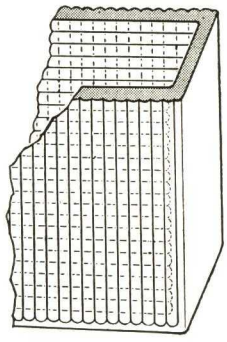
Insulux may also be had in a special pattern of low light transmission. A No. 103 block is available with two smooth exterior faces, an interior diamond shaped pattern and a light transmission of 27.6%.

DESIGN NO. 1

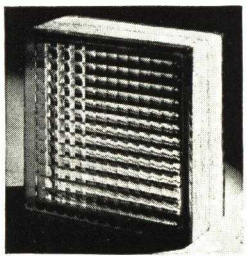


TRANSMITS 78.5% OF INCIDENT LIGHT

Design consists of ¼-in. convex ribs carried vertically on both exterior faces and horizontally on both of the interior faces.

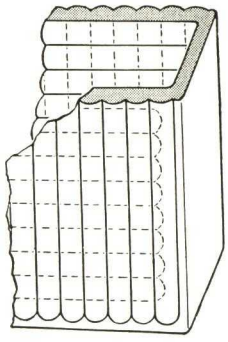


DESIGN NO. 2

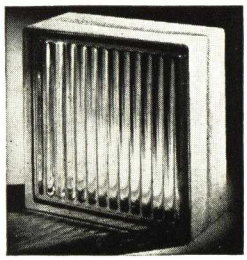


TRANSMITS 73.4% OF INCIDENT LIGHT

Design—½-in. (1 in. for 400 series) convex ribs carried vertically on both exterior faces and horizontally on both of the interior faces.

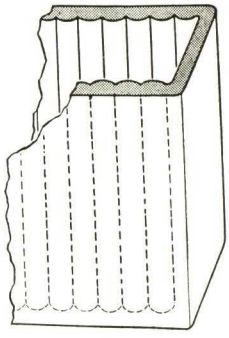


DESIGN NO. 7

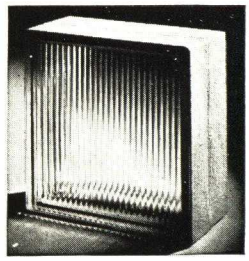


TRANSMITS 84.4% OF INCIDENT LIGHT

Design—½-in. (1 in. for 400 series) convex ribs carried vertically on both of the interior faces. Both of the exterior faces are smooth.

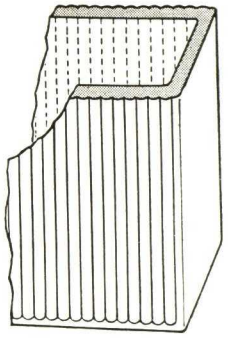


DESIGN NO. 11



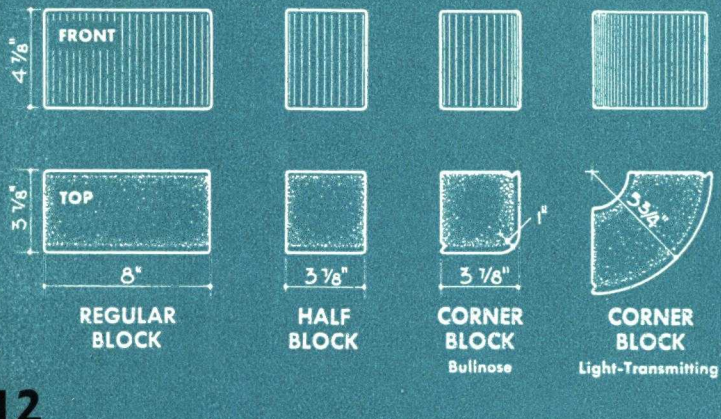
TRANSMITS 86.5% OF INCIDENT LIGHT

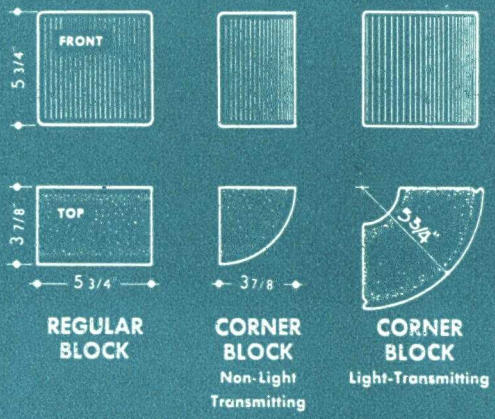
Design consists of ¼-in. convex ribs carried vertically on both of the exterior faces. Both of the interior faces are smooth.



SERIES AND SIZE OF RECTANGULAR BLOCKS

Series No.	Sizes in Inches				
100 (1)	8 x 4⅞x3⅞	101 (1)	102 (2)	107 (7)	111 (11)
100-H (1-H)	3⅞x 4⅞x3⅞	101-H (1-H)	102-H (2-H)	107-H (7-H)	111-H (11-H)
200	5¾x 5¾x3⅞	201	202	207	211
300	7¾x 7¾x3⅞	301	302	307	311
400	11¾x11¾x3⅞	—	402	407	—





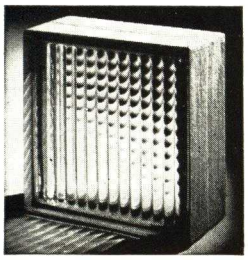
100 SERIES

200 SERIES

OWENS-ILLINOIS INSULUX GLASS BLOCK

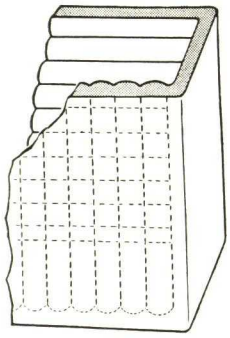
CORNER AND RADIAL BLOCKS

DESIGN NO. 16



TRANSMITS
84.4%
OF INCIDENT LIGHT

Design—½-in. (1 in. for 400 series) convex ribs carried vertically on one interior face and horizontally on the other. Exterior faces smooth.



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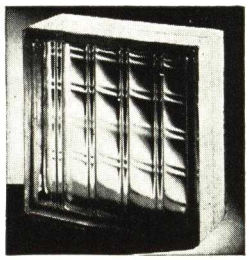
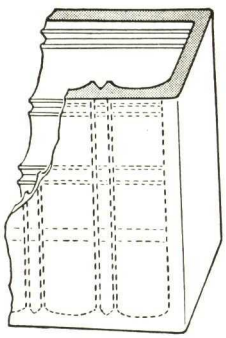
—
216
316
416

DESIGN NO. 17



TRANSMITS
84%
OF INCIDENT LIGHT

Design—1½-in. (1⅝ in. for 400 series) concave ribs on both interior faces—vertical on one, horizontal on other. Both exterior faces smooth.



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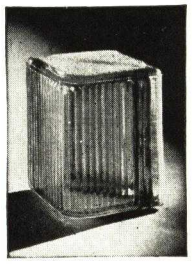
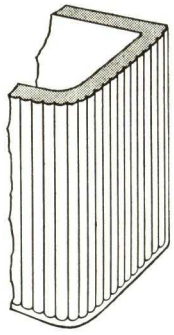
317
417

BULLNOSE



Non-light-transmitting corner block to be used with No. 100 series. Size 3⅞x3⅞x 4⅞ in. Vertical exterior ribs on faces adjacent to bullnose corner, ¼-in. ribs on the "A" block and ½-in. ribs on the "B" block.



100-A—¼" Rib (1-ABN, **100-B**—½" Rib (1-BBN)
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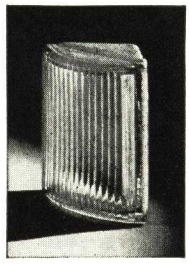
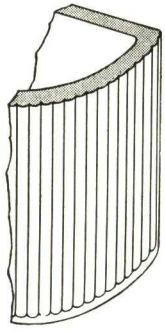
QUARTER ROUND

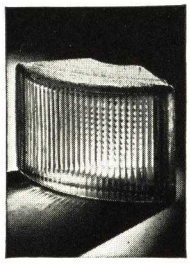


Non-light-transmitting corner block to be used with No. 200 and 300 series. Size for 200 series 3⅞x3⅞x5¾ in. and for 300 series 3⅞x3⅞x7¾ in. Vertical exterior ribs, ¼-in. and ½-in. on "A" and "B" blocks respectively.

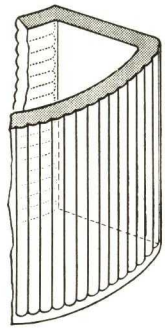


—
—
200-A—¼" Rib **200-B**—½" Rib
300-A—¼" Rib **300-B**—½" Rib
—

LIGHT TRANSMITTING CORNER

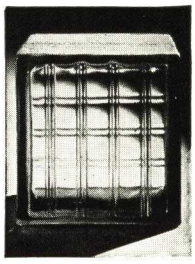


Block to be used with No. 100, 200 and 300 series. Height 4⅞-in. for 100 series, 5¾-in. for 200 series, 7¾-in. for 300 series. Vertical ribs on face of large radius and horizontal on face of small radius, ¼-, ½- and 1-in. ribs for "A," "B" and "C" block respectively.

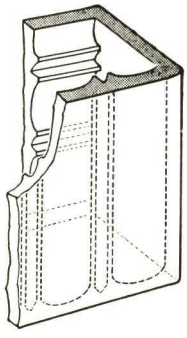


100-AL—¼" Rib (1-AL) **100-BL**—½" Rib (1-BL)
—
200-AL—¼" Rib **200-BL**—½" Rib
300-AL—¼" Rib **300-CL**—1" Rib
—

RADIAL



Radial block can be laid to varying radii from 3 ft., 6 in. to 6 ft. through variation in mortar joint. Width of long face 7¾ in., of short face 7 in. Pattern same as No. 317 Block with inside ribs, vertical on wide face, horizontal on narrow face.



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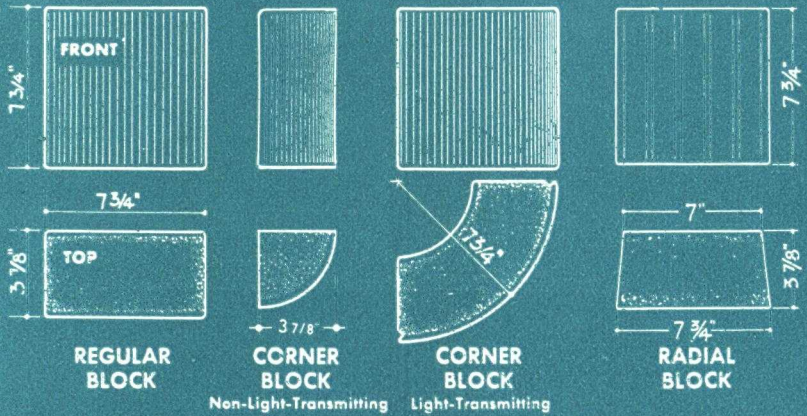
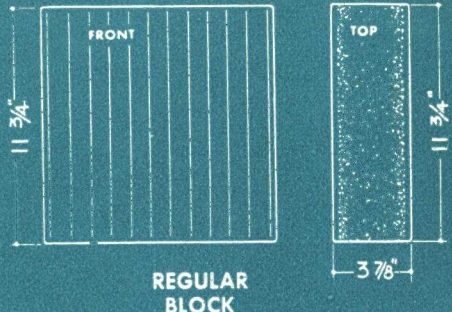
301-R **317-R** (300-R)
—

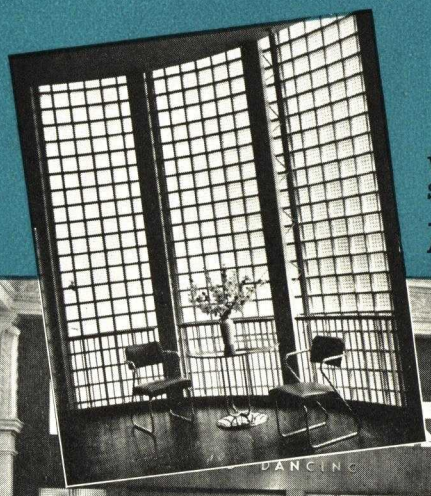


300 SERIES

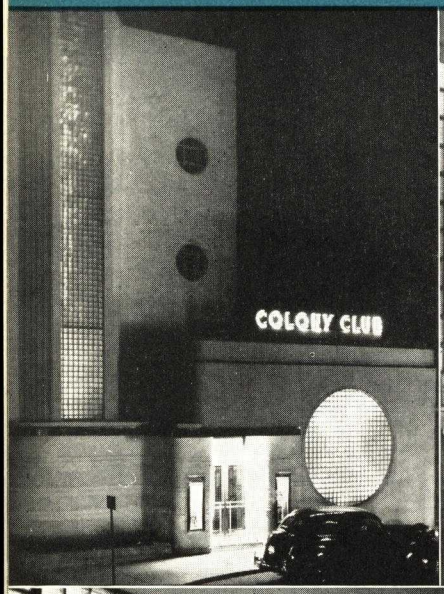


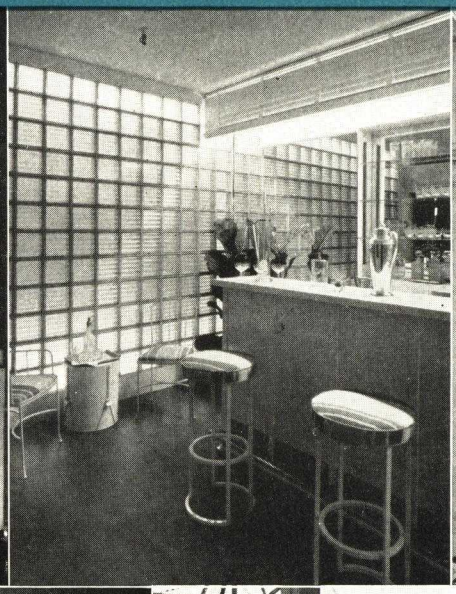
400 SERIES

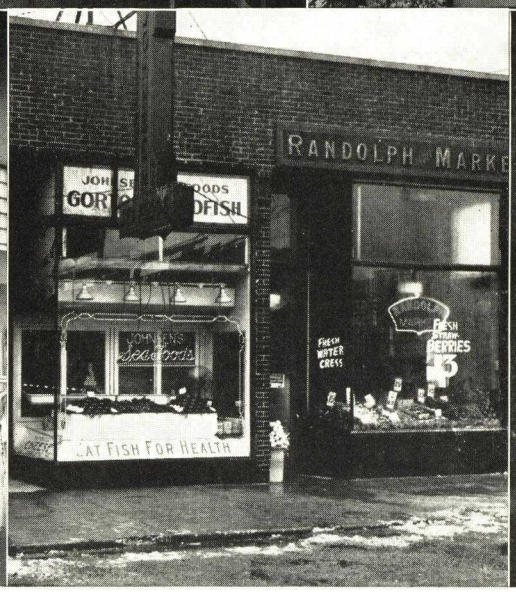
OWENS-ILLINOIS *Insulux* GLASS BLOCK IN STORES, SHOPS, RESTAURANTS, HOTELS, DISPLAYS

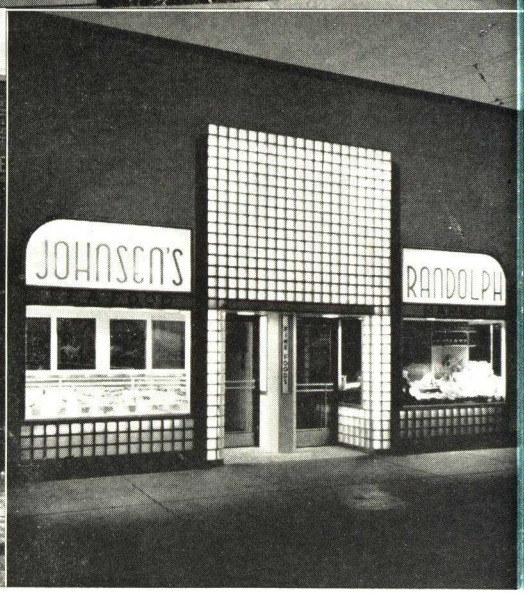


Weiboldt Department Store, Oak Park, Ill. . . . Holabird & Root, Architects.









Colony Club (remodeled) Chicago. . . George Mitchell, Architect.

Modern Cocktail Lounge. . . Designed by W. & J. Sloane, New York City.

Mural Room, Baker Hotel, Dallas, Texas. Herbert M. Greene, LaRoche & Dahl, Architects.

Weiboldt Department Store, Oak Park, Illinois . . . Holabird & Root, Architects.

Before and after modernizing, Evanston, Ill. Designed by Palmer Personal Service.

Restaurant in "Italian Village," Dallas, Texas . . . O'Neil Ford, Architect.

•

Window Displays (center and bottom) Hodge, Inc., florists, Buffalo, N.Y. . . . . James Patton, Designer.

Night Club in Washington-Youree Hotel, Shreveport, Louisiana . . . William B. Wiener, Architect.

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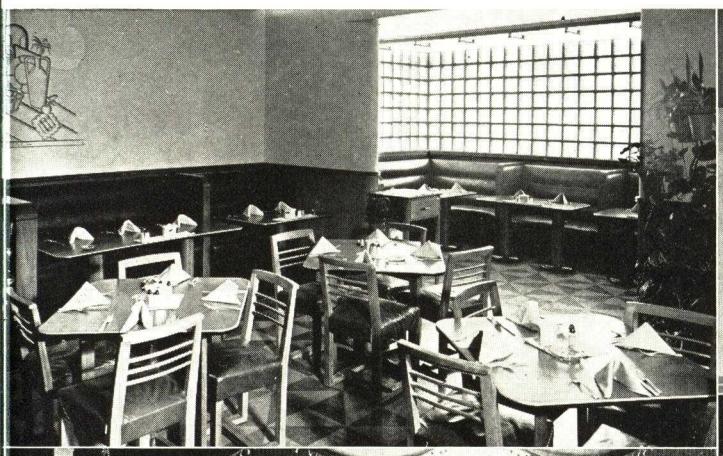
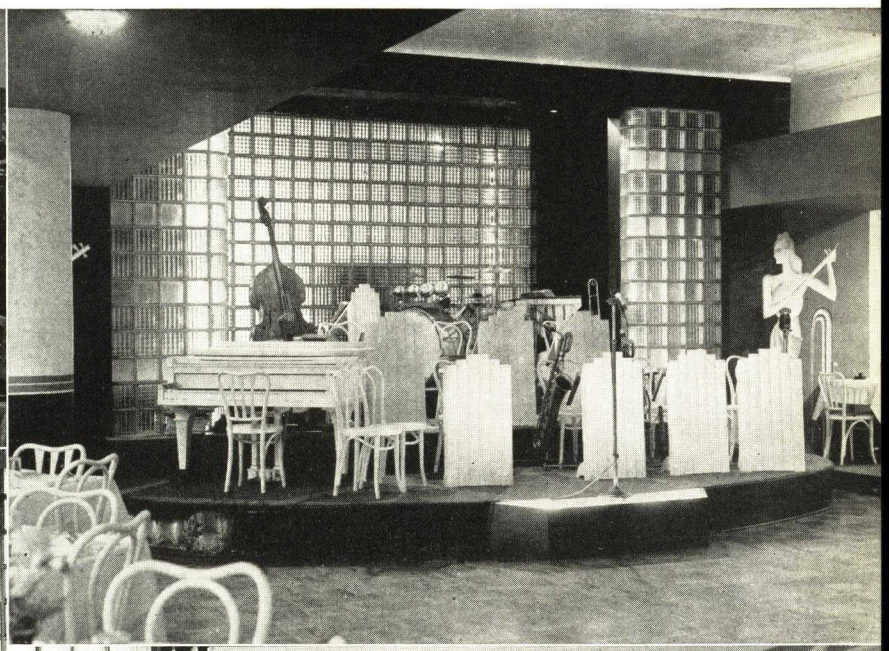
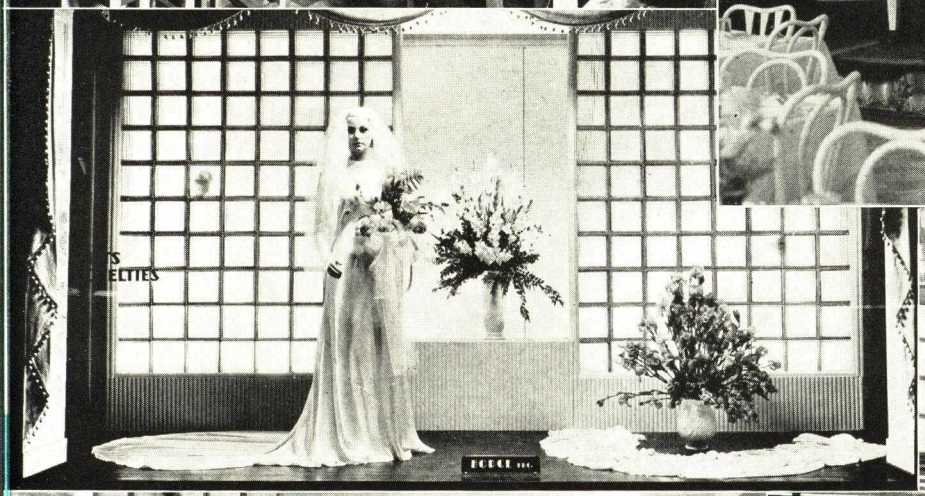
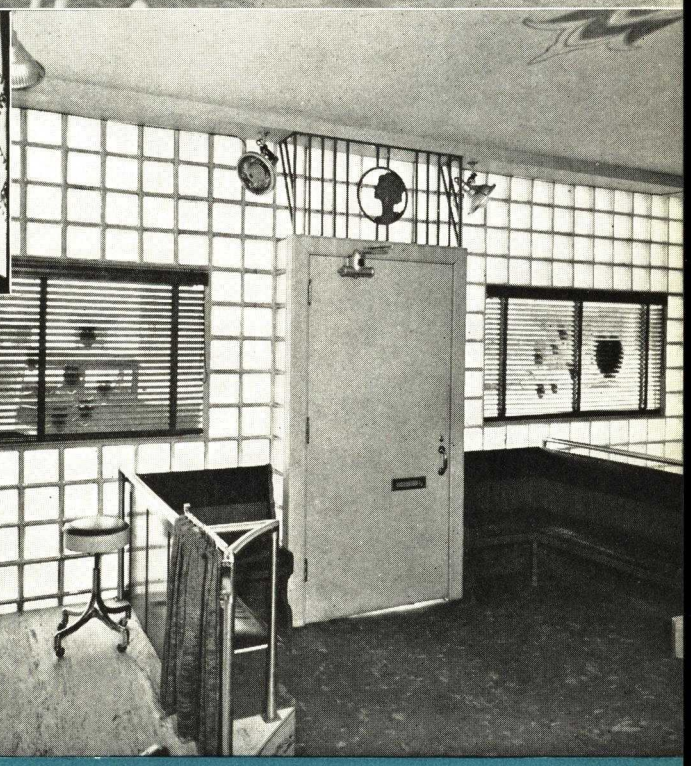
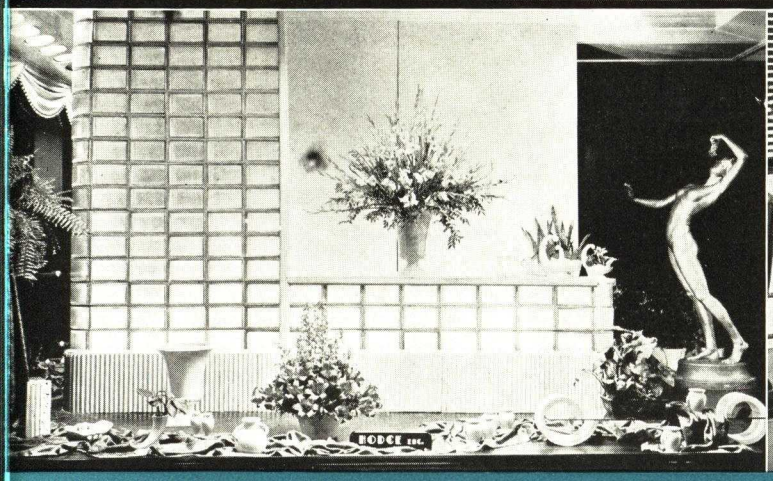
Rarey's "Beauty Box," Long Beach, Calif.











On these pages are pictured just a few of the many applications of Owens-Illinois INSULUX Glass Block, where they are used to add light, sparkle, color and gaiety to surroundings—to stimulate the imagination, and to draw patronage.

•

Insulux STRENGTH FIRE RESISTANCE *and* WIND RESISTANCE ... DEMONSTRATED BY AUTHORITATIVE TESTS

◆ Insulux Glass Block has been subjected to tests in leading laboratories to determine its physical characteristics, including strength in compression when set up in panels, strength in tension and shear at the mortar joint, resistance to lateral pressure (simulating wind pressure), resistance to sound transmission and resistance to fire. These tests have been conducted at the Underwriters' Laboratories, Inc., Chicago; the National Bureau of Standards, Purdue University, Leland Stanford, Jr. University, and Columbia University.

Information on strength and sound transmission is given on page 6 immediately preceding.

THOUSANDS OF ACTUAL INSTALLATIONS

Probably equally significant with these tests is the record of thousands of jobs of Insulux Glass Block which have permitted observation of actual performance under all kinds of field conditions. Insulux installations are now giving good service in every state in the Union, in Canada and several other foreign countries.

These have given an opportunity not only to check the physical characteristics of the material itself, but its erection, the performance of its mortar joint, both during application and in service, on large jobs and small—jobs using as much as 100,000 square feet of the block. Not only the design and physical specifications of the block itself, but the specifications for erection have been developed out of this experience. Back of all is a history of nearly three-quarters of a century in glass development and glass research by Owens-Illinois.

FIRE TEST METHODS

Insulux Glass Block panels laid up in standard specification mortar and provided with specification bond ties have been subjected to both fire tests and fire and hose stream tests.

The panels were all rectangular but of varying dimensions in accordance with the requirements of the particular test specifications. The test furnaces were designed either according to the practice of the Underwriters' Laboratories and of the National Bureau of Standards, Department of Commerce, or of the New York State Department of Labor. The former were suitable for a test panel of approximately 120 square feet in area and the latter for typical window sizes.

Two time-temperature curves were followed in the tests, either that of the American Society for Testing Materials, or the New York State Department of Labor.

OFFICIAL APPROVAL

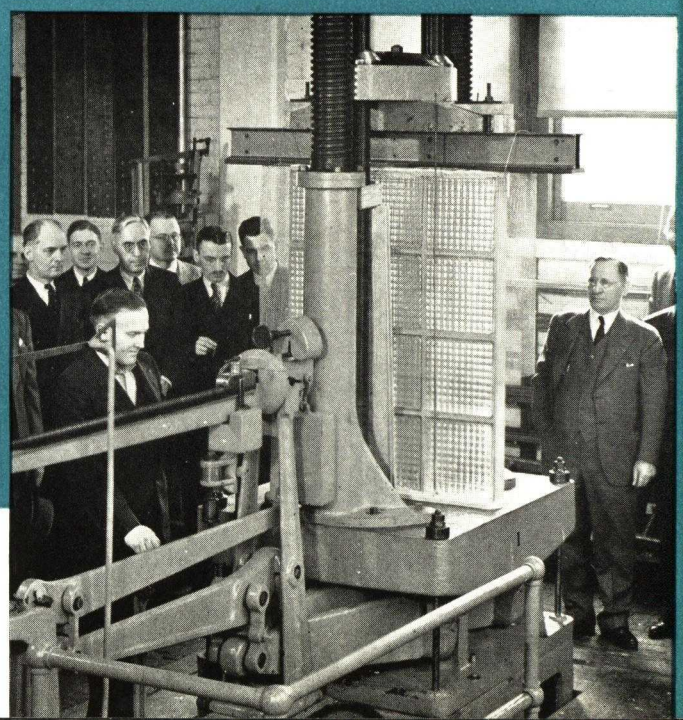
Insulux has successfully met the New York State Department of Labor requirements and is approved by the Industrial Commission as a Fireproof Window.

Insulux is listed by the Underwriters' Laboratories, Inc., Chicago: (See Retardant 2582, Sept. 8th, 1937)

"For window openings not exceeding 120 square feet in area, nor 12 feet in width or height, subject to light fire exposure (Class F Openings)."

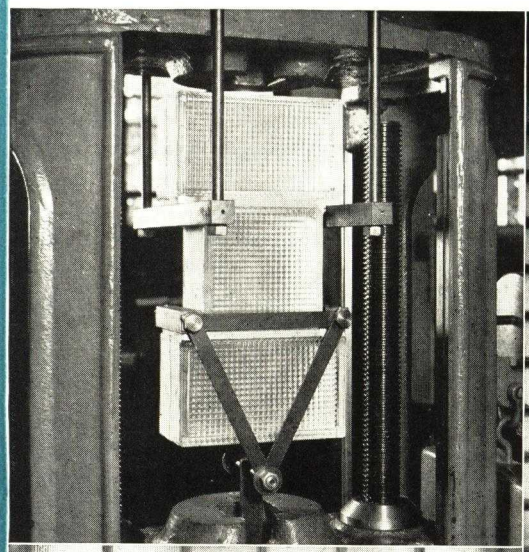
The above Underwriters' listing is for No. 101 Insulux Glass Block laid in a 1-1-4 Portland cement-lime-sand mortar reinforced in each horizontal joint with standard expanded metal wall ties, the panel set in chases at jambs and head, packed with mineral wool and caulked.

This construction may be called for in exterior walls by local fire insurance rating bureaus where fire exposure demands it, but it is not required on street fronts and in other locations of normal exposure.



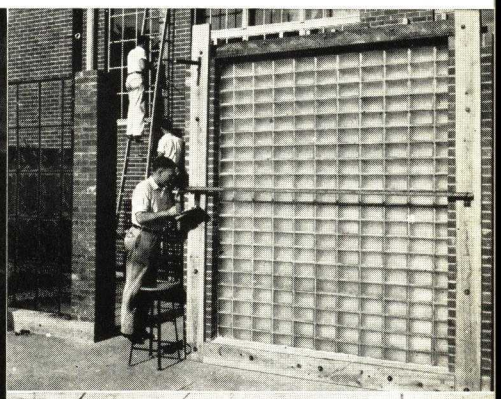
Load test on Insulux panel.

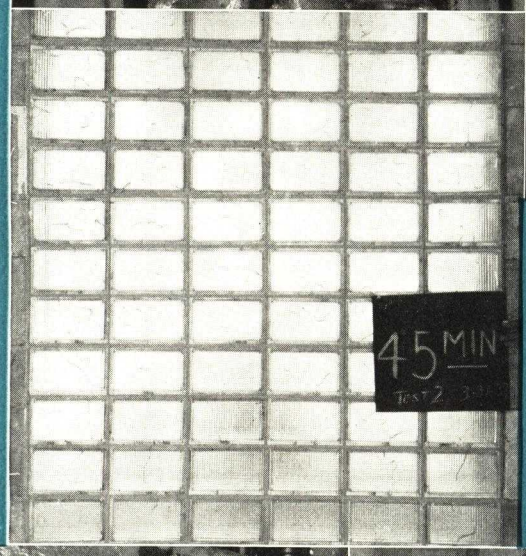
Insulux specimen loaded for tension on mortar joints.



Hand in contact with Insulux Glass Block panel during fire test. 900 degrees F. inside.

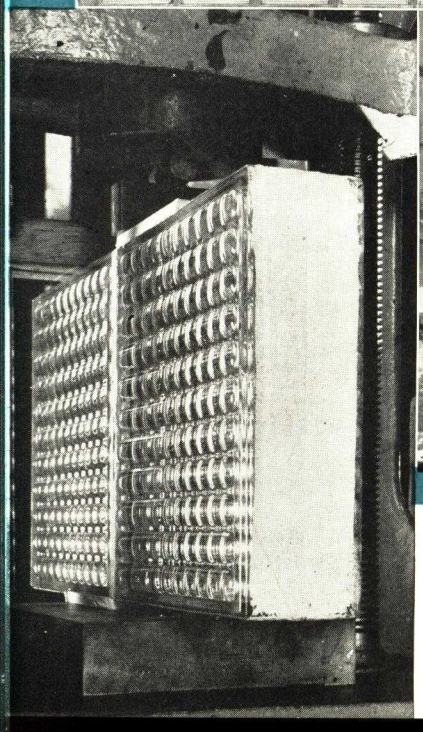
Insulux panel subjected to pressure test simulating wind pressure.





Insulux panel laid flat and subjected to uniform loading with sand.

Insulux Glass Block panel after 45 minutes of fire. . . Average temperature 1665 degrees F.



Hot side of Insulux panel resisting hose stream immediately after withdrawal from furnace on completion of standard 45-minute fire test.

Insulux specimen loaded for direct shear at mortar joints.

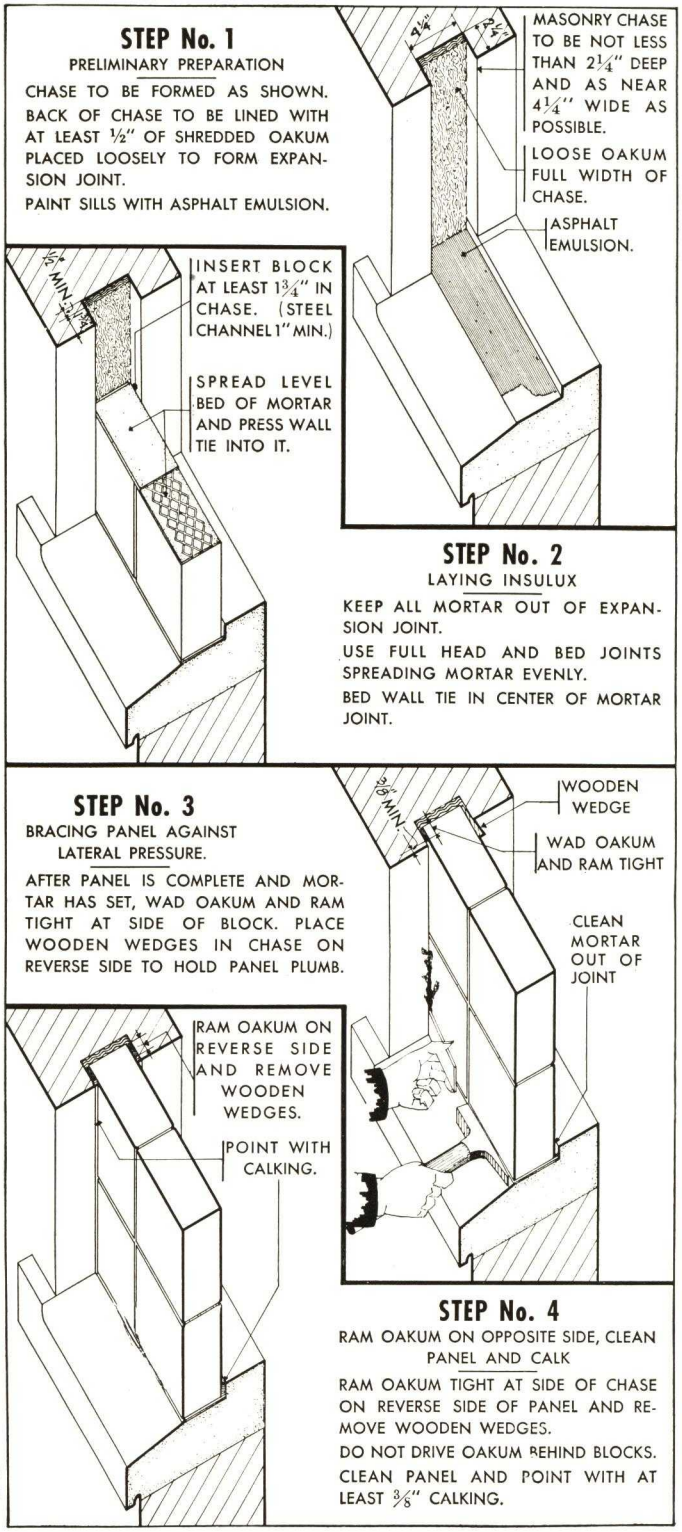
Operator making observations on Insulux pane during Underwriters' Fire and Hose Stream tes

OWENS-ILLINOIS

Insulux ERECTION PROCEDURE AND PANEL SIZES

ERECTION OF PANELS

The following drawings illustrate the proper procedure for the installation of Insulux panels in a masonry wall. The same procedure is to be followed whether jambs be steel channels, I beams, T bars or other structural shapes (See details page 20, 21 and 22).



DIMENSION TABLE

To obtain clear opening dimensions add at least ¾ of an inch horizontally, and ½ inch plus maximum beam deflection vertically to the course dimensions to provide proper clearances for expansion.

No. of Units	4⅞" x 8"		5¾" x 5¾"	7¾" x 7¾"	11¾" x 11¾"
	Height	Width	Height or Width	Height or Width	Height or Width
	¼" joints	¼" joints	¼" joints	¼" joints	¼" joints
1	5⅛"	8¼"	6"	8"	1' - 0"
2	10¼"	1' - 4½"	1' - 0"	1' - 4"	2' - 0"
3	1' - 3⅜"	2' - 0¾"	1' - 6"	2' - 0"	3' - 0"
4	1' - 8½"	2' - 9"	2' - 0"	2' - 8"	4' - 0"
5	2' - 1⅝"	3' - 5¼"	2' - 6"	3' - 4"	5' - 0"
6	2' - 6¾"	4' - 1½"	3' - 0"	4' - 0"	6' - 0"
7	2' - 11⅞"	4' - 9¾"	3' - 6"	4' - 8"	7' - 0"
8	3' - 5"	5' - 6"	4' - 0"	5' - 4"	8' - 0"
9	3' - 10⅛"	6' - 2¼"	4' - 6"	6' - 0"	9' - 0"
10	4' - 3¼"	6' - 10½"	5' - 0"	6' - 8"	10' - 0"
11	4' - 8⅜"	7' - 6¾"	5' - 6"	7' - 4"	11' - 0"
12	5' - 1½"	8' - 3"	6' - 0"	8' - 0"	12' - 0"
13	5' - 6⅝"	8' - 11¼"	6' - 6"	8' - 8"	13' - 0"
14	5' - 11¾"	9' - 7½"	7' - 0"	9' - 4"	14' - 0"
15	6' - 4⅞"	10' - 3¾"	7' - 6"	10' - 0"	15' - 0"
16	6' - 10"	11' - 0"	8' - 0"	10' - 8"	16' - 0"
17	7' - 3⅛"	11' - 8¼"	8' - 6"	11' - 4"	17' - 0"
18	7' - 8¼"	12' - 4½"	9' - 0"	12' - 0"	18' - 0"
19	8' - 1⅜"	13' - 0¾"	9' - 6"	12' - 8"	19' - 0"
20	8' - 6½"	13' - 9"	10' - 0"	13' - 4"	20' - 0"
21	8' - 11⅝"	14' - 5¼"	10' - 6"	14' - 0"	21' - 0"
22	9' - 4¾"	15' - 1½"	11' - 0"	14' - 8"	22' - 0"
23	9' - 9⅞"	15' - 9¾"	11' - 6"	15' - 4"	23' - 0"
24	10' - 3"	16' - 6"	12' - 0"	16' - 0"	24' - 0"
25	10' - 8⅛"	17' - 2¼"	12' - 6"	16' - 8"	25' - 0"
26	11' - 1¼"	17' - 10½"	13' - 0"	17' - 4"	26' - 0"
27	11' - 6⅜"	18' - 6¾"	13' - 6"	18' - 0"	27' - 0"
28	11' - 11½"	19' - 3"	14' - 0"	18' - 8"	28' - 0"
29	12' - 4⅝"	19' - 11¼"	14' - 6"	19' - 4"	29' - 0"
30	12' - 9¾"	20' - 7½"	15' - 0"	20' - 0"	30' - 0"
31	13' - 2⅞"	21' - 3¾"	15' - 6"	20' - 8"	31' - 0"
32	13' - 8"	22' - 0"	16' - 0"	21' - 4"	32' - 0"
33	14' - 1⅛"	22' - 8¼"	16' - 6"	22' - 0"	33' - 0"
34	14' - 6¼"	23' - 4½"	17' - 0"	22' - 8"	34' - 0"

TABLE SHOWING NUMBER OF REINFORCING MEMBERS* IN PANELS OF VARIOUS SIZES

GREATEST DIMENSION OF PANEL IN FEET

LEAST DIMENSION OF PANEL IN FEET	6	8	10	12	14	16	18	20
6								1
8							1	1
10						1	1	1
12					1	1	1	1
14				1	1	1	1	1
16			1	1	1	1	1	1
18		1	1	1	1	1	1	2
20	1	1	1	1	1	1	2	2

*Size and design of member to be calculated.

Note: For panels larger than 20 ft. in any dimension, provide intermediate expansion joints. See details 4, 5 & 7 on page 20.

BASIC SPECIFICATIONS FOR OWENS-ILLINOIS Insulux CONSTRUCTION

GLASS BLOCK – The Glass Block as shown on the drawings or called for in the specifications shall be hollow, partially evacuated, water-clear units of pressed glass construction as manufactured by the Owens-Illinois Glass Company. The face dimensions of the glass block shall be (4⅞ inches by 8 inches), (5¾ inches by 5¾ inches), (7¾ inches by 7¾ inches), (11¾ inches by 11¾ inches) as shown on the drawings. All walls of the blocks shall be not less than 3/16 of an inch thick. All mortar-bearing surfaces of the block shall be flat with a tolerance of ⅛ of an inch, plus or minus, and shall be pre-coated with an alkali and moisture resistant grit material of satisfactory adhesive and bonding qualities.

MORTAR – Materials used in making the mortar shall be measured by volume. For this purpose, 25 pounds of quick lime or 40 pounds of hydrated lime shall equal one cubic foot of Portland cement. The mortar shall be composed of one part Portland cement, one part lime, and four parts sand. It shall be mixed in a water-tight box and hoed from end to end until thoroughly incorporated. Consistency shall be such that the hoe is clean when withdrawn from the mortar and when tested by the use of a flow table, gives a flow number of about 90.

CEMENT – All cement used in mortar shall be Portland cement complying with the specifications of the American Society for Testing Materials.

LIME – All lime used for mortar may be either quick lime or hydrated lime. Quick lime shall be fresh, well burned, free from ashes, core, clinker, other foreign materials or air slaked particles. Quick lime shall be slaked in a water-tight box, using sufficient water to prevent burning, and to make a creamy putty. During the slaking, it shall be thoroughly hoed to prevent burning. All slaked lime shall be aged for at least 7 days before using, and the resultant putty shall be sufficiently stiff to permit easy shoveling.

HYDRATED LIME – All hydrated lime shall be of standard brand, shall meet the standard specifications of the American Society for Testing Materials, and shall be delivered in the original packages of the manufacturer.

SAND – All sand used for mortar shall be clean, sharp and well graded with angular particles, free from vegetable matter, loam, clay, and other foreign matter. It shall comply with the standard specifications of the American Society for Testing Materials.

MASONRY MORTARS – A masonry mortar of high strength and low volume change may be used instead of the Portland cement and lime mixture, if desired. Any standard brand of mortar, of which there are several, having a compressive strength at the end of 28 days of 800 pounds per square inch, according to A.S.T.M. specifications, will be satisfactory. Such masonry mortar shall be mixed and used according to the manufacturer's directions.

WATER – Shall be clean, free from alkali and organic matter.

LAYING OF GLASS BLOCK – It is particularly important in the laying of glass block that both head and bed joints be completely filled with mortar. Blocks are **not** to be hit with a metal tool, but shall be shoved into place, compressing the head joints. Compress and point joints on both surfaces with metal pointing tools after the mortar has reached its initial set. The finished surface of the joint should be smooth and non-porous. The final cleaning should not be done until after the mortar has reached its final set, in order to eliminate any possibility of injuring green mortar joints. If blocks must be disturbed after laying, clean them and then relay them. Blocks with exterior ribs are to be laid with ribs running vertically. Sills of panels are to be painted with asphalt emulsion before laying first mortar beds.

WALL TIES – Horizontal mortar joints are to be reinforced with 20-gauge expanded metal wall ties, 2⅜ inches wide by 8 feet long, galvanized after forming. Ties are to run continuously by lapping ends 6 inches and are to be located as follows:

No. 100 Series Block, every fourth course;
No. 200 Series Block, every fourth course;
No. 300 Series Block, every third course;
No. 400 Series Block, every course.

Upon approval of the architect, an alternate wall tie of 20-gauge galvanized steel, 1¾ inches wide by 6 feet long, perforated with rectangular slots, 1⅝ inches on center, may be substituted for the expanded metal type. Ties are not to be laid directly on the block, but are to be laid on the mortar and completely embedded in the center of the mortar joint.

ANCHORAGE: – Insulux panels are to be anchored to and supported by the building structure as shown on the drawings. Whenever possible, panels are to be set in a "chase" (formed by masonry, concrete, wood or metal shapes) at the jambs and at intermediate stiffeners designed so as to provide lateral support and clearance for expansion. Small panels (not over 8 feet high nor more than 100 sq. ft. in area) may be anchored to adjoining masonry at the jambs by 20-gauge galvanized perforated metal ties 1¾" x 24", laid in horizontal block joints and extended 12" into the masonry, located as frequently as wall ties. They are to be crimped or bent at the expansion joints. Panels longer than 12'-0" are to be supported at the head by angles inside and out. (See diagramatic drawings on opposite page, and details on pages 20 and 21.)

INTERMEDIATE REINFORCING – Vertical or horizontal reinforcing members are to be provided for large glass block panels and are to be of size and shape as shown on the drawings. Glass block is to be securely anchored to these members.

EXPANSION JOINTS: – Expansion joints are to be provided at the junction of glass block panels and all other materials except at the sill so that in no case will the connecting joints be filled with mortar or the block be in direct contact with the structure of the building except at the sill. Expansion joints at jambs of panels and at stiffeners are to be at least ½" in thickness. Expansion joints at heads of panels are to be thick enough to provide for maximum lintel deflection plus ½". Increase thickness of expansion joints for extremely large panels and for panels in buildings in which appreciable structural movement may occur. Provide intermediate expansion joints (use intermediate stiffeners) for panels longer than 20 feet; shelf angles for panels higher than 20 feet. Fill expansion joints with loosely packed oakum as the block are laid, keeping these joints **entirely free from mortar.** After panels have set, **wad and ram oakum tight between sides of block and sides of "chase"** for support against lateral pressure. Care should be taken not to drive panels out of plumb. Point surface of joint with not less than ⅜" of waterproof caulking compound (See diagramatic drawings on opposite page.) Use dry rope oakum.

FIRE RETARDANT PANELS – For Underwriters' specifications for fire retardant panels see bottom of column two, page 16.

OWENS-ILLINOIS TYPICAL *Insulux* CONSTRUCTION DETAILS

TYPICAL DETAILS FOR INSULUX PANELS IN MASONRY WALLS

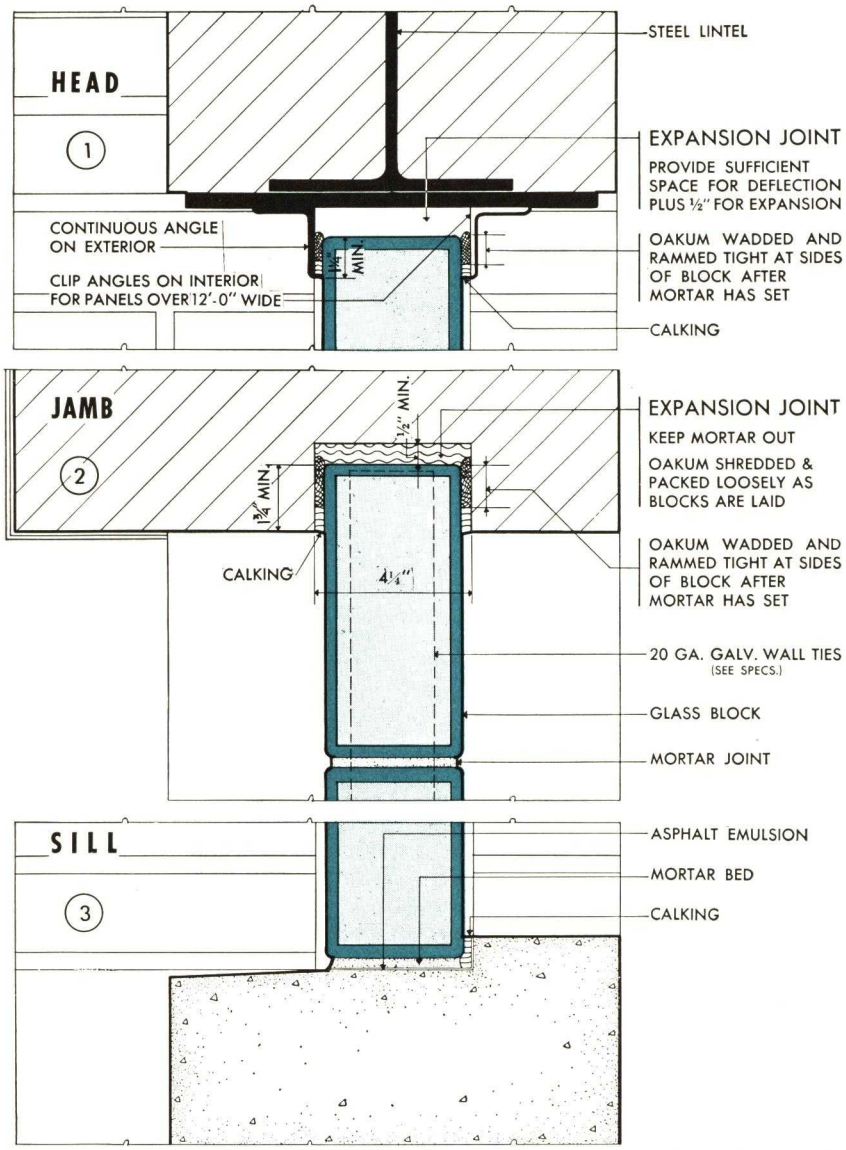
Details 1, 2 and 3 show a typical method of installing Insulux panels in masonry walls. The use of a chase at the jambs, detail 2, is desirable for all panels and is particularly necessary for large panels. (See diagramatic drawings for method of installation, page 18).

INTERMEDIATE REINFORCING

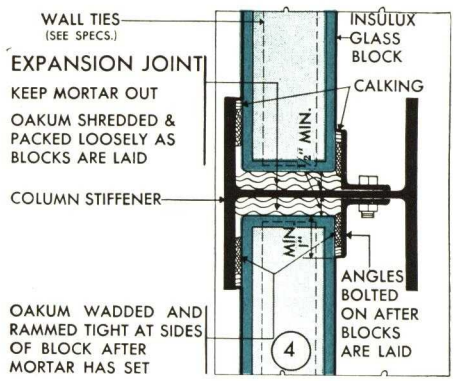
Large Insulux panels are to be reinforced with structural stiffeners spaced as shown in the table on page 18. Details 4, 5, 6 and 7 are typical methods of providing vertical reinforcement and intermediate expansion joints. Details 4, 5 and 7 are typical for long panels (more than 20'-0") providing for both reinforcement and expansion and are well adapted to use in continuous panels. Size of structural members are to be computed. In the design of vertical stiffeners care should be taken that no bolts, clips or other obstructions occur in the expansion joints where these members are connected to sills and lintels. When stiffeners are attached to lintels, which deflect appreciably, provide sliding connection.

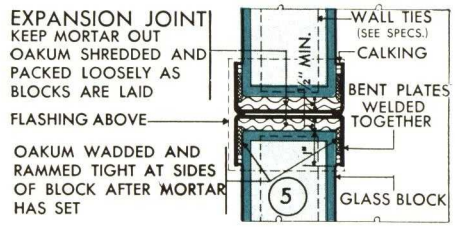
EXPANSION JOINTS AND ANCHORAGE

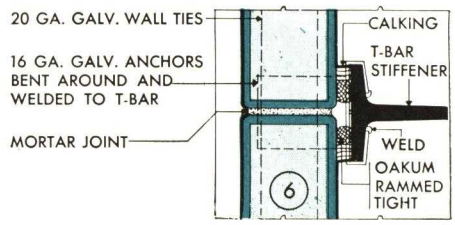
Where called for on these drawings "Expansion Joints" are to be not less than ½" thick plus maximum beam deflection at head and are to be increased accordingly for extremely large panels and for buildings in which appreciable structural movement may occur. These joints must **be entirely clear of mortar** and can be kept clear by filling them with loosely packed oakum as the blocks are laid. After panels have set, it is important to "Wad and ram oakum Tight" in locations as called for on these details in order to provide adequate support against lateral pressure. When ramming oakum between sides of block and structural members, use large wads so that the oakum will "wedge" and will not be driven into the expansion joints. Wedge both sides of the panels at the same time to prevent driving them out of plumb. Point joints with a calking material.

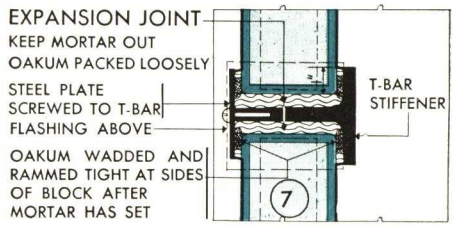


TYPICAL DETAILS FOR LARGE PANELS—12" WALLS









INTERMEDIATE REINFORCING

OWENS-ILLINOIS ALTERNATE *Insulux* CONSTRUCTION DETAILS

ALTERNATE DETAILS FOR INSULUX PANELS IN MASONRY WALLS

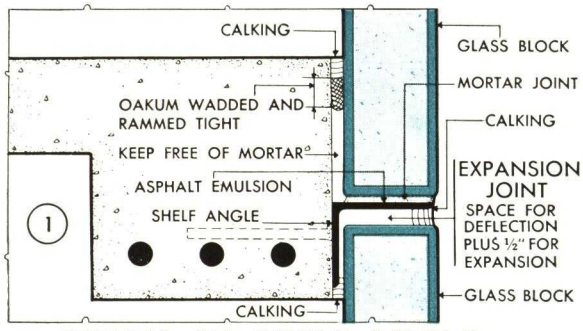
Details 4, 5 and 6 are alternate methods for installing panels in masonry walls. This method of anchorage should be confined to small panels (not more than 100 square feet or higher than 8 feet). Anchorage at the jamb is provided by means of 20 gauge galvanized perforated ties 24" long inserted 12" into masonry walls and extended into horizontal glass block joints. Anchors to be located in joints as frequently as wall ties. (See spec. for wall ties). Anchors are to be crimped at expansion joints to allow for building and panel movement. Expansion joints are to be at least ½" thick and are to be **entirely free from mortar.** This type of expansion joint may be left open until job is finished, the joint is then inspected, cleared of mortar gobs and filled with loosely packed oakum and calked.

SHELF ANGLE

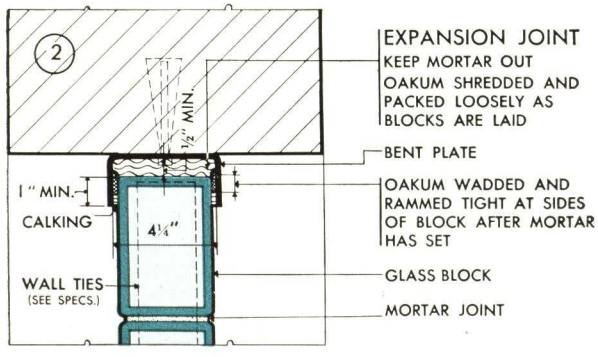
Panels higher than 20 ft. are to be carried at intermediate points by shelf angles (Det. 1). The horizontal leg of the angle is to be wide enough to provide adequate bearing for the block. Ample clearance is to be allowed between the bottom of the angle and the top of the block for deflection and expansion.

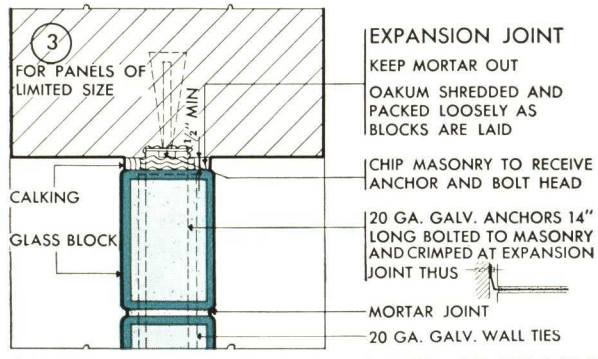
PANELS IN ALTERATION WORK

When installing panels in buildings alread constructed, Detail 2 is a typical method for anchoring large panels. If present opening size does not permit the installation of standard block, cut chases in brick work and install according to Detail 2 on page 20. Small panels may be anchored by bolting anchors to masonry (Det. 3). Allow adequate clearance between bolt head and block.

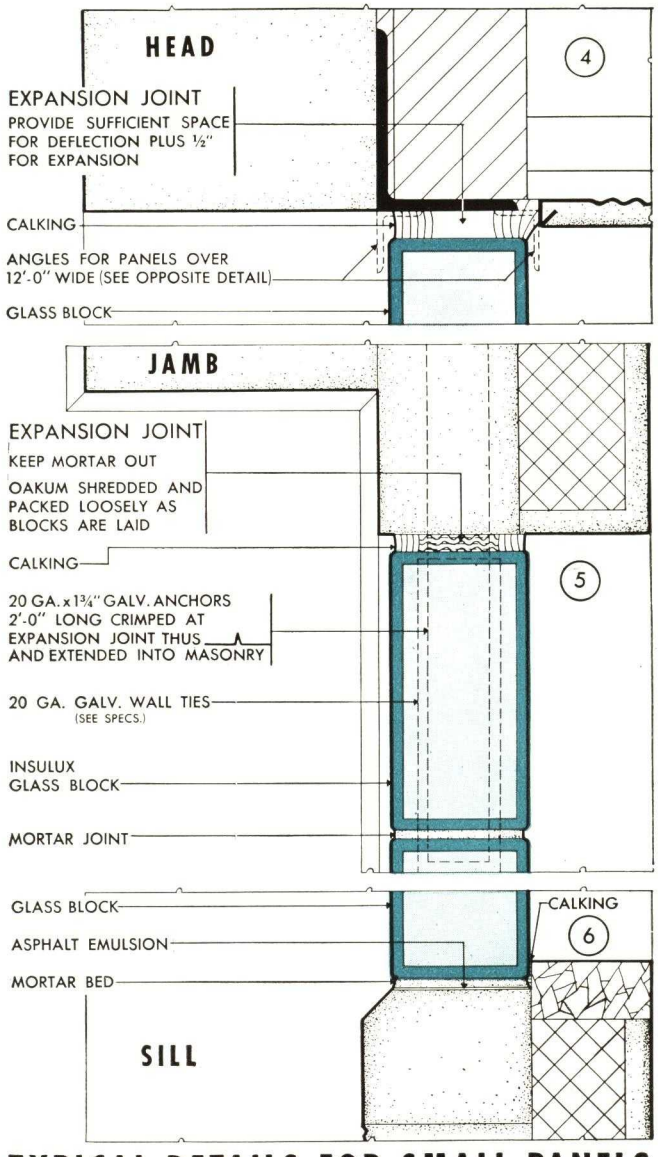


DETAIL AT SHELF ANGLE



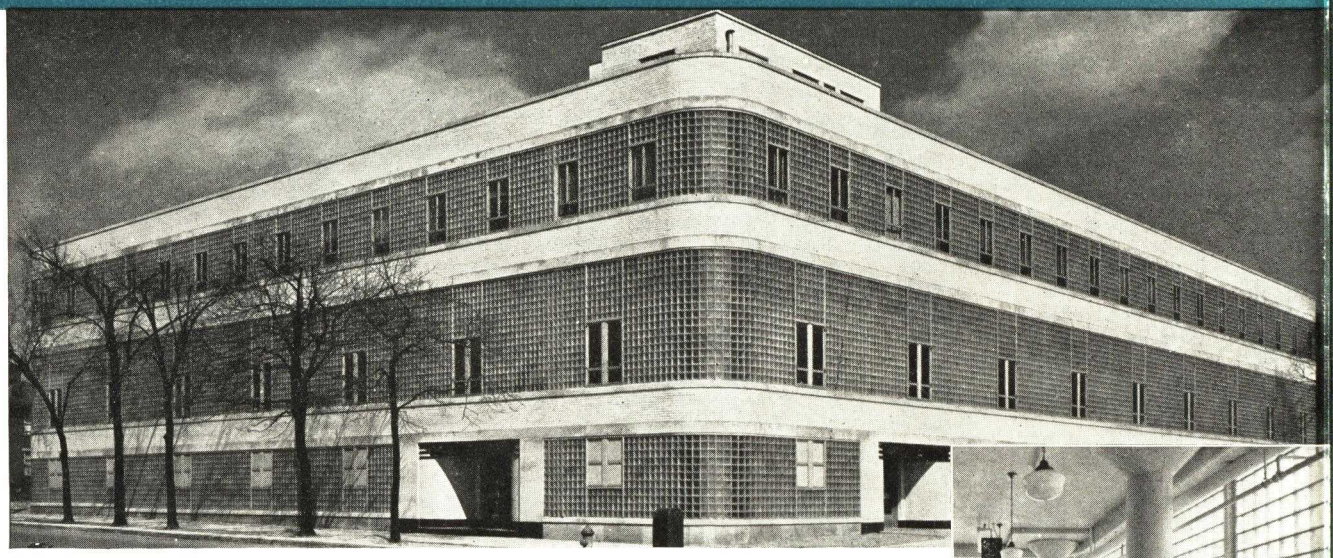


ALTERATION DETAILS—JAMB SECTIONS

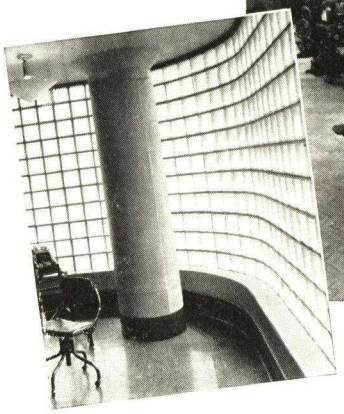


TYPICAL DETAILS FOR SMALL PANELS

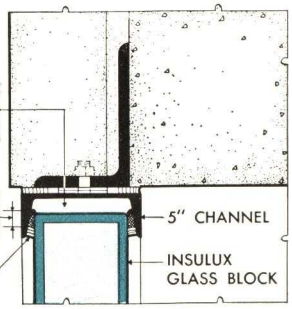
OWENS-ILLINOIS CONTINUOUS *Insulux* PANELS IN COMBINATION WITH VENTILATING SASH



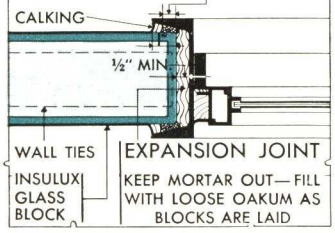
American Education Press Building Columbus, Ohio . . . Richards, McCarty and Bulford, Architects. E. Elford and Son, Contractors.



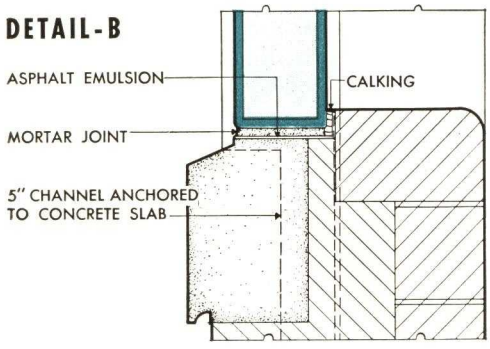
DETAIL-A



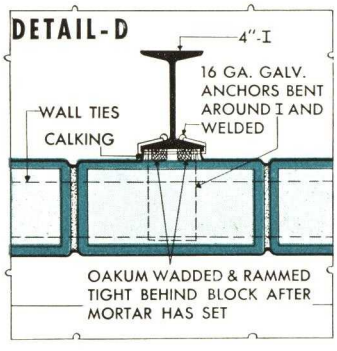
DETAIL C OAKUM WADDED & RAMMED TIGHT AT SIDES OF BLOCK AFTER MORTAR HAS SET



DETAIL-B

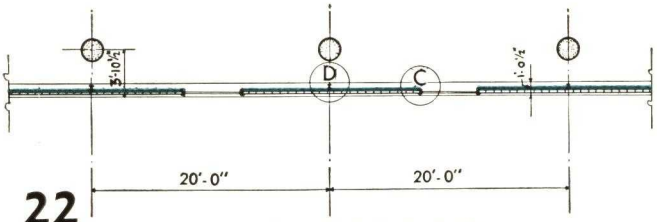


DETAIL-D

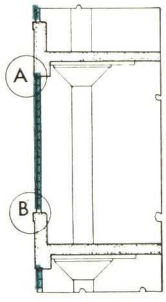


● The details on this page show a method for installing continuous glass block panels when sash are required for ventilation. The vertical structural channels used as window frames are continued to the lintel and form structural stiffeners and intermediate expansion joints for the glass block panels. (Detail C). Continuous channels (Detail A) provide horizontal anchorage and the necessary clearance for expansion at the head of the panels. Detail D is an intermediate stiffener located between window frames for the large panels on the second floor of the building. Bent plates may be substituted for channel frames when more than one-half inch clearance for expansion is necessary.

When continuous panels are not interrupted by windows, panels are to be stiffened by intermediate reinforcing members as shown on page 20, details 4, 5 and 7.



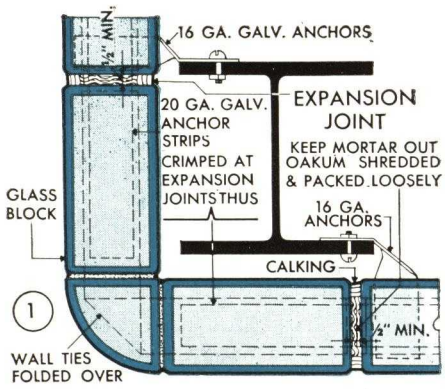
PLAN OF TYPICAL BAY



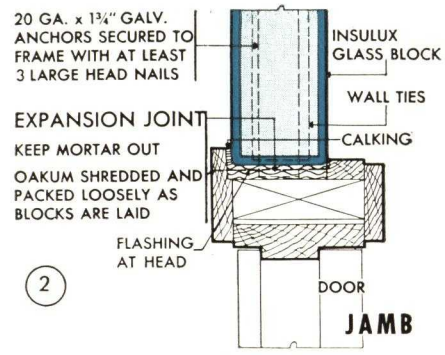
SECTION

OWENS-ILLINOIS

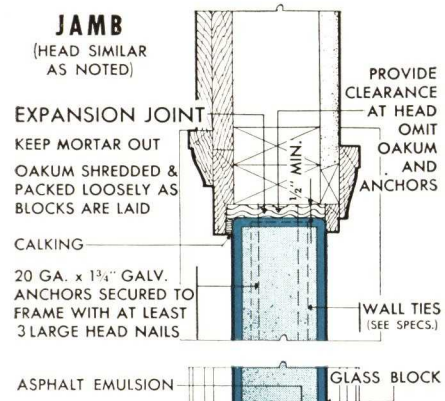
MISCELLANEOUS *Insulux* CONSTRUCTION DETAILS



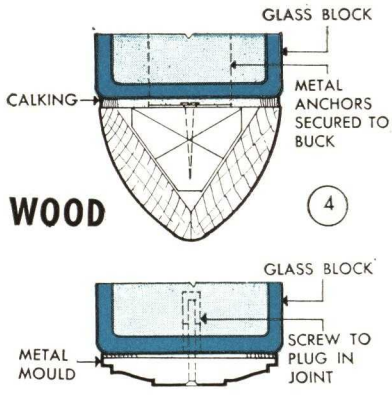
ANCHORING AT CORNER COLUMN



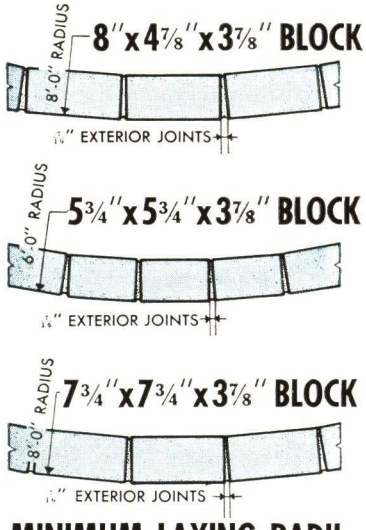
WOOD EXTERIOR DOOR FRAME



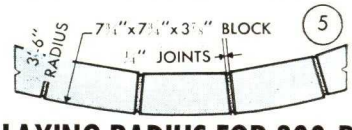
GLASS BLOCK IN WOOD FRAME CONSTRUCTION



TRIM FOR END OF BLOCKS

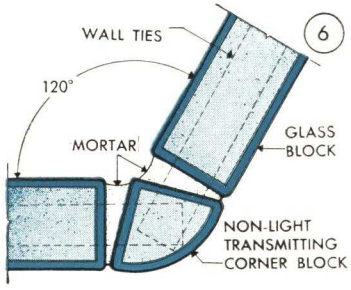


MINIMUM LAYING RADII FOR STANDARD BLOCK



LAYING RADIUS FOR 300-R

VARY JOINTS FOR OTHER RADII



120° CORNER

ANCHORAGE AT CORNER COLUMNS

A typical detail which can be adapted to continuous panel construction. It is important to keep block at least ½" from column.

DETAILS FOR WOOD CONSTRUCTION

Insulux may be installed in frame buildings by much the same methods as used in other types of buildings. Wood sills should be covered with metal flashing before laying block. (Where panels are large lay block on steel plate or channel).

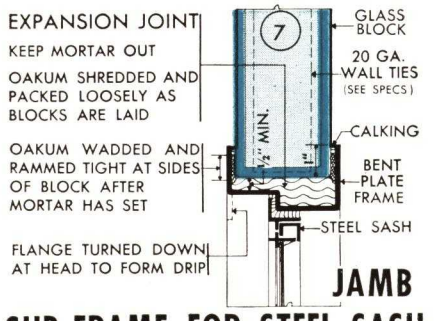
METAL EXTERIOR DOOR & WINDOW FRAMES

Door frames are to be securely anchored to building structure. Large windows set in exterior walls must be securely anchored to the building structure with provision for expansion at both jambs and sills.

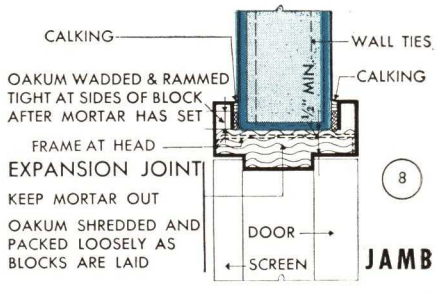
FOLLOW APPROVED METHODS

The details on this and preceding pages have been carefully worked out to assure the erection of Insulux under conditions and in a manner that will give the best results. These details are the result of experience with thousands of actual jobs under a great variety of conditions. Special care has been taken to provide complete information because Insulux has pioneered a new field and developed a new idea in building construction—the combining of light transmission, privacy, insulation value and architectural beauty in one material.

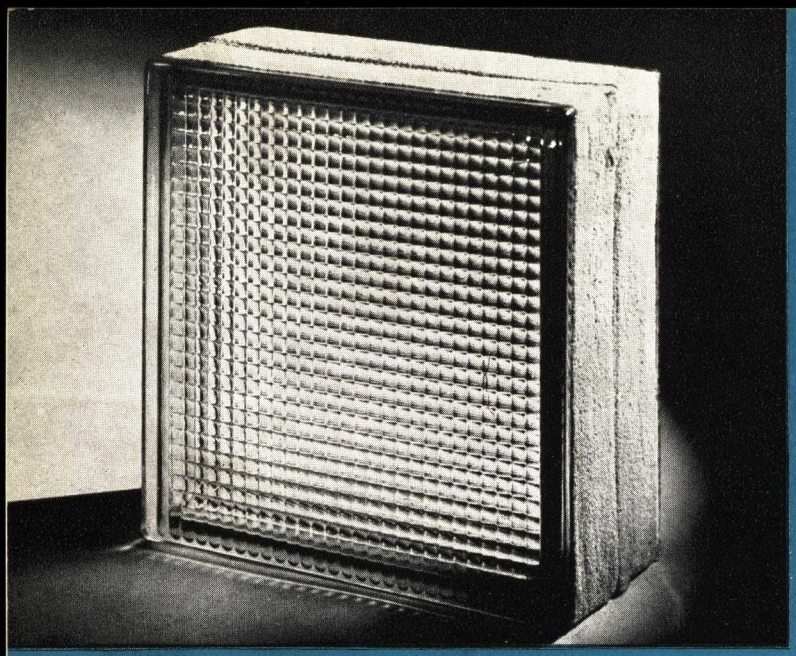
Therefore Owens-Illinois urges the adoption of specifications and details as shown in this book. Especially does it urge that good jobs demand proper expansion joints and that all panels be free from the compression or load of other materials at jambs and heads.

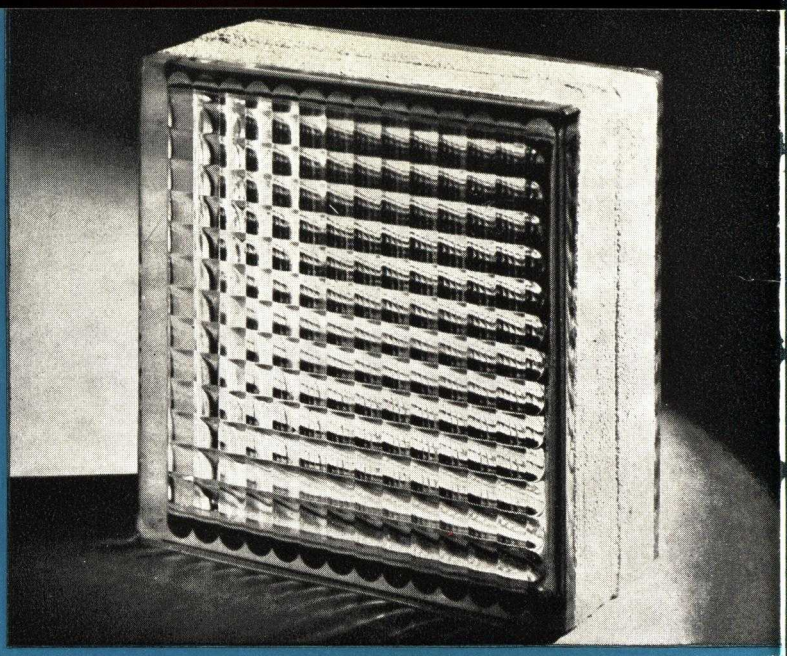


SUB-FRAME FOR STEEL SASH

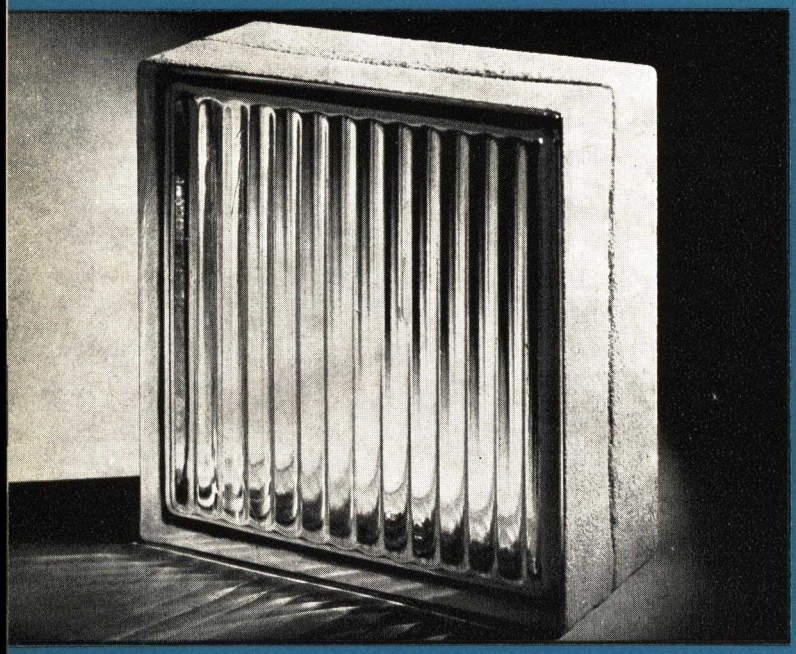


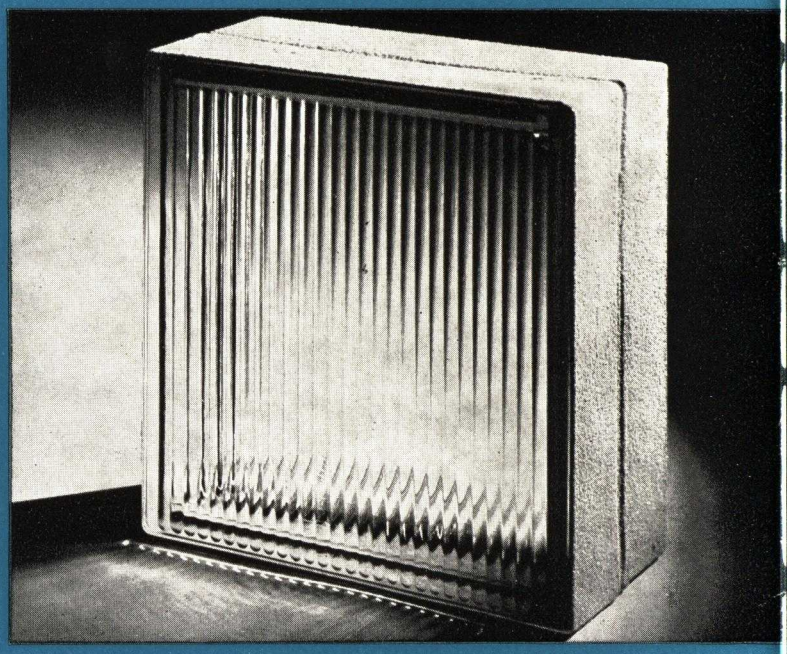
METAL EXTERIOR DOOR FRAME





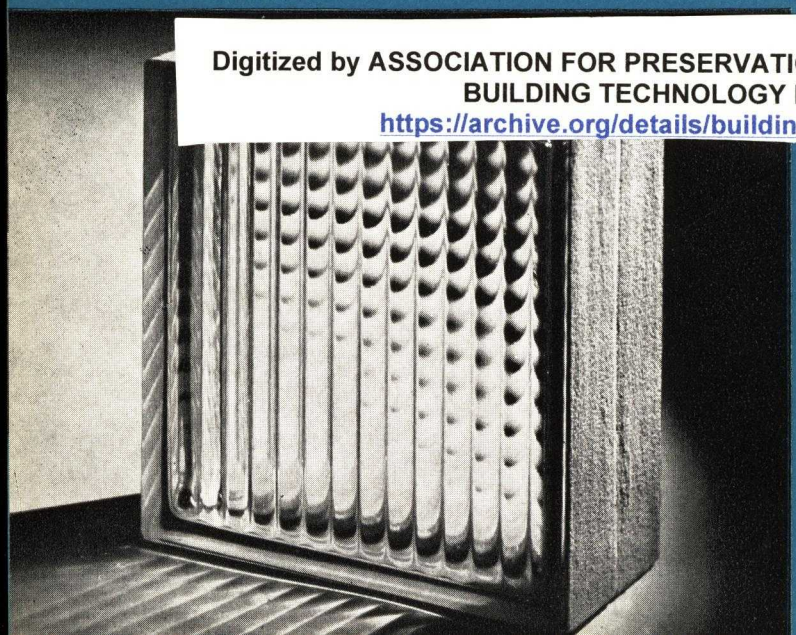
OWENS-ILLINOIS INSULUX

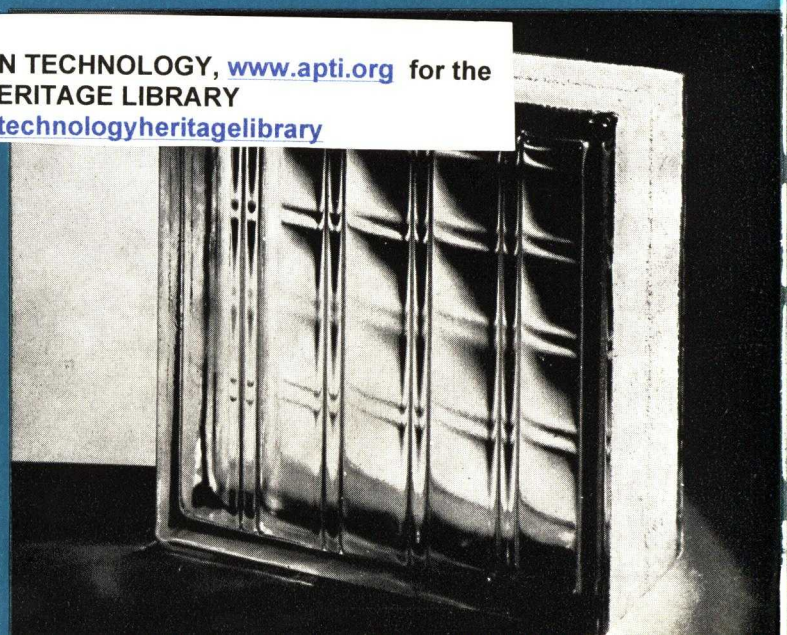




ADMITS LIGHT · RETARDS HEAT

Digitized by ASSOCIATION FOR PRESERVATION TECHNOLOGY, www.apti.org for the
BUILDING TECHNOLOGY HERITAGE LIBRARY
https://archive.org/details/buildingtechnologyheritagelibrary





SECTION 4

CONTINUED ⟶

PITTSBURGH CORNING CORPORATION

Manufacturers of Carrara Structural Glass, P C Glass Block and P C Architectural Glass Products

Grant Building, PITTSBURGH, PA.

All products distributed through the warehouses of Pittsburgh Plate Glass Company

PITTSBURGH CORNING CORPORATION

PITTSBURGH CORNING CORPORATION is a new subsidiary organization formed by the Corning Glass Works, Corning, New York, and the Pittsburgh Plate Glass Company, Pittsburgh, Pennsylvania, to specialize in the development, manufacture, and sale of various forms of structural glass.

In PITTSBURGH CORNING CORPORATION are united the research and the manufacturing facilities of the world's foremost manufacturer of technical glassware and its greatest producer of flat glass products. Combined with these resources PITTSBURGH CORNING CORPORATION has the most extensive national sales and distribution system in existence for moving glass products to the building industry. Being in position to concentrate its efforts within a specific field while having at its command the experience and unexcelled facilities of its parent companies, PITTSBURGH CORNING CORPORATION offers to architects, engineers and builders a coordinated service on all problems connected with the use of glass in structural work.

Distribution Facilities

Products of PITTSBURGH CORNING CORPORATION are distributed through the warehouses and agents of the Pittsburgh Plate Glass Company. These warehouses are located in the principal trading centers throughout the country, and form a comprehensive network of fully stocked supply headquarters, with unequalled facilities for rendering prompt and efficient service to the building trades, no matter where located. On the Pacific Coast, these products are distributed through the warehouses of W. P. Fuller & Company. This integrated service results in substantial savings of time and money.

Unequalled Research Organization

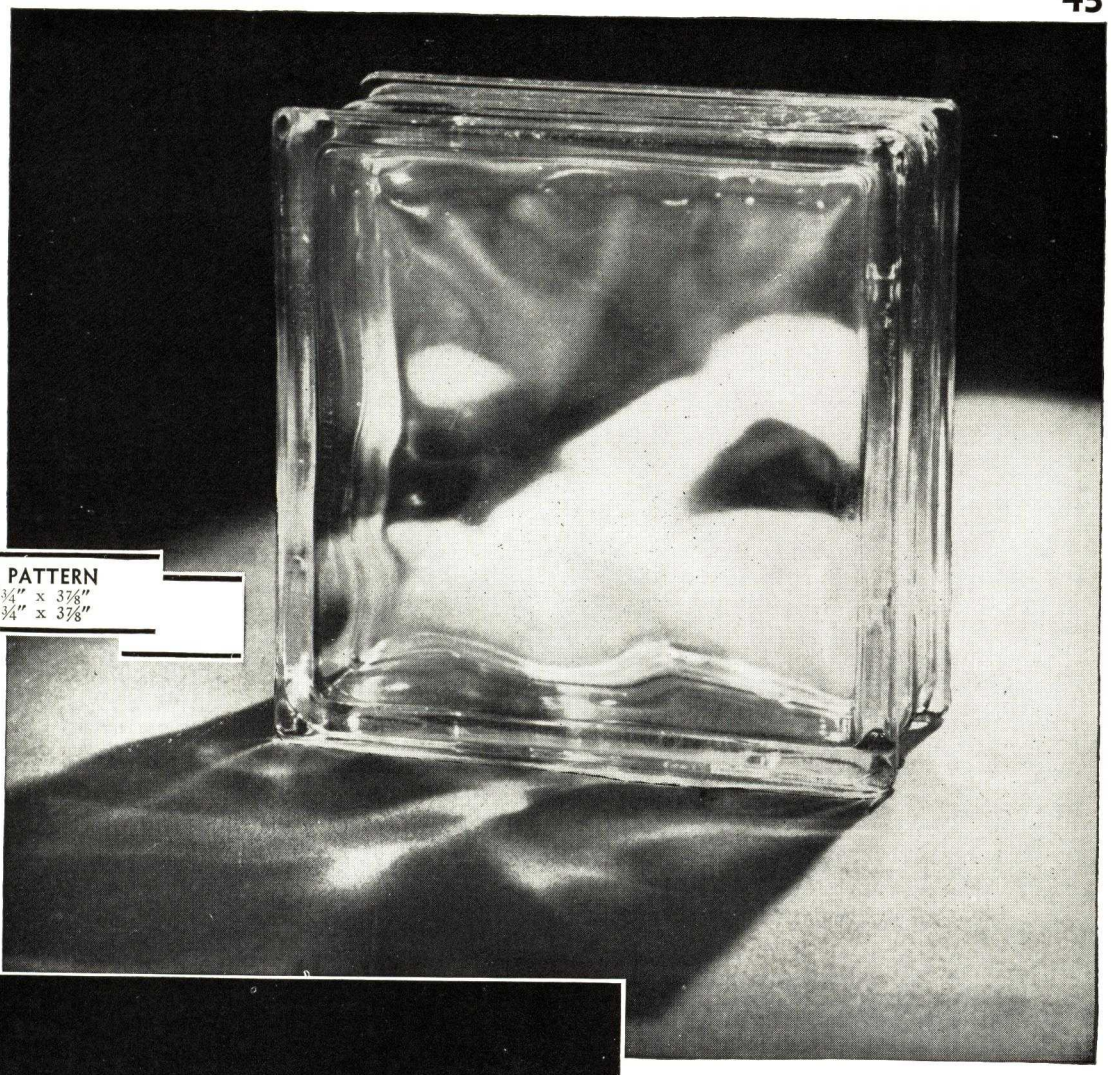
Both Corning Glass Works and Pittsburgh Plate Glass Company have maintained large staffs of research experts for many years. Under PITTSBURGH CORNING CORPORATION, these staffs are now joined to form the most complete organization of its kind in existence.

Experts in every phase of glass production are constantly at work for the purpose of providing helpful cooperation with the building industry in its quest for wider and sounder use of glass for structural purposes.

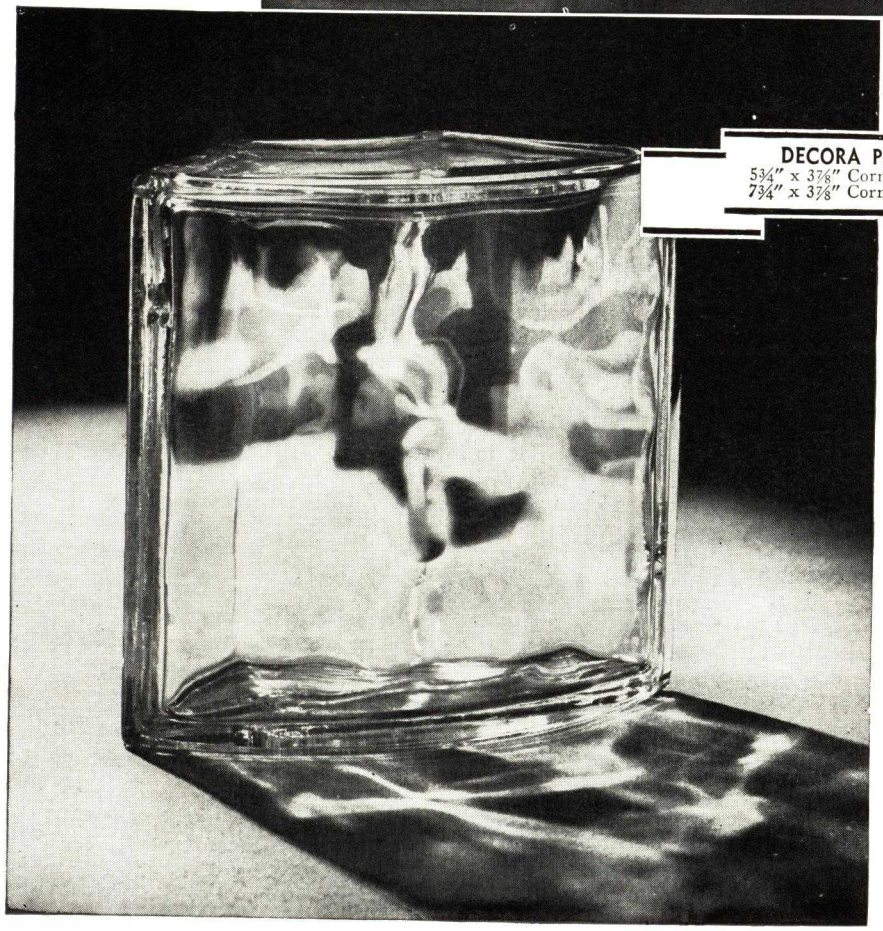
On structural glass, on glass block, on many types of architectural glass products, a tremendous amount of research is being focused . . . aimed not only at the improvement of the products themselves, but at the development of useful and authoritative installation data. The results of these studies will be made available to the building industry as each forward step is taken.

SERVICE TO ARCHITECTS

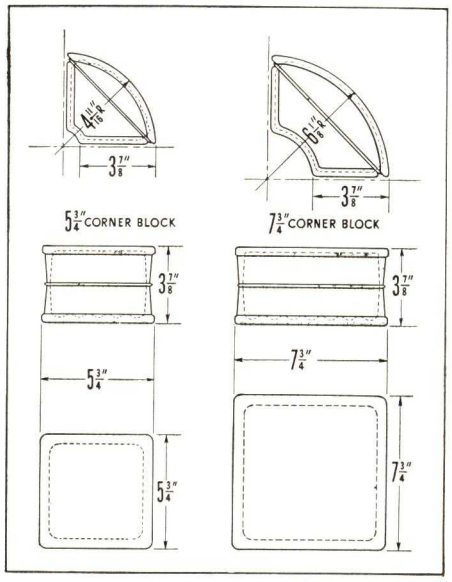
The PITTSBURGH CORNING CORPORATION maintains an able staff of field consultants and glass experts. Architects everywhere are invited to take full advantage of the cooperation and advice these men can extend in connection with problems involving these products. Complete engineering and specification service is provided on all Pittsburgh Corning Products. Communications addressed to any office of the Pittsburgh Plate Glass Company, or to the branch or general offices of the PITTSBURGH CORNING CORPORATION, will receive prompt attention.



DECORA PATTERN
5¾″ x 5¾″ x 3⅞″
7¾″ x 7¾″ x 3⅞″



DECORA PATTERN
5¾″ x 3⅞″ Corner Block 90°
7¾″ x 3⅞″ Corner Block 90°



PITTSBURGH CORNING CORPORATION

PITTSBURGH CORNING GLASS BLOCKS

The development of the PC Glass Block is the result of more than three years of intensive study and experimental work. Glass block construction offers the architect an entirely new medium with a range of application almost unlimited in scope. Wherever natural or artificial light must be considered for utility or decoration, wherever additional light is required, wherever it is desired to obscure the view without sacrifice of light, glass block construction will be found a useful and economical medium. For an endless number of decorative and practical purposes in every type of building, including hospitals, schools, theatres, stores, public buildings, hotels, industrial buildings and residences, glass block construction opens up new and fascinating possibilities.

Features

The glass blocks thus far offered by PITTSBURGH CORNING CORPORATION are made in two halves which are fused together without using metal or other binding material. The automatic fusing of the halves at a very high temperature results in the blocks being partially evacuated and free from entrapped water vapor.

The decoration of the block is all on the interior surfaces, leaving the exposed faces smooth and easy to clean.

Pittsburgh Corning Glass Blocks are crystal-clear, and are resistant to weathering and to discoloration from exposure to sunlight.

All four of the bonding surfaces are coated with a thoroughly tested plastic material which provides an expansion joint between each block and the cement surrounding it, and which increases the bond strength between the cement mortar and the glass. The use of this coating adds greatly to panel strength and reduces the possibility of glass breakage in service.

Types and Sizes

PC Glass Blocks are made in two standard patterns, the "Decora" and the "Argus," each pattern in two sizes, (see illustrations).

The larger block is 7¾ x 7¾ x 3⅞ in. with a companion radius block for use at corners.

The smaller block is 5¾ x 5¾ x 3⅞ in., also with its radius corner block.

Note: These are typical PC Blocks. Due to the rapid development of the industry, it is impossible for PITTSBURGH CORNING CORPORATION to give at this time a complete list and description of the various types, sizes and shapes of PC Blocks which may be available in the near future. From time to time, new units will be developed and introduced, and architects will be immediately notified of these additions to the PC line as they occur.

TECHNICAL DATA ON PC GLASS BLOCK

***Bond Strength**—Properly cemented (as outlined in the specification below), PC Glass Blocks have a bond strength of 35 lbs. per sq. in. in tension and 150 lbs. per sq. in. in shear.

Transmission of Light—The average transmission of light through each of the two standard designs is 78%. This high value is in part due to the purity of the glass composition. In locations where there is an unusual amount of sunlight, the use of these patterns may result in excessive brilliance. In such cases, other designs affording greater diffusion and a lower value for brightness can be had. For any special problem, consult the PITTSBURGH CORNING CORPORATION.

TECHNICAL DATA ON PC GLASS BLOCK PANELS

Important Warning—At this time PITTSBURGH CORNING CORPORATION neither recommends nor offers PC Glass Blocks as a masonry substitute in load-bearing walls. Glass Block construction is distinctly non-load-bearing, and it must never be used where an edge thrust may be encountered. For panels supported in self-sustaining walls, PC Glass Block is an excellent and thoroughly tested material.

†**Insulation**—Several laboratory tests on PC Glass Block panels with cement mortar used as a binder have established an overall coefficient of heat transfer of 0.48 b.t.u. per sq. ft. per hr. per degree Fahrenheit, (in still air) as compared, for example, with the overall coefficient of 1.1 for window glass. The equivalent value for Glass Block where wind velocity is 15 miles per hour, is .55 b.t.u. per sq. ft. per hr. per degree Fahrenheit. The air space in each PC Block gives to a panel built of this material, therefore, a distinct insulating value, and from the figures given it is obvious that a large saving in the initial and operating costs of heating and cooling systems is possible where block construction can be used instead of single glazing.

‡**Sound Transmission**—Tests show that glass block panels, built according to our specifications, have a sound reduction factor of 35.7 decibels. For ready reference this value may be compared with the following figures taken from "Acoustics and Architecture" by Sabine.

3″ Hollow gypsum tile unplastered	27.2 decibels
4″ Clay tile unplastered	31.4 decibels
¼″ Plate glass window	27.0 decibels
Sash window, 12 panes 10 x 19 x ⅛ glass	24.7 decibels
4″ Clay tile with ½″ plaster	36.3 decibels
8″ Brick wall with 1″ plaster	53.8 decibels

Surface Condensation—Tests show that moisture will not condense on the warm side of PC Glass Block panels under the following extreme conditions:

I

Inside relative humidity (max.)	40%
Inside air temperature	70° F.
Outside temperature (still air)	—30° F.

II

Inside relative humidity (max.)	65%
Inside air temperature	70° F.
Outside temperature (still air)	0° F.

This behavior of glass block construction makes it eminently suited for use in commercial buildings where manufacturing processes cause or require a constant high humidity, or in any location where there may be wide fluctuations in temperature and humidity.

***Wind Resistance**—Tests repeated over a period of many months show that a properly built square panel of PC Glass Block 100 sq. ft. in area will withstand an ultimate load of 80 lbs. per sq. ft. with a maximum deflection of 0.10 in. This is equivalent to a total load of 8,000 lbs. or a wind velocity of approximately 160 miles per hour.

Waterproofness—Many tests have been made to establish the waterproof qualities of this type of construction. These have proved that, if properly built, PC Glass Block panels will resist moisture penetration successfully under conditions far more severe than any which are likely to be encountered in actual service.

Fire Rating—The Underwriters Laboratories, Inc. and other authorized agencies are now investigating PC Glass Block Panels under fire conditions. In due course this new type of construction will receive a proper rating.

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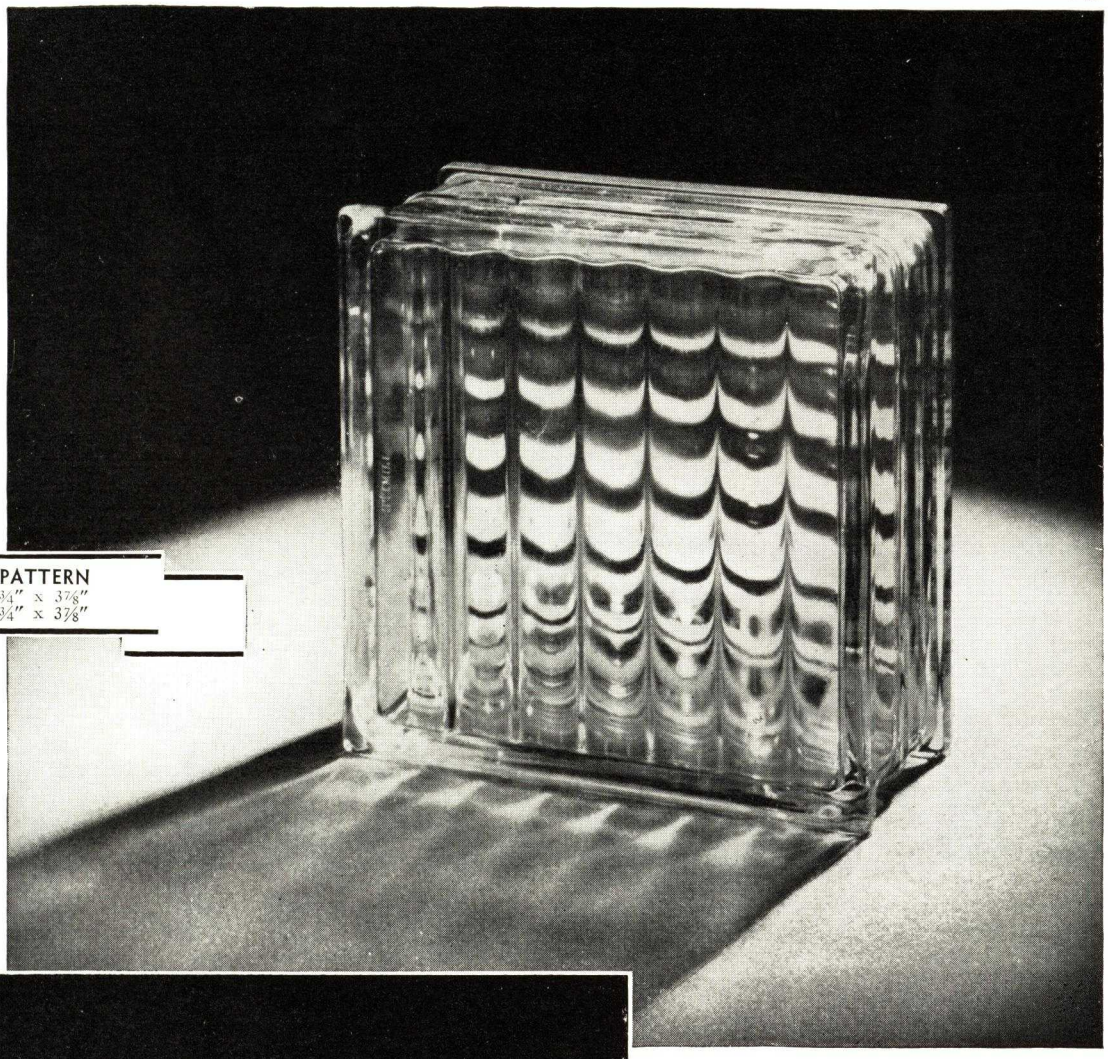
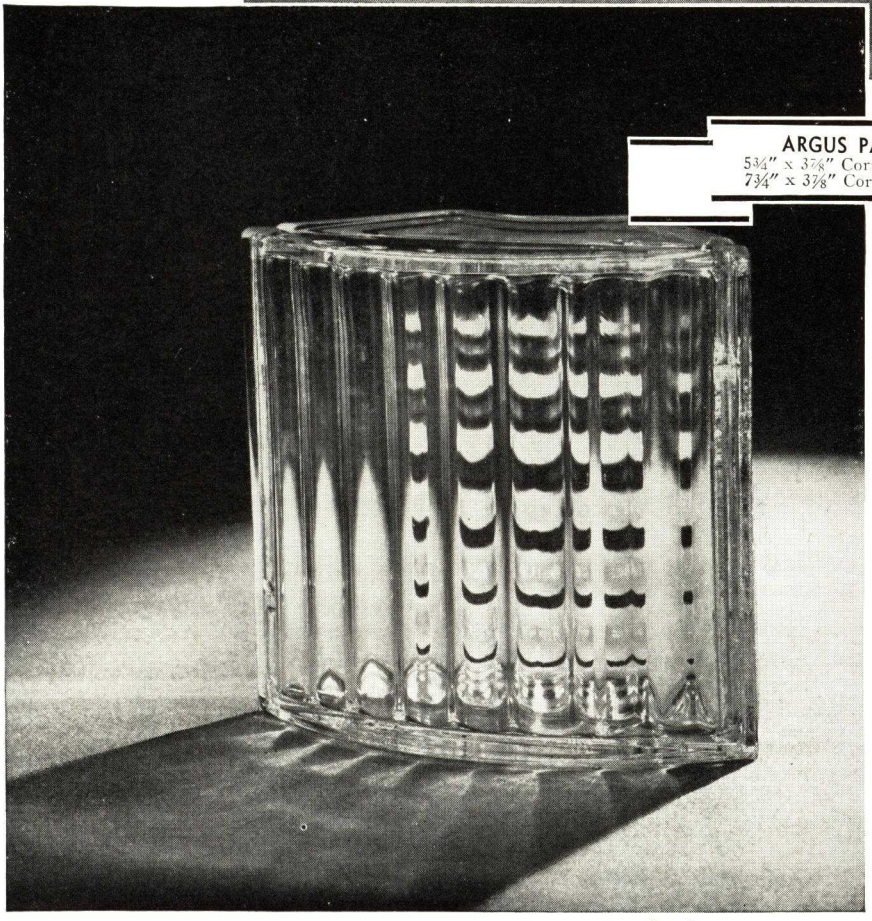
*Figures by Pittsburgh Testing Laboratories.

†Figures by University of Minnesota, P.T.L. and our laboratories.

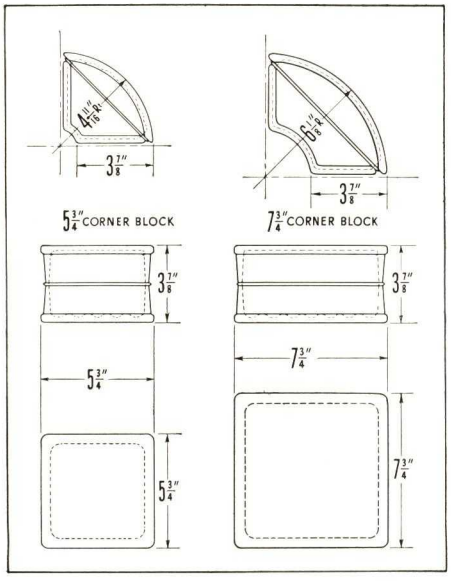
‡Figures by Riverbank Laboratories.



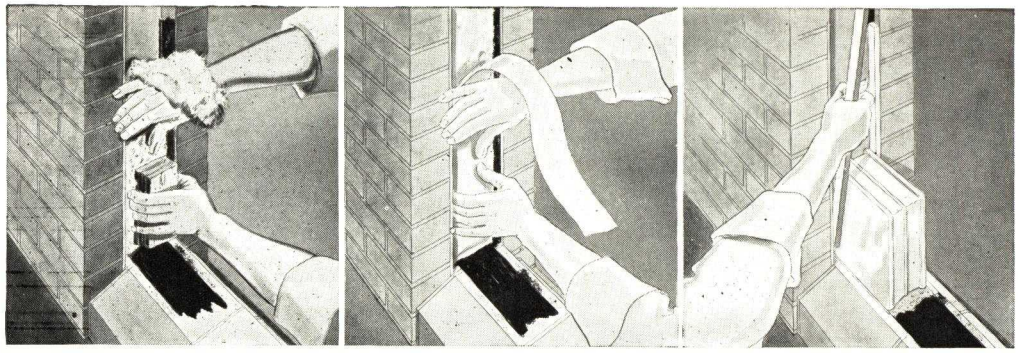
ARGUS PATTERN
5¾″ x 5¾″ x 3⅞″
7¾″ x 7¾″ x 3⅞″



ARGUS PATTERN
5¾″ x 3⅞″ Corner Block 90°
7¾″ x 3⅞″ Corner Block 90°



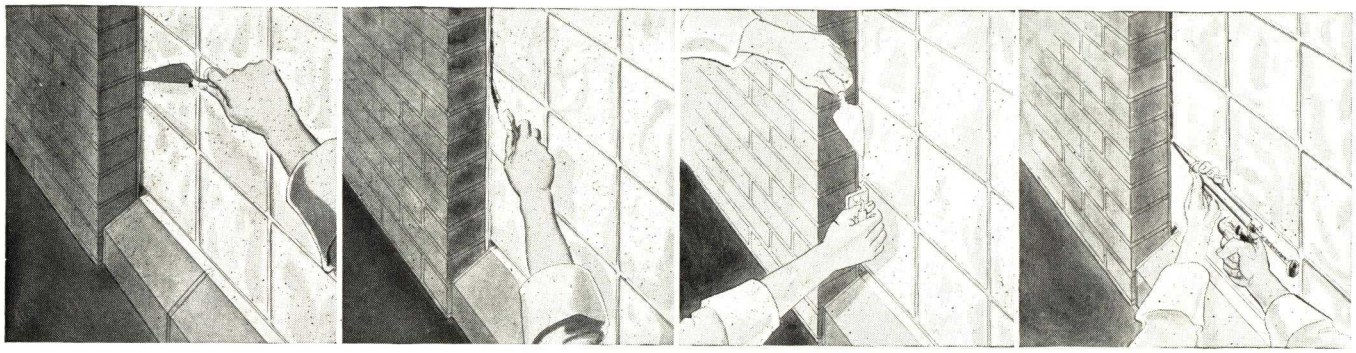
To obtain a "floating" panel, with uniform support around three edges and a firm bed on the sill we recommend the method shown in this series of pictures. This sequence of operations should be followed with all types of head, jamb, and sill construction.



1. Brush Asphalt, or Equivalent, on both Edges of Chase and on Sill. Tamp Packing in Chase

2. Completely Cover Packing with Builders Paper

3. Spread Mortar Bed on Sill—Center Blocks in Chase Against Paper

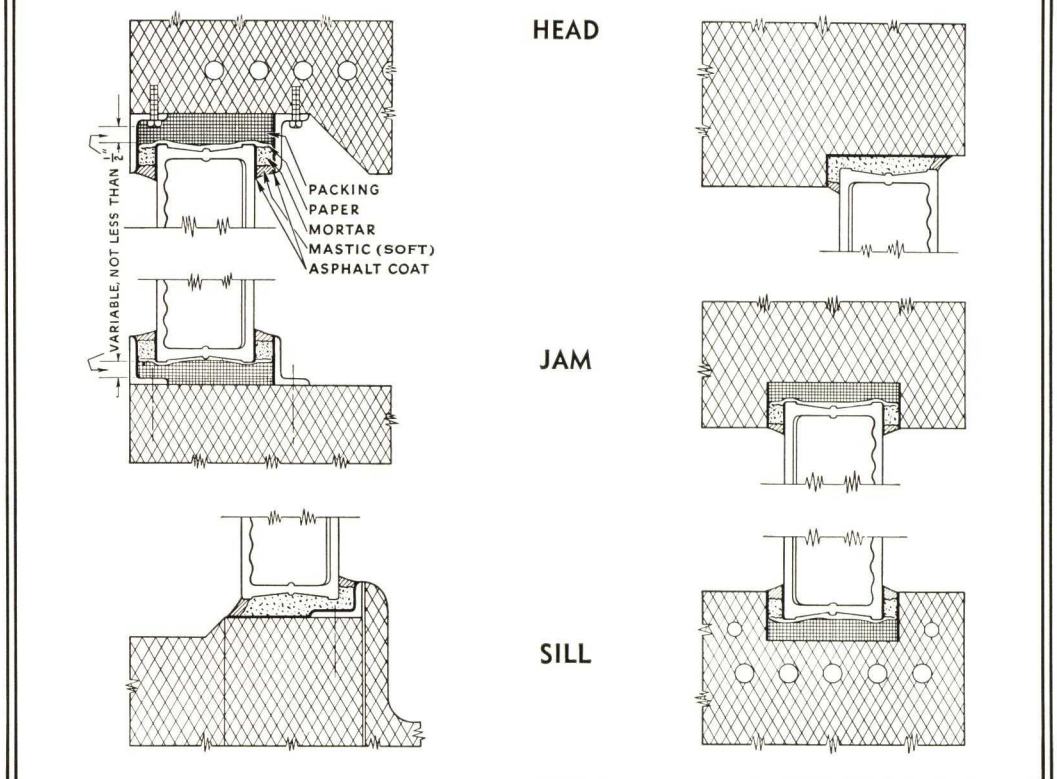


4. Remove All Excess Mortar from Space between Glass and Edges of Chase—both Sides of Panel

5. Brush Asphalt, or Equivalent, All Around Recessed Edges of Panel

6. Insert Soft Mortar for Depth of ¾ to 1 in.—Rake Back ¼ in. from Face of Jamb

7. Caulk All Edges on Weather Side of Panel with Waterproof Non-hardening Compound



DESIGN AND SPECIFICATION DATA

Cement

All cement used in mortar shall be a Portland Cement complying with the specifications of the American Society for Testing Materials.

Lime

Lime used for mortar may be either quicklime or hydrated lime, complying with specifications of A.S.T.M.

Quicklime shall be fresh, well burned, free from ashes, core, clinker, other foreign materials or air-slaked particles.

Quicklime shall be slaked in a water-tight box using sufficient water to prevent burning and to make a creamy putty. During the slaking it shall be thoroughly hoed to prevent burning.

All slaked lime shall be aged for at least 7 days before using and the resultant putty shall be sufficiently stiff to permit easy shoveling.

Hydrated Lime

All hydrated lime shall be of standard brand, shall meet the standard specifications of the American Society for Testing Materials and shall be delivered in the original packages of the manufacturer.

Sand

All sand used for mortar shall be clean, sharp and angular particles, free from vegetable matter, loam, clay or other foreign matter. It shall comply with the standard specifications of the American Society for Testing Materials.

Water

Shall be clean, free from alkalis or organic matter.

Mortar

Cement mortar shall be by dry volume one part Portland Cement, one part lime, 6 parts sand. Mix should be uniform and as *dry as can be worked.*

Laying

All joints must be completely filled, well packed, raked on both sides and tooled on both sides when set. Mortar must be allowed to set after each four courses of 8" blocks and five courses of 6" blocks. Blocks must be set with not more than ¼" visible mortar joints. If a block must be disturbed after being laid, clean it and relay.

Construction Details

For satisfactory performance glass block panels should "float" in the surrounding structure, and must not be exposed to edge thrust in any direction. Ample clearance must be allowed at top and two sides to provide for differential expansion, deflections of beams, columns and lintels, and for settlement and distortions in the structure. Panels must be provided on all four edges with uniform support against lateral pressures. This can be accomplished by the use of a soft mortar provided the face-edges of the panel are painted with asphalt emulsion, or its equivalent. This treatment of the edges of the panel provides a slip joint for edgewise motions. Care must be exercised to keep this soft mortar on face of panel only—and out of the space occupied by the packing material.

Whenever possible panels should be set in a recess or chase, either prepared in the masonry or built up by the use of angles.

Mortar bed on all sills should be laid on a coating of asphalt emulsion or asphalt asbestos paint. SEE TYPICAL DETAILS ON OPPOSITE PAGE.

Waterproofing

Glass block panels must be caulked all around on the exterior faces.

Panel Size

The maximum unsupported panel area for exterior installations shall not exceed 144 square feet. No exterior panel shall have a greater lineal dimension than 20.0 feet without a well designed waterproof expansion joint.

For partitions or other interior installations panel sizes may be 50 per cent greater than above specified.

Reinforcing

Except as may be especially indicated in a particular installation no reinforcing in mortar joints shall be used.

Estimating Data

FOR 100 SQUARE FEET OF PANEL AREA

Size of Block	5¾ x 5¾ x 3⅞	7¾ x 7¾ x 3⅞
Number of blocks	400	225
Shipping weight of blocks	1300 lbs.	1500 lbs.
Volume of mortar joints	2.6 cu. ft.	2.0 cu. ft.
*Crew hours	10	8

*Crew consists of one mason and two helpers

Note

The foregoing recommendations are based on the results of laboratory and field work extending over a period of more than two years. Our investigations are continuing and we urge consultation with our staff when designs are being prepared. Glass Block Construction is a recent development and presents problems whose complete solution will require close cooperation between the manufacturers and the architectural profession. Communicate with us at our general offices, Grant Building, Pittsburgh, Pa., our New York office at 718 Fifth Ave., or through any of the branches and agents of the Pittsburgh Plate Glass Company.

THE ROBINSON CLAY PRODUCT COMPANY

AKRON, OHIO

SALES OFFICES AND WAREHOUSES

The Robinson Clay Product Company of New York

Empire State Building, NEW YORK, N. Y.

BUFFALO, N. Y. ROCHESTER, N. Y. SYRACUSE, N. Y. ALBANY, N. Y. MASPETH, N. Y. C. MOUNT VERNON, N. Y.
BLOOMFIELD, N. J. HARTFORD, CONN. BALTIMORE, MD. PHILADELPHIA, PA.
EASTERN CLAY GOODS COMPANY, 135 North Beacon Street, Boston, Mass. N. A. WILLIAMS CO., 111 West Washington Street, Chicago, Ill.

THE ROBINSON CLAY PRODUCT COMPANY OF CANADA, Ltd.
Foot of Shaftesbury Avenue, TORONTO, ONT., CANADA

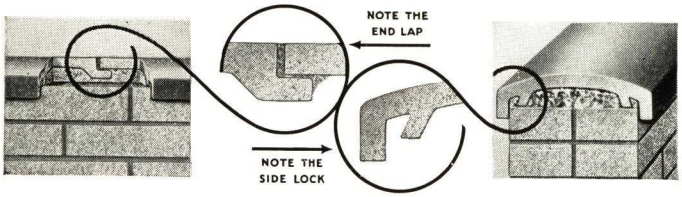
Products

Fire Brick, High Temperature Cements, Drain Tile, Lap-Lok Wall Coping, Chimney Pots and Tops, Septic Tanks, Floor Tile, Flue Lining, Vitrified Clay Sewer Pipe, Channel Pipe, Meter Boxes, Segment Block, Acidware Pipe, Filter Underdrains, Insulting Brick, Asphaltic Compound, Jute.

Robinson Lap-Lok Wall Coping

An attractive, streamlined wall coping for modern buildings; a finish that protects brick, concrete or stucco parapet walls from erosion and disintegration. It is durable and attractive, and so designed that the narrow close fitting flush joint, with its concealed lap, prevents disintegration of the joint and protects the wall from weather, frost, and fumes. Brown or light buff in color, Robinson Lap-Lok Coping is thoroughly vitrified and will not disintegrate, rust, or discolor. Robinson Lap-Lok Coping is being specified by leading architects for covering parapet walls on modern residences, apartments, and business buildings.

Complete information on Robinson Lap-Lok Wall Coping will be sent on request.



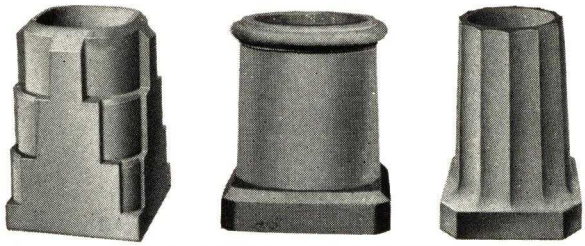
New-style Patented Lap-Lok Coping

Has a streamlined appearance and is superior in design. The narrow flush joint with a concealed lap protects the joint from water and frost and the new side lock bonds the coping securely to the wall, as illustrated above.

Robinson Chimney Pots and Tops

Robinson Chimney Pots add an attractive finish to roof lines and thus enhance the appearance of the well designed modern residence. They are built in various new styles demanded by architects for improvement over the obsolete styles of the past decade. Manufactured of selected clays; burned to withstand heat, they will not crack from changes in temperature. They have a smooth unglazed finish, either reddish brown or terra cotta in color, effectively add to the draft of the chimney, and prevent deterioration caused by rain seeping into the joints of unprotected brick work.

Write for complete information.



Three of a Dozen Designs of Chimney Pots
Manufactured by Robinson Clay Product Company

Robinson Fire Clay Flue Lining

Square or Rectangular Robinson Flue Lining

Robinson Flue Liners provide a smooth flue which increases draft, saves fuel, will not collect soot, and protects against losses from chimney fires. They are made from fire clay which will withstand heat, gases, and sudden changes in temperature. The liners are buff in color and are manufactured in round styles in sizes from 6 to 36 in., inclusive, in diameter, and in square and rectangular styles up to 24x24 in., inclusive.

Write for literature.

Robinson Jumbo Floor Tile

Robinson Jumbo Floor Tile is acclaimed by architects as one of the most attractive and durable tiles for porches, patios, terraces, game rooms, loggias, garden and swimming pool walks, solariums and conservatory floors . . . and for special service in manufacturing plants.

Manufactured of vitrified clay of reddish brown color and unglazed, this durable acid-proof tile makes an attractive floor covering, and is easy to install. The tile dovetails into mortar to provide a positive, permanent bond.

Robinson Jumbo Floor Tile

Sizes 9x18x1¼ in.

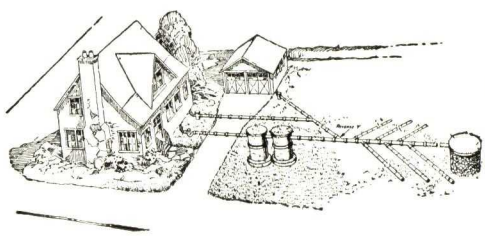
Robinson Septic Tanks

Robinson Septic Tanks offer an economical, efficient, sanitary sewage disposal system for residences, schools, farms, tourist camps, and many other purposes. The system is self-operated, free from odors, requires no chemicals, is easy to install, and is completely underground.

Robinson Septic Tanks with burned-in baffles are made of thoroughly vitrified salt-glaze clay, a material recognized throughout the world as being the best for sewer construction. They are resistant to corrosive action of the acids and gases commonly found in sewer systems and also resist the continuous attack of alkaline and ground waters from the outside.

Write for a descriptive folder, containing sizes and capacities of these tanks.

Robinson Vitrified Sanitary Septic Tank



Typical Installation of Septic Tanks—Providing Sewage Disposal Without Cesspools

HEATH CUBE SERVICE

SALES PROMOTION DIVISION OF THE HEATH UNIT TILE COMPANY

TACOMA, WASH.

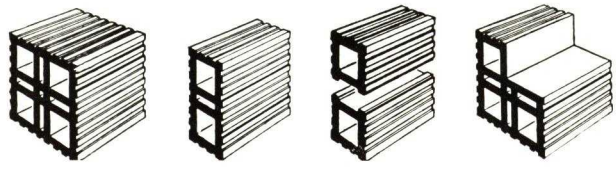
LICENSEES AND REPRESENTATIVES

BRIGHTON, MICH., Charles D. McKinney
CLEVELAND, OHIO, The Cleveland Builders Supply Co.
COLUMBUS, OHIO, Nelsonville Brick Co.
DALLAS, TEX., Fraser Brick Company
DENVER, COLO., G. T. Ripley Selling Co.
DULUTH, MINN., Standard Salt & Cement Co.
EAST ST. LOUIS, ILL., The Hill Brick Co.
FARGO, N. D., Victor H. Leeby Co.
GREEN BAY, WIS., The Gagnon Clay Products Co.
MILWAUKEE, WIS., W. H. Piphorn Co.
MINNEAPOLIS, MINN., Landers-Norblom-Christianson Co.
OWENSBORO, KY., The Owensboro Brick & Tile Co.
PORTLAND, ORE., Columbia Brick Works
PUEBLO, COLO., Summit Pressed Brick & Tile Co.
ST. PAUL, MINN., Dick Speaks Supply & Fuel Co.
SAN FRANCISCO, CALIF., N. Clark & Sons
SEATTLE, WASH., Seattle Brick & Tile Co.
SHEFFIELD, IOWA, Sheffield Brick & Tile Co.
SPOKANE, WASH., Gladding, McBean & Co.
TACOMA, WASH., Far West Brick & Tile Co.

THE HEATH CUBE TILE UNITS ARE USED IN SUPER-STRENGTH HOLLOW TILE MASONRY

Heath Cubes are unique in their simplicity. The Basic Cube and its divisional units build every masonry detail. They do away with special tile shapes, brick patchwork, and slushing exposed cells. The Heath Cube is the only tile shape that can be side-set and end-set in the same course, thus the closure units are the same units as used in the body of the wall.

The Architect and Builder are assured of substantial and uniform and economical masonry when they use Heath Cube tile units, something not heretofore accomplished, and the Owner is benefited by better masonry construction. Heath Cube Tile masonry is a unification of an idea and practice, and a decided advance in hollow tile masonry.



The Heath Basic Masonry Units

SPECIFICATIONS FOR HEATH CUBES

Used in Super-Strength Hollow Tile Masonry

Heath Cube tile units shall have a compression strength of 1000 lbs. per sq. in. gross area. The wall structure built with them shall develop 50 per cent of the Cube unit strength. Other physical properties of the tile units shall be as required by the American Society for Testing Materials.

The Heath Cube tile units, including the Cube closure units, shall be laid in two-way interlocking bond, in double-web-and-shell vertical alignment in each 4-in. thickness of wall, laid either side-set or end-set.

Build jambs, chases and pilasters with end-set Heath Cube tile units of whole, half and quarter units, bonding into the wall tile units 4 in. in alternate courses. Open cells in jambs or in the face of the wall will not be permitted.

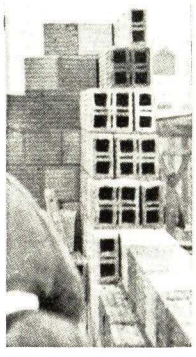
In warm weather wet the tile before laying.

Cement-lime mortar shall be used, mixed one part cement, one part lime putty, and six parts sand, measured by volume. The lime shall be water slaked, strained and run into boxes, properly protected, and aged in the putty condition 20 days before using. After the cement has been added the mortar shall be used within two hours.

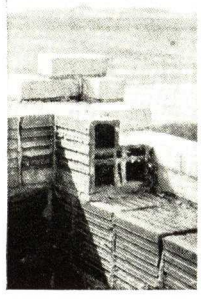
Data

The standard Heath Cube is 7¾ ins. wide, 7¾ ins. high, and 8 ins. long. This size is slightly increased or decreased to conform to the size of the brick in the locality where it is used. The Cube measure, as laid in the wall including the mortar, approximately 8¼x8¼x8½ ins. which equals six bricks including the intervening mortar.

Wall Measurements—1 cube equals ⅓ cu. ft.
2 cubes equal 1 sq. ft. of surface.
3 cubes equal 1 cu. ft.



12-in. wall built with Cubes and Half Cubes. Note interlocking bond between alternate courses, and double-web-and-shell vertical alignment.



12-in. wall. Shows how the Header Cube is placed back of the face brick.

A typical construction of combining Brick Facing with Cube Backing.

How high masons can lay Cubes. Note it is as high as they can see the mortar joint. As high as they can lay brick.

Backing face brick with alternate Cubes and Header Cubes every sixth course of brick.

TRADE-MARK
HEATH CUBES
BASIC BUILDING UNITS
PATENTED

Heath Cubes and System of Masonry Construction are patented, and owned by the Heath Unit Tile Company, Tacoma, Washington, and are licensed to manufacturers in exclusive manufacturing and selling territories.

Write the Licensees for demonstration of use and economies, or the Heath Unit Tile Co., Puget Sound Bank Building, Tacoma, Washington, for literature covering Heath Cube Super-Strength Masonry.

NATIONAL FIREPROOFING CORPORATION

Manufacturers of Natco Structural Clay Tile

GENERAL OFFICES

PITTSBURGH, PA.

BRANCH OFFICES

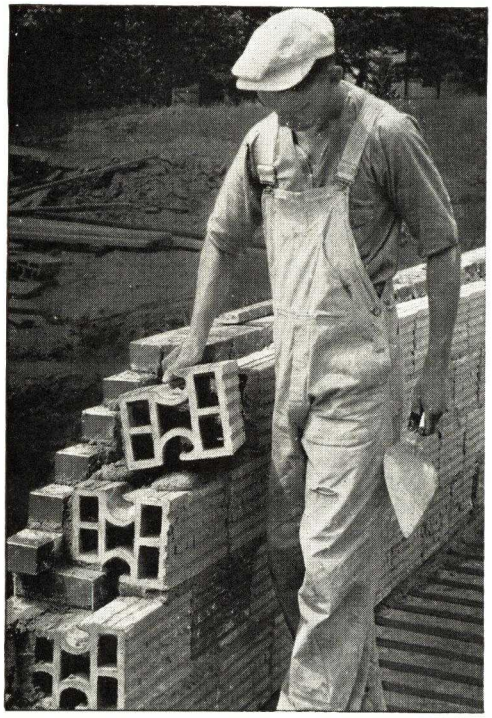
NEW YORK, 205-17 E. 42nd Street
PHILADELPHIA, Architects Building
CHICAGO, 208 W. Washington Street
DETROIT, 5737 Commonwealth Avenue
NORTH BIRMINGHAM, ALA.

IN CANADA: The National Fireproofing Company of Canada, Ltd., TORONTO, ONT.

TRADE MARK
NATCO
SINCE 1889

The Natco Line of Structural Clay Products comprises units which can be economically and effectively used for walls, partitions and foundations, for fireproof floors of many kinds, as a protection for steel structural members, for roofs—in short, they have an application somewhere in every building, everywhere in some buildings.

The Engineering Department of the Corporation will gladly co-operate in working out the most efficient and economical use of Natco Structural Clay Tile on specific applications.



Speed-A-Backer Wall section showing how handle increases speed of erection. Note how brick is bonded, also absence of through mortar joints

Natco Speed-A-Backer Tile

For Backing Brick Walls

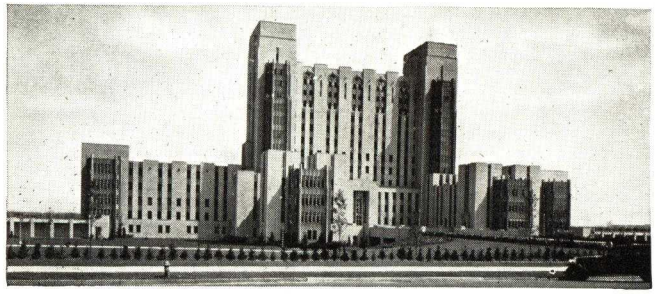
Licensed under Wheeler Patent No. 1803158 and Patent No. 1456373.

Natco Speed-A-Backer Tile—a structural clay tile unit—hard burned—designed with two smooth handles—one at top—the other at the bottom of each tile. Speed-A-Backers are laid very speedily with one hand and without gloves. The mason retains the trowel in the other hand at all times. This greater ease and speed of handling—with lessened costs for mortar—naturally means reduced construction costs in laying time over ordinary backing materials.

Non-continuous mortar joints, together with the three-cell or air pocket protection at every point in the thickness of the wall, prevent dampness from being carried through the mortar joints by capillary attraction—also resist the passage of heat and cold. Being made of hard burned clay, shrinkage, which causes cracks in the plaster, is reduced to a minimum.

Natco Speed-A-Backer construction permits a perfect bonding of brick with the tile wall every sixth course. With this construction, loadbearing value in the complete wall is at a maximum.

Jane Addams Housing Project, Chicago, where Natco Speed-A-Backer Tile was used for exterior walls. S. N. Nielsen Co., Maurice L. Bein and Dahl-Stedman, contractors



United States Naval Hospital, Philadelphia. Karcher & Smith, Architects, John McShain, Inc., General Contractor, John B. Kelly, Inc., Mason Contractor. Natco Speed-A-Backer Tile used throughout

Natco Speed-A-Backer Tile—the Fastest Laid Backing Tile in the World

Below are standard sizes of Natco Speed-A-Backer Tile:

Tile Thickness, inches	Tile Plus Brick, inches	Tile Height, inches	Tile Length, inches
7¾	12	7¾	12
9¾	14	7¾	12
11¾	16	7¾	12

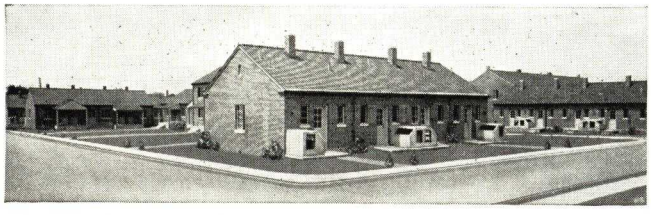
Also furnished in 7⅜-inch height.

One Speed-A-Backer unit with ½-inch mortar joints lays up .716 square foot of wall area. When estimating, figure 140 Speed-A-Backer units for 100 square feet of wall area. Where ⅜-inch brick joints are specified, Speed-A-Backer Tile in the 7⅜-inch height is furnished. Here, each tile lays .684 square foot of wall area. Figure 146 units for 100 square feet of wall area.

The all-tile interior surface of a Speed-A-Backer wall is scored for plastering, but for unplastered smooth walls, tile with smooth interior face is furnished on special order.

With Natco Speed-A-Backer Tile, but one unit is required on the scaffold. Its weight, compared with solid brick masonry, materially reduces foundation and steel costs, without sacrifice of strength and permanence. Natco Speed-A-Backer wall construction is particularly economical of mortar. It saves approximately one-third over ordinary tile construction. The cellular tile structure promotes insulation comfort and economy.

Natco Speed-A-Backer Tile construction combines strength and lightness with speed and labor economies, which make it very desirable for use in all types of brick faced buildings of either loadbearing or skeleton curtain wall construction. It can also be used with units reversed to build complete tile walls. The wall detail, bottom left, illustrates this type of construction.



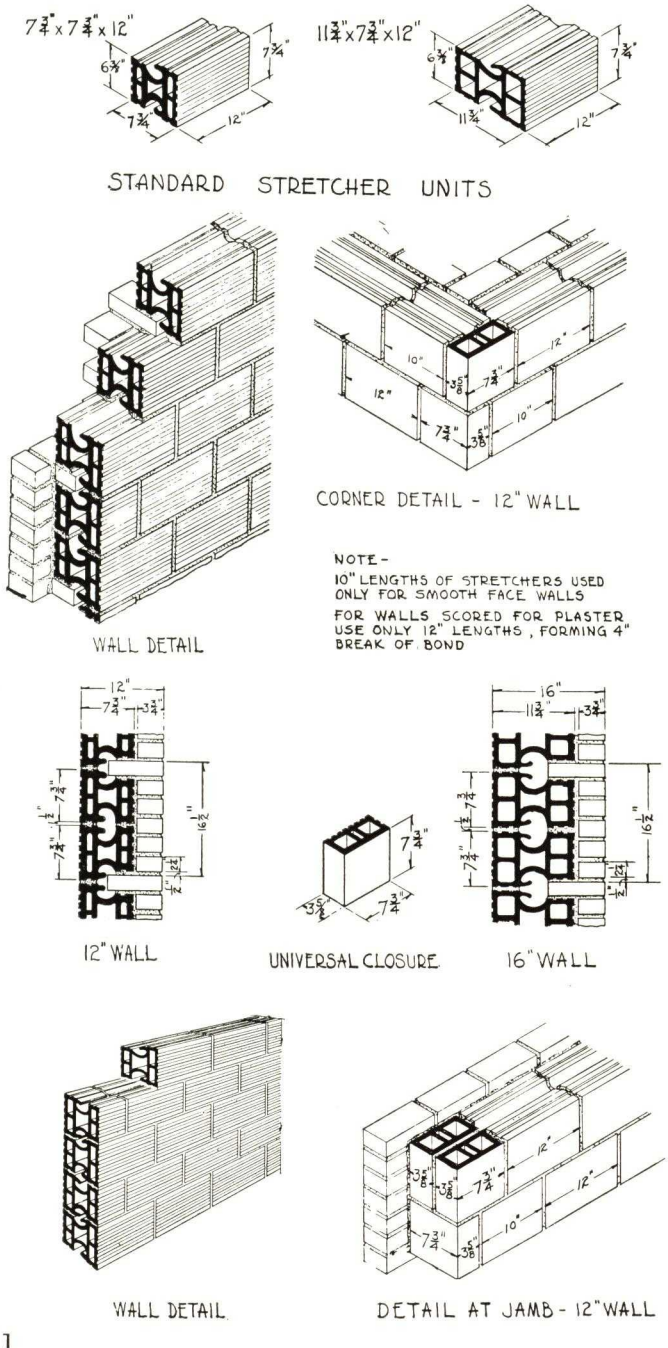
Smithfield Court Houses at Birmingham, Alabama. Both Natco Speed-A-Backer Tile and Natco Clay Tile were used in this project; D. O. Whildin, Architect

TenEyck Housing Project in Brooklyn. Natco Speed-A-Backer Tile, Natco Speedtile and Natco Structural Facing Tile were extensively used. Shreve, Lamb & Harmon, Architects

Greater Effectiveness with the Natco Universal Closure

By the use of the new Natco Universal Closure Unit, 3⅝x7¾x7¾ inches—as shown in the detail drawings below for corners, jambs, pilasters, etc.—an even greater flexibility, speed and effectiveness can be secured in backing up brick walls completely with Speed-A-Backer Tile.

Details of Natco Speed-A-Backer Shapes and Wall Sections



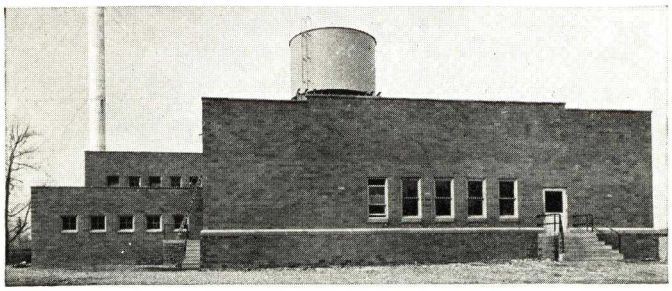
Natco Speedwall Tile

For Permanent, Attractive, Insulated, Fireproof, Termite-Proof, Damp-Proof Walls and Foundations

Illustrating ease and speed with which Natco Speedwall Tile is laid in the wall.

A new insulated structural wall and foundation unit of hard burned clay, furnished glazed, in mingled buff shades, and unglazed in natural, burned clay colors. In both glazed and unglazed, the exterior and interior surfaces have a stippled texture finish which is both enduring and attractive.

Series No.	Thickness, inches	Length, inches	Height, inches
S-4816	3¾	16	8
S-8816	8	16	8
S-12816	12	16	8
S-4512	3¾	12	5
S-8512	8	12	5



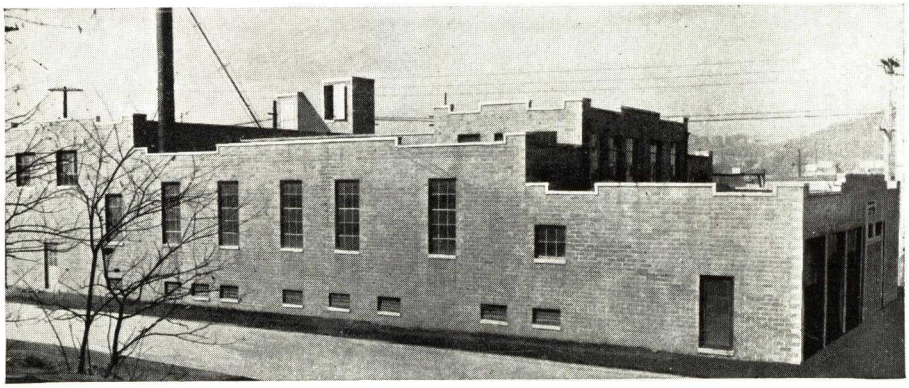
Windsor Dairy Company, Carrollton, Ohio, found that Natco Speedwall Tile was ideal from a sanitary and every other standpoint.

Smooth, built-in handles in the 8-inch and 12-inch wall thicknesses, licensed under Wheeler Patent No. 1803158, effect savings of from 15 per cent to 30 per cent in laying time.

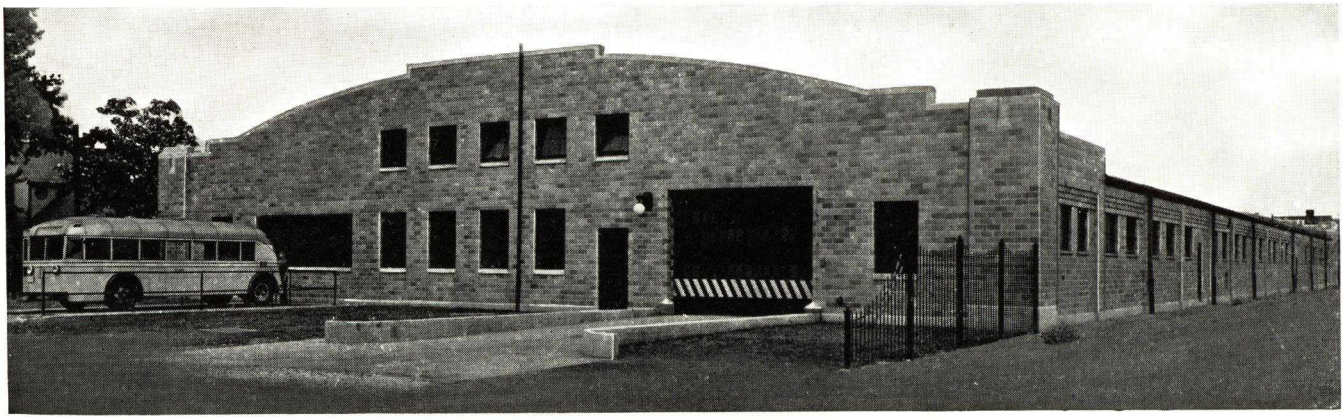
Non-continuous mortar joints resist the passage of moisture through the walls. The double-shell design, minimum of through cross-webs, and the location of dead air spaces within the tile add to the insulation value.

In addition to savings in future painting and repairs, there is also freedom from subsequent shrinkage and cracking of walls when Speedwall tile is used.

Natco Speedwall Tile insures fireproof, dry, sanitary, termite-proof, attractive basements. It is also ideally suited for walls of residences, public and private garages, farm buildings, mill, mine, railroad, warehouse, dairy, brewery, distillery and similar types of commercial and industrial buildings, where sanitation, insulation, attractiveness, low maintenance costs and durability are important.



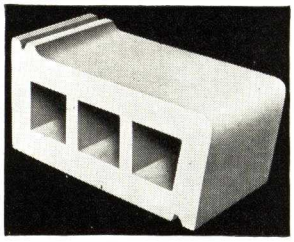
Showing Natco Speedwall Tile in the new modern plant of the Hays Packing Co., Hays, Pa.; Harry M. Jacobson, Homestead, Pa., Contractor.



Motor Bus Garage of the Columbus Railway, Power & Light Co., Columbus, Ohio. Size: 302 feet long, 103 feet wide—housing 75 buses, Natco Glazed Speedwall Tile was used throughout.

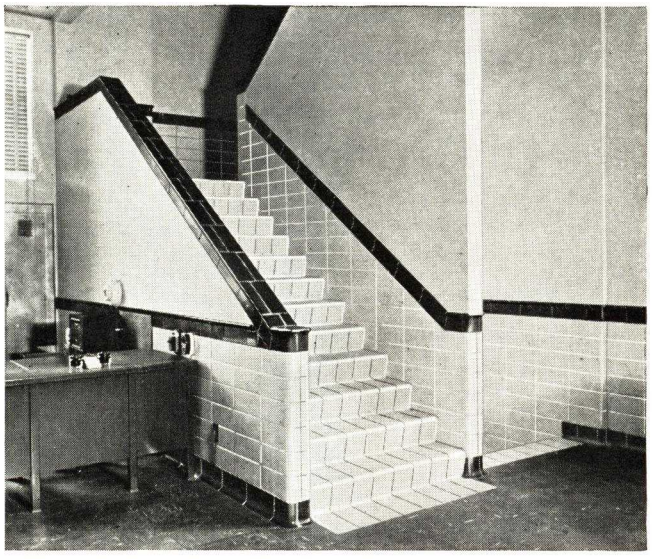
Natco Bulldog Stair Treads

A Burned Clay Product



Typical Natco Stair Tread Unit

Natco Bulldog Stair Treads are made by the new De-airing process of hard burned clay in pleasing cream buff shades. They are permanently slip-proof with long wearing qualities. While units are replaceable, this feature will hardly ever be required, except under unusually severe usage.



Natco Bulldog Stair Treads in Hutchings Sealy Bank, Galveston, Texas. B. L. Austin, Architect

Meets Every Building Condition

Difference in story heights and horizontal dimensions can easily be met by varying mortar joints. The steel frame is exceedingly simple and results in definite savings in tonnage. The rounded corners between tread and riser prevent dirt and grease from collecting. Strong cleaning compounds can be used with no harmful effect.

Details below show the three units required and may be described as follows:

(1) Standard Stair Stretchers—These are furnished in two standard sizes in heights as follows:

Type 115—

ST—1151—11½ inches long, 5¼ inches high.
ST—1153—11½ inches long, 5¾ inches high.
ST—1155—11½ inches long, 6¼ inches high.

Type 105—

ST—1051—10½ inches long, 6¼ inches high.
ST—1053—10½ inches long, 6¾ inches high.
ST—1055—10½ inches long, 7¼ inches high.

Note: The standard width in all sizes is 6 inches.

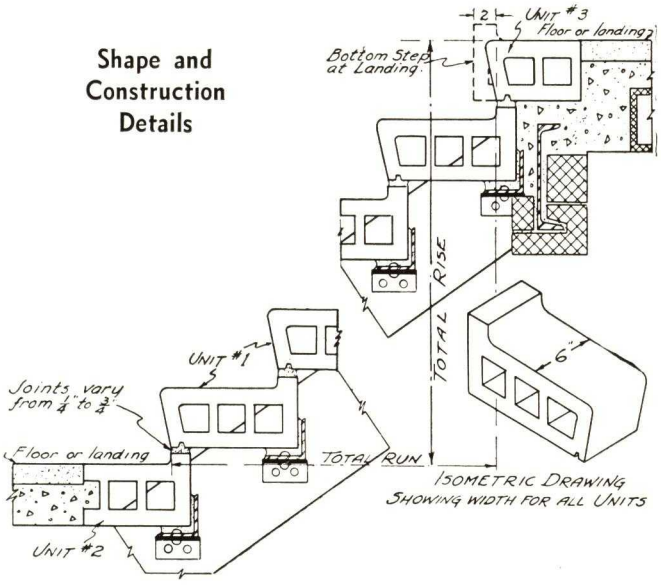
(2) Bottom Tread—In place, this unit is flush with the floor finish.

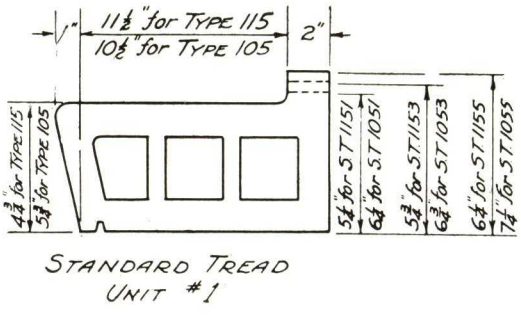
(3) Top Tread—This is flush with the floor finish of the landing or corridor.

The details show Natco Bulldog Stair Treads as adapted to a closed stairway. They can readily be used for open stairways as well.

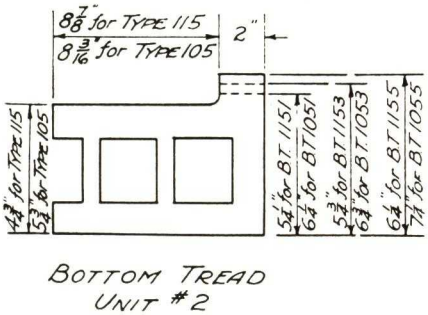
The Natco Engineering Department will be glad to furnish such additional information as may be required.

Shape and Construction Details

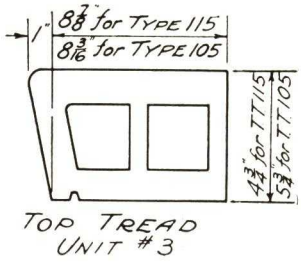




STANDARD TREAD
UNIT #1



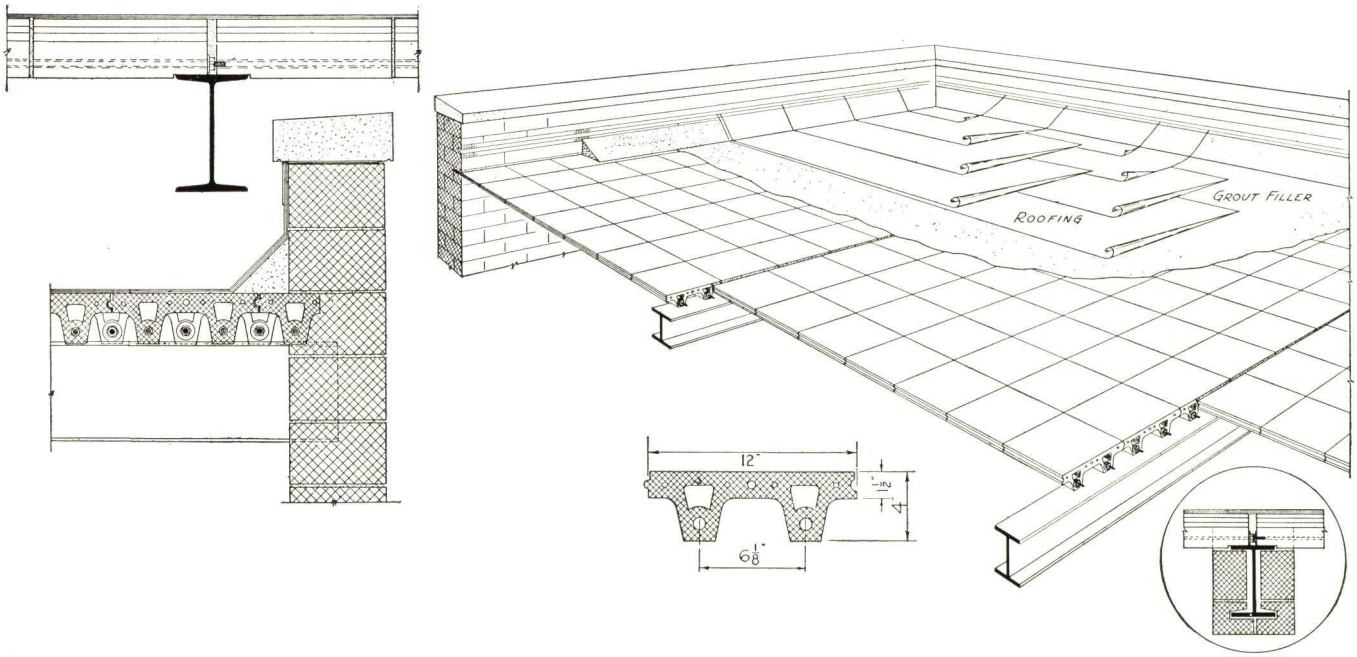
BOTTOM TREAD
UNIT #2



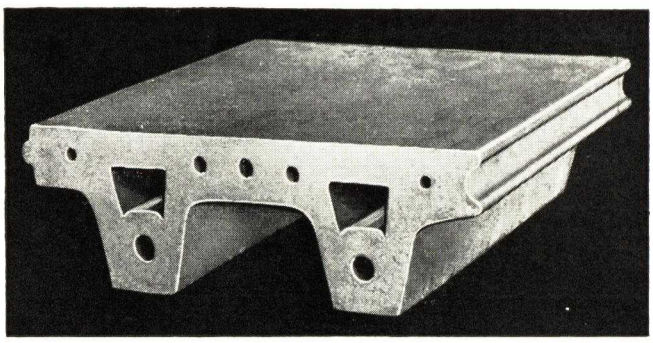
TOP TREAD
UNIT #3

Natco Dek-Tile

For Roofs of Industrial, Commercial and Factory Buildings



Construction Details—Natco Dek-Tile, Type 4W-13—Large drawing above shows perspective view of typical Dek-Tile installation. Note thin cement grout which fills joints. Detail in circle shows method of fireproofing supporting beams or purlins. In lower center, a dimensioned cross section of single unit is shown. View at upper left shows notched end Dek-Tile units for pitched roofs or for excessive vibration. Lower left shows method of staggering units in adjacent roof panels



Typical Dek-Tile Unit

Natco Dek-Tile is made of clay in a process which results in a finely divided cellular structure after burning at approximately 2000° Fahrenheit.

The two openings through the legs accommodate tie rods and nuts for securing together a number of the individual square units for a desired span up to a recommended maximum of 8 feet. The standard width is 12 inches between tongue and groove sides, where adjoining assemblies fit together. Placement is made on adjacent spans so the tile legs are staggered and the projecting ends of the tie rods do not interfere.

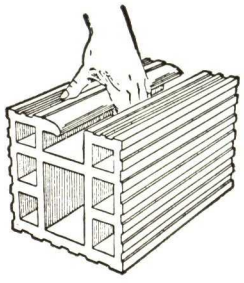
The tile weight is 13 pounds per square foot. Load ratings range from 66 pounds per square foot on an 8-foot span to 169 pounds per square foot on a 5-foot span. The coefficient of heat transmission, without insulation, is .50 and with 1 inch of insulation is .20, expressed in B.T.U. per hour per square foot per degree difference in temperature and includes a built-up roofing on top of the tile to a thickness of 3/8 inch.

Assembly of individual Dek-Tile units is made on the job, the end joints being cemented. A thin grout is applied over the top to seal the tongue-and-groove connections. The construction is free from condensation under normal conditions. The burned clay units are impervious to acid fumes and will not flake or disintegrate. Overhangs and drip board at eaves can be taken care of readily.

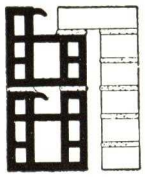
The Engineering Department of the Corporation will gladly co-operate in showing how Natco Dek-Tile can be economically and effectively used.

Natco Load-Bearing Speedtile

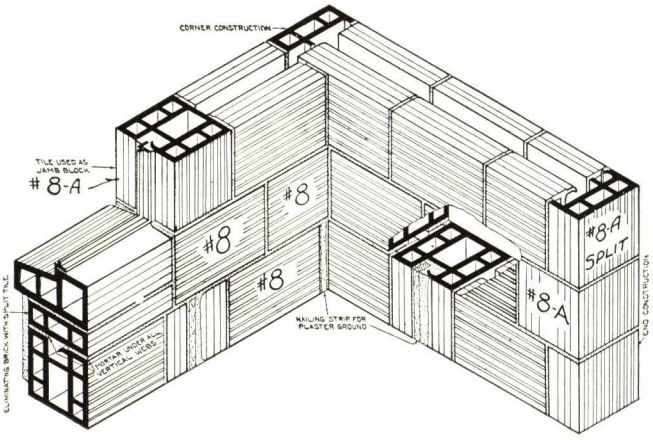
The Fastest Laid Tile in the World



No. 8 Natco Speedtile
Illustrates how handle promotes speed in laying



Natco Speedtile Header and Stretcher Units in Brick Face Construction



Natco Speedtile is primarily designed for loadbearing walls to receive exterior stucco and interior plaster applied directly to the tile surfaces. The handle feature, licensed under Wheeler Patent No. 1803158 enables the mason to pick individual units up with one hand and lay in the wall quickly and easily.

Natco Speedtile is furnished as follows:

No. 8—for 8-inch walls—7¾x7¾x12 inches.
No. 108—for 10-inch walls—9¾x7¾x12 inches.
No. 12—for 12-inch walls—11¾x7¾x12 inches.

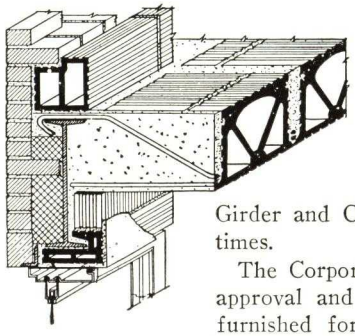
All the above are scored on interior and exterior faces. If sufficient tonnage is involved, tile can be supplied with smooth interior faces.

The No. 8-A—7¾x7¾x7⅞ Speedtile Closure Tile—is used for corners, window and door openings. Natco Speedtile Header Units, as illustrated, are also furnished for brick face construction. Here the recessed header tile permits a full bond header course to be laid.

Through the use of Natco Speedtile, low cost and rapid laying are united with permanence, resistance to decay and corrosion, fireproof qualities and high structural value.

Natco Floor Systems and Fireproofing

There is a Natco Structural Clay Tile Floor System adaptable for any type of building. The Natcoflor System, a section of which is shown at the right, is a combination of special shape Natco Tile with 2-inch wide reinforced cement grout joists or ribs. It saves dead load, floor depth, plastering, labor costs and insurance.



Natco Flat Arch Floors are installed rapidly regardless of temperature. Holes may be cut at any time or tile units omitted for pipe work. Natco Segmental Arch Floors are particularly adapted to buildings where a heavy dead load is met.

The Natco Engineering Department will be glad to furnish floor tables and similar data, also suggest floor systems that will be most economical and effective for any type of building to be erected.

The purpose of beam, girder and column covering is to place a retardant to fire over the structural steel frame of buildings, and to provide a surface to plaster. Experience has proved that well-burned structural clay tile has no equal as such a protective covering. Standard shapes of all Natco Beam, Girder and Column Covering are carried in stock at all times.

The Corporation furnishes schedules for the architect's approval and the contractor's use of just what will be furnished for each beam or girder shown on the final steel erection plans.

Natco Beam Girder and Column Covering saves dead load, promotes speed of erection, provides the best plastering surfaces, lowers insurance and retards corrosion.

Write for table of shapes to fit all standard beams.

Natco Clay Products—for Every Building Need

Natco Clay Products are available in shapes and sizes for every structural requirement. Natco Clay Roofing Tile, manufactured at our plant in Birmingham, Ala., is furnished in a great variety of soft, natural tones that make it particularly desirable for residences and commercial buildings. Natco XXX Load Bearing Tile, Natco Heath Cubes, Natco Segmentile for silos, storage bins and protection for oil tanks, Natco Clay Conduit for power and telephone lines—these are but a few of the many Natco Clay Products available for every type of construction.

Wherever used, Natco Structural Clay Tile and other products give maximum strength with minimum weight. All units are made of selected clay, cured and burned under the supervision of experienced ceramic engineers.

Any desired information will be gladly furnished on request.

AMERICAN CYANAMID AND CHEMICAL CORPORATION

STRUCTURAL GYPSUM DIVISION

EXECUTIVE OFFICES

TELEPHONE
Circle 7-0100

38 Rockefeller Plaza, NEW YORK, N. Y.

SALES OFFICES IN THE PRINCIPAL EASTERN CITIES

For Gypsteel Gypsum Pre-cast Floors and Roofs and Gypsteel Gypsum Plasters, see File Index

Products

GYPSTEEL GYPSUM PARTITION TILE.

Also Gypsteel Gypsum Soffit Slabs, Shoe Tile and Column Covering.

Construction Details and Installation

Our architectural service sheet No. 4 contains complete construction details and specifications and full directions for installation. A copy of this service sheet will be sent on application to any of our offices.

Facilities

The central location of our plant at Linden, N. J., makes rapid deliveries possible in the New York Metropolitan area. Orders will be delivered in 24 hours and if received in the morning can be delivered the same afternoon by high speed trucks.

AMERICAN CYANAMID AND CHEMICAL CORPORATION is one of the two largest producers of structural gypsum products in the United States.

GYPSTEEL GYPSUM PARTITION TILE

Where Gypsteel Gypsum Partition Tile May Be Advantageously Used

(1) Non-bearing partitions, walls of corridors, and column covering.
(2) Fire division walls.
(3) Covering for steel members, such as girders, beams, and columns.
(4) Heat ducts and light wells.
(5) Elevator, dumbwaiter, corridor and stairway enclosures.
(6) Wall furring (when split).

Special Advantages of Gypsteel Gypsum Partition Tile

The high quality of Gypsteel Gypsum Partition Tile is due to the combination of purity of the gypsum with a distinctive process of control that insures uniformity in the finished product.

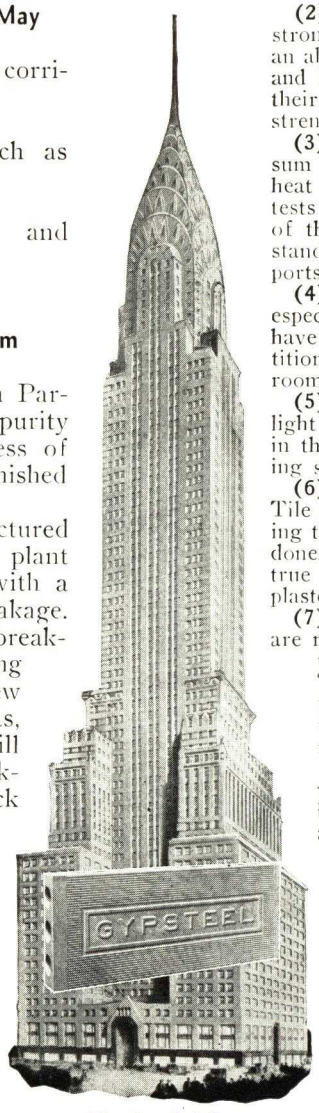
The great purity of gypsum manufactured by the Gypsteel Process at our Linden plant insures a stronger and tougher block, with a minimum waste from chipping and breakage.

Another factor tending to minimize breakage and waste is our express trucking service within and adjacent to the New York and Philadelphia metropolitan areas, whereby block is delivered from our mill within a few hours by truck. This truckload delivery assures clean, strong block free from breakage and waste.

The machinery by which Gypsteel Block is made at our Linden plant insures absolute accuracy and produces blocks true to size, accurately proportioned, and of uniform weight, strength and density.

General Advantages of Gypsum Partition Tile

(1) Fireproof—Gypsum Partition Tile are approved for first class fireproof construction by the Building Departments of all cities and have the highest rating in all Insurance Rating Bureaus.



Chrysler Building

One of the many modern buildings in which Gypsteel Partition Tile are used throughout

(2) Savings in Labor—Gypsteel Partition Tile are stronger than ordinary tile. Breakage is reduced to an absolute minimum with resulting savings in material and labor. Additional savings are achieved because of their accuracy in size and uniformity in composition, strength and weight.

(3) Heat Insulation—The great superiority of gypsum partition tile in preventing the transmission of heat has been frequently demonstrated by numerous tests under many conditions. Distinctly high qualities of thermal protection for embedded steel are an outstanding characteristic of gypsum partition tile. Reports of actual tests are available on request.

(4) Sound Insulation—Tests made many times, especially at the New England Conservatory of Music, have demonstrated the superior value of gypsum partition tile in retarding conduction of sound from one room to another.

(5) Light Weight—Gypsum Partition Tile are so light in weight that their use effects a large reduction in the total dead-load, and this permits of corresponding savings in the steel framework and foundations.

(6) Savings in Plaster—Gypsteel Gypsum Partition Tile are strong, they chip and break very little, meaning there is less mortar used, and less pointing-up to be done. Their uniformity of size and proportions assure true plaster base and effect a substantial saving in the plastering.

(7) Perfect Plaster Base—Gypsteel Partition Tile are made of gypsum, with a very small percentage of wood planer chips, and laid up in gypsum mortar. The chemical bond established between the gypsum tile, and the gypsum in both the mortar and plastering, produces a wall of great strength and rigidity.

(8) Easily Altered—Gypsum Partition Tile cuts with a saw, permitting of alterations being made in partitions with a minimum of expense and annoyance.

Sizes

All Gypsteel Partition Tile are 12x30 ins. They are furnished in standard thicknesses 2, 3 and 4 ins. solid and 3, 4, 5 and 6 ins. hollow.

WEIGHT PER SQ. FT. OF GYPSTEEL PARTITION TILE

Description of Gypsteel Furring and Partition Tile	Weight tile per sq. ft., lbs.	Weight mortar per sq. ft., lbs.	Total weight plastered one side per sq. ft., lbs.	Total weight plastered two sides per sq. ft., lbs.
2x12x30" Solid..	10.5	1.5	13.5	16.5
3x12x30" Hollow	11.0	2.0	14.0	15.0
3x12x30" Solid..	13.0	2.0	16.0	19.0
4x12x30" Hollow	13.0	2.5	16.0	19.0
6x12x30" Hollow	20.0	3.0	23.0	26.0

Note: Wt. plaster on one side, 3 lb. per sq. ft.

CONCRETE INFORMATION

EDWARD L. BAILEY SCHOOL, JACKSON, MISS.
N. W. Overstreet & Town, Architects • W. J. McGee & Son, Contractors

QUALITY CONCRETE · ARCHITECTURAL CONCRETE · TERRAZZO · CONCRETE ASHLAR
CONCRETE FLOOR FINISHES · PRECAST JOIST CONCRETE FLOORS

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

33 WEST GRAND AVENUE · CHICAGO, ILL.

QUALITY CONCRETE GUIDE—With Tables of Quantities of Materials

Hardening of concrete mixtures is brought about by chemical reactions between the cement and water, the aggregates (sand, gravel, stone, etc.) being inactive ingredients used as fillers.

Use Proper Amount of Water—In proportioning concrete, the most important factor affecting strength, watertightness, durability and other qualities is the amount of mixing water used with each sack of cement. The less mixing water used, provided the concrete can be placed properly, the stronger, more watertight and more durable will be the concrete.

The proper amount of mixing water to use on a given job will usually depend on conditions of exposure. Experience and tests make it possible to make definite recommendations as in Table I for concrete made as recommended herein. At 28 days, such concretes should have compressive strengths of about 5000, 4000 and 3000 lb. per sq. in for 5, 6 and 7½ gal. of mixing water respectively.

Allow for Moisture in Sand—Sand as used on the job nearly always contains considerable moisture which is free to combine with cement. This moisture must be considered as part of the mixing water. On jobs where sand is shipped from a screening and washing plant, the average moisture is around 4 or 5 per cent by weight. (1 gal. water = 8.33 lb.) For accurate control, tests should be made to determine exact amount of moisture. This should be subtracted from the total mixing water to determine correct amount to add at the mixer. Tests may be made by surface drying samples of the sand, weighing before and after drying. There is generally so little moisture in coarse aggregate it can be neglected.

Mixes and Quantities of Materials by Weight—On large jobs the aggregates are measured by weight. Even on small jobs, contractors are finding the weight measurement gives better control, more uniform results and better economy so that the equipment quickly pays for itself. A platform scale with runways on two sides to facilitate running wheelbarrows or carts onto the platform is used.

Table II gives approximate proportions and quantities of materials by weight for the three classes of concrete suggested in Table I. The consistency that can be used will depend on the placing conditions. Proportions and quantities are therefore shown for stiff, medium and wet concrete.

In this table moisture in the sand is assumed to be 5 per cent by weight. The weight of sand has been corrected for this moisture. The corrected amount of water to add at the mixer after deducting moisture is also shown. This is the proper amount of water, which should be measured as accurately as possible.

Use a Workable Mixture—Should the proportions of sand and coarse aggregate selected give a mixture which is not workable, they should be adjusted to produce a mixture suitable for the job but *without exceeding the recommended amount of mixing water*. The concrete should be a plastic mass which holds together during handling and placing. Very stiff mixes can be used when concrete is placed by vibration. Mixtures which permit water to rise to the surface or permit mortar to separate from coarse material should be avoided whether placing is by hand or by vibration.

Mixes and Quantities of Materials by Volume—Moisture causes a very appreciable swelling of sand, up to 30 per cent or more. The amount of swelling is affected by the grading of the sand and the amount of moisture. Since these will vary from job to job, tables of proportions and quantities by volume can not be accurate. Table III gives volume proportions and quantities for a certain set of conditions as indicated. The quantities shown will not, of course, be accurate if the moisture or weight per cubic foot of the aggregates to be used are greatly different from the assumed values.

More accurate volumetric estimates can be made by using Table II as follows: First, weigh a cubic foot of each aggregate to be used, measured damp and loose. From Table II get the total batch weight of each aggregate. Divide these totals by the weight per cubic foot of the corresponding aggregate, as determined. This gives the cubic feet of sand and coarse aggregate per sack of cement.

Measure Material Accurately—Each ingredient should be accurately measured. Cement is furnished in sacks weighing 94 lb., considered as one cubic foot. Fractional bags should not be used unless they are weighed for each batch. As stated previously, weight measurement of aggregates gives best results. When scales are not available a cubic foot box may be used. Usually the proper amount of sand is measured by the box into one wheelbarrow and the proper amount of coarse aggregate into another wheelbarrow, observing or marking the level to which each is filled. Wheelbarrows are then filled to these levels for each batch, dispensing with the box.

Water may be measured by buckets or by the tank on the mixer if it has an accurate measuring device. The capacity of a bucket may be determined by filling it with water from a quart measure, placing a mark on the inside of the bucket to indicate the proper amount. (One quart = ¼ gal.) If a measuring device on the mixer is used, find out how much water is measured at each setting on the dial. This is done by discharging the water measured at each dial-setting into buckets of known capacity.

Use Good Materials—Sand, gravel, crushed stone or other aggregates for concrete work must be clean and free from clay, loam and dirt. Usually washed and screened materials assure best results. Mixing water should be clean enough to drink.

Coarse materials give more economical results than finer materials. This is because each particle must be thoroughly coated by cement paste and less paste is required for a given volume of coarse particles than for the same volume of small particles. Best results are secured with graded aggregates, that is, aggregates containing particles ranging from fine to coarse, with coarse predominating. Sufficient fine particles are necessary, however, to give workability and smooth surfaces. Generally, sand should contain from 10 to 20% of particles passing a 50 mesh sieve.

Materials should be kept in separate piles. Cement should be kept in a dry place as in a building or on a platform raised off the ground and covered with tarpaulins.

Keep New Concrete Moist—The chemical reactions between cement and water require time. Under favorable conditions of moisture and temperature they continue indefinitely. Thus the strength, hardness, watertightness, durability and other qualities continue to improve under the right conditions.

For continued improvement concrete must be kept moist. When the water used in mixing is lost by evaporation, the chemical reactions cease. Concrete should be protected from early drying by leaving forms in place, covering exposed surfaces with wet sand, burlap or other materials and by sprinkling. This wet "curing" should be started as soon as possible without marring the surfaces and should be continued as long as possible—at least a week in most cases when standard portland cement is used and two or three days when standard high early strength portland cement or concrete is used.

TABLE I—RECOMMENDED AMOUNTS OF MIXING WATER FOR CONCRETE TO MEET DIFFERENT DEGREES OF EXPOSURE

Gallons Per Sack of Cement

Exposure \ Class of structure	Reinforced piles, thin walls, light structural members, exterior columns and beams in buildings.	Reinforced reservoirs, water tanks, pressure pipes, sewers, canal linings, dams of thin sections and all other watertight structures.	Heavy walls, piers, foundations, dams of heavy sections.
Extreme: (1) In severe climates like in northern U.S., exposure to alternate wetting and drying, freezing and thawing, as at the water line in hydraulic structures. (2) Exposure to sea and strong sulphate waters* in both severe and moderate climates.	5	5	6
Severe: (3) In severe climates like in northern U.S. exposure to rain and snow, and freezing and thawing, but not continuously in contact with water. (4) In moderate climates like southern U.S., exposure to alternate wetting and drying, as at water line in hydraulic structures.	6	6	6
Moderate: (5) In climates like southern U.S., exposure to ordinary weather, but not continuously in contact with water. (6) Concrete completely submerged, but protected from freezing.	6	6	7½
Protected: (7) Ordinary inclosed structural members; concrete below the ground and not subject to action of corrosive ground waters or freezing and thawing.	7½	6	7½

*Waters containing sodium and magnesium sulphates, often referred to as alkali waters, also sewage and similar liquids.

TABLE II—WEIGHT OF MATERIALS REQUIRED FOR CONCRETE

WITH 1-INCH AGGREGATE

Consistency	Materials Per Sack of Cement						Yield—cu. ft. of concrete per sack cement	Materials Required Per Cubic Yard of Concrete				
	With Gravel			With Crushed Stone				Cement sacks	With Gravel		With Stone	
	Sand lb.	Gravel lb.	Water lb.	Sand lb.	Stone lb.	Water* gal.			Sand lb.	Gravel lb.	Sand lb.	Stone lb.
5 Gallons Total Water Per Sack of Cement												
Stiff	189	307	3.9	225	273	3.7	4.09	6.6	1250	2025	1480	1805
Medium	167	271	4.0	199	241	3.8	3.75	7.2	1200	1950	1430	1740
Wet	149	241	4.2	177	215	3.9	3.46	7.8	1160	1875	1380	1670
6 Gallons Total Water Per Sack of Cement												
Stiff	252	360	4.6	297	318	4.2	4.91	5.5	1390	1980	1630	1750
Medium	224	320	4.7	263	283	4.4	4.50	6.0	1350	1920	1580	1700
Wet	201	286	4.8	236	253	4.6	4.15	6.5	1310	1860	1530	1640
7½ Gallons Total Water Per Sack of Cement												
Stiff	350	441	5.4	406	386	5.1	6.13	4.4	1540	1940	1790	1700
Medium	312	392	5.6	362	344	5.3	5.62	4.8	1500	1880	1740	1650
Wet	278	351	5.8	323	307	5.5	5.19	5.2	1450	1820	1680	1600
WITH 2-INCH AGGREGATE												
5 Gallons Total Water Per Sack of Cement												
Stiff	199	366	3.8	234	333	3.7	4.50	6.0	1190	2200	1400	2000
Medium	175	321	4.0	205	292	3.8	4.09	6.6	1160	2115	1350	1920
Wet	155	284	4.2	181	258	3.9	3.75	7.2	1120	2040	1300	1860
6 Gallons Total Water Per Sack of Cement												
Stiff	266	428	4.5	307	398	4.2	5.40	5.0	1330	2140	1540	1940
Medium	234	378	4.7	272	342	4.4	4.91	5.5	1293	2080	1500	1880
Wet	208	336	4.8	241	304	4.6	4.50	6.0	1250	2020	1450	1820
7½ Gallons Total Water Per Sack of Cement												
Stiff	369	525	5.2	424	473	5.0	6.75	4.0	1470	2100	1690	1890
Medium	325	464	5.6	373	418	5.2	6.13	4.4	1430	2040	1650	1840
Wet	290	413	5.8	332	372	5.5	5.62	4.8	1390	1980	1600	1780

*Amount of water to add allowing for moisture in sand.
This table is based on aggregates of 2.65 specific gravity and sand containing 5 per cent moisture by weight. No allowance has been made for waste.

Avoid Low Temperatures—Favorable temperature is the second requirement for continued improvement. The reactions between cement and water are more rapid at high than at low temperatures. Near freezing, the reactions almost cease. Concrete moist cured at 70 deg. F. for a week may have twice the strength of similar concrete cured at 50 deg. F. In mildly cold weather, the water may be heated to raise the temperature of the concrete to 70 deg. F. In freezing weather, the water and aggregates should be heated so that the temperature of the mixed concrete is between 70 and 100 deg. F. It should then be kept above 70 deg. F. for three (3) days or above 50 deg. F. for five (5) days for standard portland cement concrete, and above 70 deg. F. for two (2) days or 50 deg. F. for three (3) days when standard high early strength portland cement or concrete is used. Salt or other chemicals should not be used to lower the freezing point of concrete.

General Suggestions—Mix concrete thoroughly. Do not overload mixers or operate them at speeds higher than recommended by the manufacturer. Continue mixing for at least a minute after all materials are in the mixer. Longer mixing gives more uniform results.

Handle and place concrete carefully to prevent the materials from separating. It should not be dropped into place more than 5 or 6 ft. Place it in the forms where it is to stay, and in horizontal layers, usually not over one to two feet thick. Do not allow the concrete to flow over long distances in the forms as this causes the materials to separate. Spade each layer to settle the concrete, release air, remove stone pockets and provide smooth surfaces along the forms.

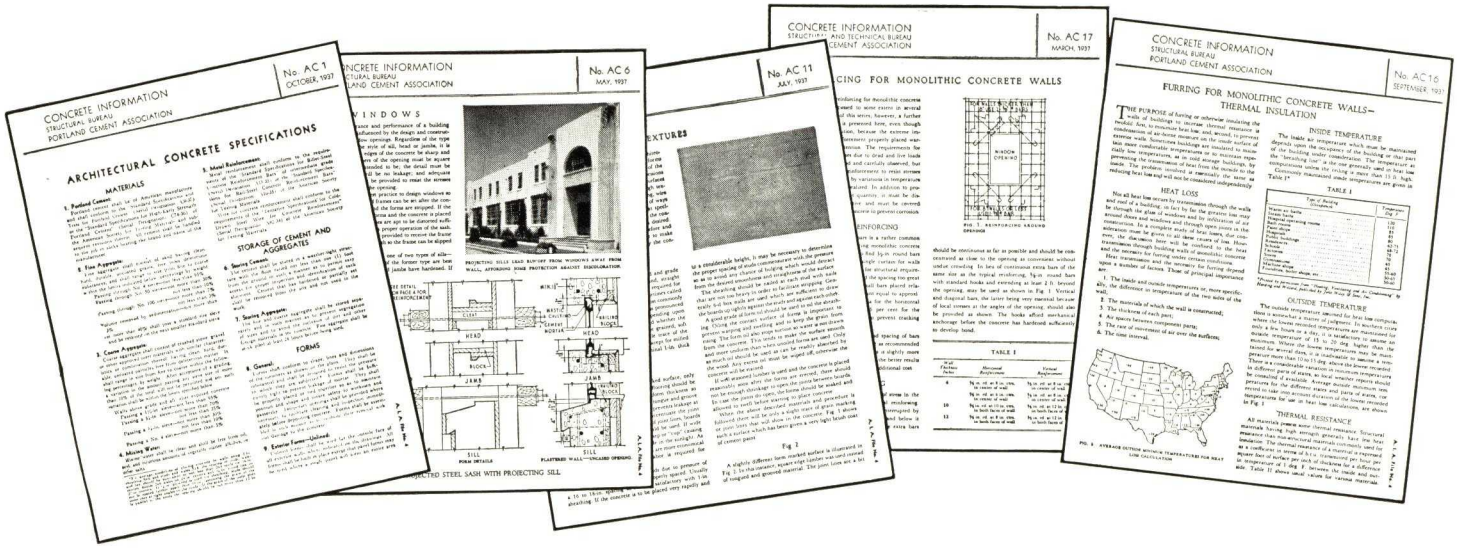
Do not trowel or float concrete excessively while it is soft. Such working of the surface brings water and fine materials to the top which, upon hardening, has a tendency to check and crack. Best results are secured by allowing the concrete to stand until it is quite stiff before finishing.

TABLE III—VOLUME OF MATERIALS REQUIRED FOR CONCRETE—AGGREGATES MEASURED BY DAMP LOOSE VOLUME

WITH 1-INCH AGGREGATE

Consistency	Mix with gravel	Water* added with gravel—gal. per sack	Mix with crushed stone	Water* added with crushed stone—gal. per sack	Yield cu. ft. of concrete per sack cement	Cement sacks	Materials Required for One Cubic Yard of Concrete							
							With Gravel				With Crushed Stone			
							Sand		Gravel		Sand		Stone	
							cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.
Total Mixing Water 5 Gallons Per Sack of Cement														
Stiff	1-2.1-3.1	3.9	1-2.5-2.8	3.7	4.09	6.6	14.1	.52	20.4	.76	16.6	.62	18.2	.67
Medium	1-1.9-2.7	4.0	1-2.2-2.4	3.8	3.75	7.2	13.6	.50	19.7	.73	16.0	.59	17.6	.65
Wet	1-1.7-2.4	4.2	1-2.0-2.2	3.9	3.46	7.8	13.1	.49	19.0	.70	15.5	.57	16.9	.63
Total Mixing Water 6 Gallons Per Sack of Cement														
Stiff	1-2.8-3.6	4.6	1-3.3-3.2	4.2	4.91	5.5	15.6	.58	20.0	.74	18.3	.68	17.7	.66
Medium	1-2.5-3.2	4.7	1-3.0-2.9	4.4	4.50	6.0	15.1	.56	19.4	.72	17.7	.66	17.2	.64
Wet	1-2.3-2.9	4.8	1-2.6-2.6	4.6	4.15	6.5	14.6	.54	18.8	.70	17.2	.64	16.6	.62
Total Mixing Water 7½ Gallons Per Sack of Cement														
Stiff	1-3.9-4.5	5.4	1-4.6-3.9	5.1	6.13	4.4	17.2	.64	19.6	.73	20.1	.74	17.2	.64
Medium	1-3.5-4.0	5.6	1-4.1-3.5	5.3	5.62	4.8	16.8	.62	19.0	.70	19.5	.72	16.7	.62
Wet	1-3.1-3.5	5.8	1-3.6-3.1	5.5	5.19	5.2	16.3	.60	18.3	.68	18.9	.70	16.2	.60
WITH 2-INCH AGGREGATE														
Total Mixing Water 5 Gallons Per Sack of Cement														
Stiff	1-2.2-3.7	3.8	1-2.6-3.4	3.7	4.50	6.0	13.3	.49	22.2	.82	15.7	.58	20.2	.75
Medium	1-2.0-3.2	4.0	1-2.3-3.0	3.8	4.09	6.6	13.0	.48	21.4	.79	15.2	.56	19.4	.72
Wet	1-1.7-2.9	4.2	1-2.0-2.6	3.9	3.75	7.2	12.5	.46	20.6	.76	14.6	.54	18.8	.70
Total Mixing Water 6 Gallons Per Sack of Cement														
Stiff	1-3.0-4.3	4.5	1-3.4-4.0	4.2	5.40	5.0	14.9	.55	21.6	.80	17.2	.64	19.6	.73
Medium	1-2.6-3.8	4.7	1-3.0-3.5	4.4	4.91	5.5	14.4	.53	21.0	.78	16.8	.62	19.0	.70
Wet	1-2.3-3.4	4.8	1-2.7-3.1	4.6	4.50	6.0	13.9	.52	20.4	.76	16.3	.60	18.4	.68
Total Mixing Water 7½ Gallons Per Sack of Cement														
Stiff	1-4.1-5.3	5.2	1-4.7-4.8	5.0	6.75	4.0	16.5	.61	21.2	.79	19.0	.70	19.1	.71
Medium	1-3.6-4.6	5.6	1-4.2-4.2	5.2	6.13	4.4	16.0	.59	20.6	.76	18.4	.68	18.6	.69
Wet	1-3.2-4.2	5.8	1-3.7-3.8	5.5	5.62	4.8	15.6	.58	20.0	.74	17.9	.66	18.0	.67

*Corrected for free moisture carried by sand.
This table is based on the following assumptions: Absorption of aggregates 1 per cent by weight; free moisture in sand 5 per cent by weight; coarse aggregate surface dry; weight of sand 89 lb. per cu. ft. measured damp, loose; weight of coarse aggregate 99 lb. per cu. ft. measured loose.



ARCHITECTURAL CONCRETE SPECIFICATIONS

MATERIALS

(1) Portland Cement—Portland cement shall be of American manufacture and shall conform to the "Standard Specifications and Tests for Portland Cement" (Serial Designation: C9-30) or the "Standard Specifications for High-Early Strength Portland Cement" (Serial designation: C74-36) of the American Society for Testing Materials and subsequent revisions thereof. All cement shall be handled to the job in sacks bearing the brand and name of the manufacturer.

(2) Fine Aggregate—Fine aggregate shall consist of sand having clean, hard, durable, uncoated grains, free from deleterious substances, and shall range in size from fine to coarse within the limits indicated below, percentage by weight:

Passing through No. 4 sieve—not less than 95%
Passing through No. 50 sieve—not more than 30%
not less than 10%
Passing through No. 100 sieve—not more than 7%
not less than 3%
Volume removed by sedimentation—not more than 3%

Not more than 40% shall pass a standard size sieve and be retained on the next smaller standard sieve.

(3) Coarse Aggregate—Coarse aggregate shall consist of crushed stone, gravel or other approved inert materials with similar characteristics or combination thereof, having clean, hard, durable, uncoated particles free from deleterious matter. It shall range in size from fine to coarse within the following percentages, by weight. After acceptance of a grading, a variation in the amount passing any sieve size or more than 10 per cent of the total will not be permitted and any such variation shall be within the limits specified below.

Walls above grade and all other exposed concrete:

Passing a 1½-in. sieve—not less than 95%
Passing a ¾-in. sieve—not more than 70%
not less than 35%
Passing a ⅜-in. sieve—not more than 30%
not less than 10%
Passing a No. 4 sieve—not more than 5%

(4) Mixing Water—Mixing water shall be clean and shall be free from oil, acid, and injurious amounts of vegetable matter, alkalies, or other salts.

(5) Metal Reinforcement—Metal reinforcement shall conform to the requirements of the "Standard Specifications for Billet-Steel Concrete Reinforcement Bars" of intermediate grade (Serial Designation: A15-33) or the "Standard Specifications for Rail-Steel Concrete Reinforcement Bars" (Serial Designation: A16-33) of the American Society for Testing Materials.

Wire for concrete reinforcement shall conform to the requirements of the "Tentative Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement" (Serial Designation: A82-34) of the American Society for Testing Materials.

STORAGE OF CEMENT AND AGGREGATES

(6) Storing Cement—The cement shall be stored in a weather-tight structure with the floor raised not less than one (1) foot from the ground in such manner as to permit easy access for proper inspection and identification of each shipment. Cement that has hardened or partially set shall be removed from the site and not used in the work.

(7) Storing Aggregate—The fine and coarse aggregate shall be stored separately and in such manner as to prevent segregation of sizes and to avoid the inclusion of dirt and other foreign materials in the concrete. Fine aggregate shall be stock piled at least 24 hours before being used.

FORMS

(8) General—Forms shall conform to shape, lines and dimensions of the members as shown on the plans. They shall be substantial and shall be designed to resist the pressure to which they are subjected.* Forms shall be sufficiently tight to prevent leakage of mortar. They shall be properly placed or tied together so as to maintain position and shape and insure safety to workmen and passersby. Temporary openings shall be provided where necessary to facilitate cleaning and inspection immediately before depositing concrete. Forms shall be assembled in such manner as to facilitate their removal without damage to the concrete.

(9) Exterior Forms—Unlined—Unlined forms shall be used for the outside face of all exterior walls where indicated on the drawings. All forms shall be built in place except that panel forms may be used where a single panel will form an entire area from one reveal to another. The use of panel forms will not be permitted where the joints between adjacent panels must be made on flat surfaces or in any other conspicuous locations.

The contact surface of all unlined forms shall be constructed of No. 1 common dressed and matched Longleaf Southern Yellow Pine or Douglas Fir Boards.† This material shall be delivered to the site immediately on signing the contract and shall be sorted and graded on the job. The best twenty-five (25) to

* For average conditions of placing concrete in walls using 1-in. sheathing S4S and studs and wales S1E the spacing of studs, wales and ties should be equivalent to not less than 2x4 studs on 16-in centers, double 2x4 wales on 24-in. centers and ⅜-in. round ties on 27-in. centers. If ⅝-in. plywood is used for sheathing, studs should not be spaced farther apart than 16 in. assuming the grain of the outer plies is at right angles to the studs. If the grain of the outer plies is parallel to the studs the spacing should be not more than 12 in.

† If an impression in the concrete of knots and other flaws in the wood is desired No. 2 boards may be used. For rough-textured surfaces re-sawed square-edged No. 1 or No. 2 boards, or boards surfaced one side and two edges may be used with the rough side of the lumber used as the contact surface. The width of form boards varies from 4 to 8 in., depending on the scale of the building and the effect desired. Boards of 1-in. nominal thickness are generally used. ⅝-in. 5-ply Douglas Fir plywood may be used in place of boards for sheathing where a surface practically free from joint lines is desired. Proper substitution should be made in the specifications to require the type of sheathing material to be used that will give the surface finish desired.

thirty (30) per cent of each load shall be selected for the outside face forms. The selected sheathing shall be stacked clear of the ground in layers separated by ¼-in. laths to facilitate air drying.

Note: Use the following paragraph in place of the preceding one and omit the second last paragraph of this section if plywood is used for sheathing.

The contact surface of all unlined forms shall be constructed of ⅝ or ¾-in. five-ply Douglas Fir plywood made with a waterproof glue and especially manufactured for concrete formwork. Full-sized sheets of plywood must be used except where smaller pieces will cover an entire area. All horizontal and vertical joints shall be backed solidly to prevent leakage and the edges of abutting sheets shall be nailed to the same stud or blocking with 6d box nails not farther apart than 8 in. Wherever panel forms are permitted by the Architect the joints shall be so constructed as to comply with the above requirements.

Vertical boarding shall have all vertical joints truly plumb and all horizontal boarding shall have all horizontal joints exactly level and without changes in level in any horizontal line. Portions of full-width boards will not be permitted adjacent to construction joints. The vertical joints in horizontal boarding shall not be over one board wide and shall be staggered at least two (2) feet and shall not be made except at studs or girts. Each board shall be driven up snug and nailed to every stud or girt with 8d box nails. All 6-in. sheathing shall be double nailed, and 8 and 10-in. boards shall be nailed at both edges and at center. The three (3) top boards adjacent to horizontal construction joints shall not be erected until after the wetting operation specified in Sec. 13 has been completed, and to fill the remaining space each board shall be ripped to approximately one-third of the height between the top full-width board and construction joint. Form boards shall not be re-used a second time in contact with exposed surfaces unless approved by the Architect.

When the outside form is erected and pointed as may be required and reinforcing is in place and before the inside form is erected the Architect shall be notified and the inside form shall not be placed until work already done is approved.

(10) Exterior Forms—Lined—The backing for form lining shall be constructed of a good grade of form lumber that is solid, straight, and free from defects that might impair its strength but need not be of the quality used for contact forms. Square edged lumber may be used for form boarding in place of shiplap or T&G. The boarding for lined forms may be horizontal or vertical, depending upon convenience. Form sheathing shall be securely nailed to studs and so spaced as to prevent any bulging of the lining.

Non-warping fibre board not less than three-sixteenth (3/16) inch in thickness, or one-quarter (¼) inch plywood, shall be securely nailed to the form sheathing. All lining material shall be used in as wide pieces as possible. Areas less than four (4) feet in width shall be lined with a single width of fibre board.

Joints in lining and backing shall not occur at the same place and abutting edges of adjacent sheets shall be nailed to the same board. The lining material shall be nailed to the backing beginning at the center of the board and working toward the edges to prevent buckling. Three-penny blue shingle nails or similar nails with thin flat heads shall be used to attach lining material to sheathing. The nails shall not be farther apart than 8 in. along the edges and there shall be at least one nail for every square foot of surface. The edges of the lining shall be butted tight together, or joints between the sheets shall be filled with cold water putty, patching plaster or similar material. Lining material may be re-used if it is in satisfactory condition and is approved by the Architect.

Presdwood shall be thoroughly wet with water at least 12 hours before being used. The water shall be applied to the screen side of the board and the board shall be stacked screen side to screen side.

(11) Ornamental Detail—Ornamental concrete work shall be placed integrally with the body of the concrete in wood molds or plaster waste molds. Moldings, column fluting and simple ornament shall be formed with wood, using No. 2 or better Idaho white pine or equal. No material thicker than 2 in. shall be used without approval of the Architect and members making up wood molds shall be kerfed on the back wherever such members may become wedged between projections in the ornament. Molds shall be so constructed that joints will not be opened by slight movement and swelling of the wood. Joints in the molds shall be broken and made as inconspicuous as possible by pointing where necessary with water putty, patching plaster and similar material.

Intricate detail that cannot be formed with wood molds shall be cast in waste molds made from models approved by the Architect and shall be of such thickness and be so reinforced with fibre and a frame work of wood that they may be readily handled without breakage. Waste molds shall be sized with two (2) coats of thin shellac. Wherever waste molds require pointing or patching, the work shall be done with patching plaster and shall be shellacked after drying but damaged molds shall not be patched without approval of the Architect.

The plaster waste molds shall be carefully set in the forms and securely held in the exact position to reproduce the design shown on the drawings. The framing of the wood form above the molding shall be sufficiently strong to remove all load from the molds. Where wood forms adjoin waste molds, the wood shall be neatly fitted to the profile of the molds and all joints shall be carefully pointed to eliminate jointing.

(12) Form Ties—Form ties approved by the Architect shall be used. They shall be adjustable in length and of such type as to leave no metal closer than one and one-half (1½) inches of the surface and they shall not be fitted with any lugs, cones, washers or other device to act as a spreader within the form or for any other purpose which will leave a hole larger than seven-eighths (⅞) inch in diameter or a depression back of the exposed surface of the concrete. Wire ties will not be permitted.

Ties that are to be pulled from the wall shall be coated with cup grease or other approved material to facilitate removal.

Tie rod clamps shall not be removed in less than four (4) days after the concrete is placed if ordinary concrete is used, or two (2) days for high early strength concrete, nor until the concrete has hardened sufficiently to permit the tie rods to be withdrawn, broken off, or otherwise removed without damaging the concrete. Care shall be exercised to avoid spalling the concrete on the exposed surfaces. Ties of uniform diameter that are wholly withdrawn from the wall shall be pulled toward the inside face. Cutting ties back from the face of the wall will not be permitted. Tie rod holes shall be plugged as specified in Sec. 34.

(13) Wetting and Oiling Forms—The inside surface of wood forms shall be soaked continuously with clean water for twelve (12) hours before any concrete is placed. In case forms have been erected for some time and have become dry so that joints have opened, then the forms shall be thoroughly soaked at least twice each day for at least three (3) days prior to placing concrete. All lined forms shall be greased with an approved form oil or with a good grade of cup grease thinned with kerosene. All excess grease shall be wiped off with rags to leave the surface of the forms just oily to the touch. Plaster waste molds shall be greased with soft cup grease or cup grease thinned to a point where it can be applied with a brush by addition of a mixture of crystallized stearic acid and kerosene.

In case forms have been erected for some time and have become dry so that the joints have opened, then the forms shall be thoroughly soaked at least twice each day for three (3) days prior to placing the concrete so as to tighten all joints. Concrete shall not be placed in any form until inspected by the Architect and permission is given to start placing.

(14) Removing Forms—All wall forms shall be removed when the concrete has thoroughly hardened, but in no case in less than four (4) days except when high early strength cement or concrete is used, in which case forms may be removed after two (2) days. Waste molds shall be left in place until thoroughly dry and until all placing of concrete has been competed and in no case less than fourteen (14) days and shall then be carefully stripped off to prevent damage to the concrete.

REINFORCEMENT

(15) Cleaning—Metal reinforcement before being placed shall be thoroughly cleaned of mill and rust scale and of coatings that will destroy or reduce the bond. Reinforcement appreciably reduced in section shall be rejected. Where there is delay in depositing concrete reinforcement shall be reinspected and when necessary cleaned.

(16) Bending and Straightening—Reinforcement shall be carefully formed to the dimensions indicated on the plans. Cold bends shall be made around a pin having a diameter of six (6) or more times the least dimensions of the reinforcement bars.

Metal reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends

not shown on the plans shall not be used. Heating of reinforcement will be permitted only when the entire operation is approved by the Architect.

(17) Placing—Metal reinforcement shall be accurately positioned and secured against displacement by using annealed wire of not less than No. sixteen (16) gage or suitable clips at intersections and shall be supported in a manner that will keep all metal away from the exposed surface of the wall. Nails shall not be driven into the outside forms to support reinforcement nor shall any other device for this purpose come in contact with the outside form. The minimum clear distance between any bar and the weather side of all exterior walls shall not be less than one and one-half (1½) inches. At all wall surfaces not exposed to the weather a minimum of one (1) inch of concrete cover over all steel shall be provided.

(18) Splicing—Wherever it is necessary to splice reinforcement otherwise than as shown on the plans, the character of the splice shall be decided by the Architect on the basis of allowable bond stress and the stress in the reinforcement at the splice. Splicing shall not be made on points of maximum stress nor shall adjacent bars be spliced at the same point.

All bars shall be lapped at least 40 diameters at all corners and at abrupt changes in directions of walls.

PROPORTIONING

(19) General—Fine and coarse aggregate shall be proportioned by direct weight upon suitable weighing devices approved by the Architect. Portland cement in standard unopened cloth or paper sacks as packed by the manufacturer may be considered as weighing ninety-four (94) pounds per sack.

(20) Measuring Ingredients—All measurements of cement, fine and coarse aggregate shall be made separately. Measurements by weight shall be based on actual dry, loose weight per cubic foot of fine and coarse aggregate used. Proportioning aggregates for fractional sacks of cement will not be permitted unless the cement is weighed for each batch. Weighing equipment shall be arranged to permit making compensation for changes in the weight of moisture contained in the aggregates. Weighing equipment shall meet the approval of the Architect and shall be accurate within one per cent of the net load being weighed.

A satisfactory auxiliary device shall be used in connection with the scale beam to indicate or register at least the last one hundred (100) pounds of each of the aggregates required for the batch. The weighing hopper shall be equipped with a means of adjusting the volume of the compartment in which the aggregates are weighed.

Water shall be measured by an approved device capable of accurate measurement to one (1) pint, plus or minus, of the total amount of water required per batch.

(21) Water-Cement Ratio—The proportioning of materials shall be based on the requirements for a plastic and workable mix with the use of not less than 5½ sacks of cement per cubic yard and not more than six and one-half (6½)* gallons of water per sack of cement including the surface water carried by the aggregate, expressed in terms of the quantity of cement. The water in the aggregate must be included in the quantity specified and subtracted from the amount added to the mixture. It shall be measured by methods satisfactory to the Architect which will give results within one (1) pound for each one hundred (100) pounds of aggregate. Moisture determinations shall be made on representative samples at least once each day and at such other times as the appearance of the aggregate or the mixed concrete indicates a change in moisture content.

(22) Proportioning and Consistency—The proportions of aggregate to cement shall be such as to produce concrete that can be thoroughly compacted. The slump shall not exceed four (4) inches when vibration equipment is used and in no case shall the slump exceed six (6) inches.

The combined aggregate shall be of such composition of sizes that when separated by the No. 4 standard sieve the weight retained on the sieve shall be not less than ½ nor more than ⅔ of the total based on dry materials, except where adjustment is necessary in the opinion of the Architect for casting in special details.**

* In Southern climates where there is little or no freezing and thawing this may be increased by ½ gal. per sack of cement and the minimum cement content per cubic yard may be reduced to 5¼ sacks.

** In practically all cases the regular mix can be used for casting details. Where detail is intricate it may be necessary to reduce the amount of coarse aggregate but it is rarely necessary to reduce the maximum size.

(23) Trial Batches—Full size trial batches shall be made in the mixer using the aggregates selected for the job to establish the correct proportions of the mix to give proper workability without exceeding the water-cement ratio and slump specified. If the desired workability is not obtained with the first combination of aggregates, then the proportions of fine and coarse aggregate shall be adjusted within the limits specified until the mix meets with the approval of the Architect.

(24) Mixing—Concrete shall be mixed in a batch mixer for not less than one (1) minute after all the materials are in the mixer drum and until there is a uniform distribution of the materials and the mass is uniform in color and is homogeneous. The mixer shall rotate at a peripheral speed of about two hundred (200) feet per minute and shall not be loaded above its rated capacity.

(25) Central or Transit-Mixed Concrete—Concrete from a central plant or mixed in transit-mixer trucks may be used if it complies with these specifications. The Architect shall have free access at all times to the batching and mixing plant for sampling of all materials and inspection of work performed for this project. Concrete shall be delivered in watertight containers which will not permit segregation of the materials. When delivered, the concrete shall be uniform throughout the mass.

DEPOSITING CONCRETE

(26) Cleaning Equipment—Before beginning a run of concrete, hardened concrete and foreign materials shall be removed from the inner surfaces of the mixing and conveying equipment. All conveyances, buggies, or barrows shall be thoroughly cleaned at frequent intervals during the placing of the concrete.

(27) Transporting—Concrete shall be handled from the mixer to the place of final deposit in carts, buggies or conveyors and shall not be spouted nor delivered by spout or trough from the hoists, nor dumped into carts with a free fall from the mixer of more than three (3) feet. Every possible precaution shall be taken to prevent separation or loss of the ingredients while transporting the concrete. Delivery carts or buggies shall be kept on temporary runways built over the floor system and runway supports shall not bear upon reinforcing steel or fresh concrete.

(28) Time of Placing—Before starting work on any exposed concrete the contractor shall construct complete and finish a section of basement wall or other unexposed wall where directed by the Architect as a demonstration panel, using the same materials and methods of construction as will be used for exposed surfaces.

Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position, nor until the forms have been inspected and approved by the Architect and form ties at construction joints have been retightened, nor until all bucks, sleeves, hangers, pipes, conduits, bolts, wires and any other fixtures required to be embedded therein have been placed and anchored by the Contractors, nor until the forms and reinforcement have been cleaned and oiled as specified in Sec. 13. Concrete shall not be placed at any time except under the direct supervision of the Architect nor outside of regular working hours unless the Architect is notified at least four (4) hours in advance and Architect's superintendent or inspector is on the job.

(29) Placing—Special care must be exercised to prevent splashing the forms or reinforcement with concrete and any such splashes or accumulations of hardened or partially hardened concrete on the forms or reinforcement above the general level of the concrete already in place must be removed before the work proceeds. Concrete shall be placed in the forms for all exterior walls and other places where the concrete is to be exposed, in such a way as to prevent all segregation. All concrete for walls shall be placed through openings in the inside form spaced at frequent intervals, or through "elephant trunks" (heavy duck canvas or galvanized iron chutes) equipped with suitable hopper heads. Chutes shall be of variable lengths so that the free fall shall not exceed four (4) feet, and a sufficient number shall be placed in the forms to insure the concrete being kept level at all times. When placing concrete which is to be exposed, sufficient illumination shall be provided in the interior of the forms so that the concrete at places of deposit is visible from the deck and runways. Plaster waste molds shall be protected by a canvas cover over the inside face of each mold which shall remain in place until the level of the concrete in the wall form reaches the middle of the mold or a point at least one foot above the bottom of the mold. The canvas shall be slowly lifted, allowing the con-

crete to enter the mold. Every precaution shall be taken to completely fill the mold.

Concrete shall be spaded and rodded to thoroughly embed all reinforcement and fixtures. When forms are removed, surfaces shall be even and dense, free from aggregate pockets or honeycomb.

(29a) Placing with Vibration—Concrete shall be placed with the aid of mechanical vibrating equipment. Where vibration is used it shall be applied directly to the concrete unless otherwise approved by the Architect. The intensity of vibration shall be sufficient to cause flow or settlement of the concrete into place. Vibration shall be applied at the point of deposit and in the area of freshly placed concrete. It shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures as approved by the Architect.* To secure even and dense surfaces, free from aggregate pockets or honeycomb, vibration shall be supplemented by forking or spading by hand in the corners and angles of forms and along form surfaces while the concrete is plastic under the vibratory action.

Concrete placed in the interior of the building and not to be finally exposed shall not be dumped into the forms with a free fall of more than twelve (12) feet; and whenever possible openings in the forms shall be provided through which the concrete shall be placed so as to reduce the fall as much as possible.

(30) Construction Joints and Stoppages—The placing of concrete shall be carried on continuously between construction joints shown on the drawings. If for any reason it shall become necessary to stop the placing of concrete at places other than those indicated on the drawings, such places shall have the approval of the Architect and the manner of making the joint shall be approved.

The surface of the concrete shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of the walls a strip of 1-inch sheathing shall be tacked to the forms at the outside surface of the wall. The concrete shall be carried about one-half (½) inch above the underside of the strip. About one (1) hour after the concrete is placed, the strip shall be removed and any irregularities in the joint line shall be levelled off with a wood float and all laitance shall be removed. Wherever horizontal construction joints are made ties or bolts shall be provided 3 to 6 inches below the joint with which to tighten the forms against the hardened concrete.

Vertical stops shall be placed at interior corners only, unless otherwise shown on the drawings or approved by the Architect.

Note: In the exterior walls it is desirable to locate horizontal construction joints at such well defined lines as the bottom or top of window openings. Joints at the tops of windows allow considerable shrinkage to occur in the concrete panel between the windows thereby minimizing the possibility of shrinkage cracks.

(31) Depositing Against Other Concrete—Before depositing new concrete on or against concrete that has hardened, the forms shall be re-tightened, the surface of the hardened concrete shall be roughened as required, thoroughly cleaned of foreign matter and laitance, and moistened with water. The new concrete placed in contact with hardened or partially hardened concrete shall contain an excess of mortar to insure bond. To insure sufficient mortar at the juncture of the hardened and the newly deposited concrete, the cleaned and moistened surface of the hardened concrete, including vertical and inclined surfaces, shall first be slushed with a coating of neat cement grout against which the new concrete shall be placed before the grout has attained its initial set. Concrete for the first six inches of the next layer shall consist of a mix having one-half the amount of coarse aggregate in the regular mix.

(32) Protecting and Curing—All exposed surfaces of concrete shall be protected from premature drying and freshly placed concrete shall be protected against wash by rain. All concrete shall be kept wet for a period of five (5) days after placing, except that two (2) days' curing shall be considered sufficient if high early strength portland cement or concrete is used.

(33) Depositing in Cold Weather—Concrete when deposited shall have a temperature not below 70 deg. F. and not above 100 deg. F. In freezing weather suitable means shall be provided for maintaining the concrete at a temperature not lower than 70 deg. F. for 3 days, or 50 deg. F. for 5 days after placing, except when high early strength cement or concrete is used the temperature must be maintained at not less than 70 deg. F. for 2 days or 50 deg. F. for 3 days. The methods of heating the materials and protecting the concrete shall be approved by the Architect. Salt, chemicals, or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing.

(34) Patching—Any concrete work not formed as shown on the plans, or which for any reason is out of alignment or level or shows a defective surface, shall be considered as not conforming with the intent of these specifications and shall be removed from the job by the contractor at his expense, unless the Architect grants permission to patch the defective area, which shall be done in accordance wtih the following procedure. Permission to patch any such area shall not be considered a waiver of the Architect's right to require complete removal of the defective work if the patching does not, in his opinion, satisfactorily restore the quality and appearance of the surface.

Immediately after removing forms, all concrete surfaces shall be inspected and any poor joints, voids, stone pockets or other defective areas permitted by the Architect to be patched and all tie holes shall at once be patched before the concrete is thoroughly dry. Defective areas shall be chipped away to a depth of not less than one (1) inch with the edges perpendicular to the surface. The area to be patched and a space of at least six (6) inches wide entirely surrounding it shall be wetted to prevent absorption of water from the patching mortar. The patch shall be made of the same material and of the same proportions as used for the concrete except that the coarse aggregate shall be omitted and white cement shall be substituted for a part of the gray cement to match the color of the surrounding concrete. The amount of water used in mixing the mortar shall be as little as consistent with the requirements of handling and placing. The mortar shall be re-tempered without the addition of water by allowing it to stand for a period of one (1) hour during which time it shall be mixed with a trowel to prevent setting.

The mortar shall be thoroughly compacted into place and screeded off so as to leave the patch slightly higher than the surrounding surface. It shall then be left undisturbed for a period of one (1) to two (2) hours to permit initial shrinkage before being finally finished. The patch shall be finished in such a manner as to match the adjoining surface. On exposed surfaces where unlined forms have been used the final finish shall be obtained by striking off the surface with a straightedge spanning the patch and held parallel to the direction of the form marks.

Tie holds left by withdrawal of rods or the holes left by removal of ends of ties shall be filled solid with mortar. For holes passing entirely through the wall a plunger type grease gun or other device shall be used to force the mortar through the wall starting at the back face. A piece of burlap or canvas shall be held over the hole on the outside and when the hole is completely filled the excess mortar shall be struck off with the cloth flush with the surface. Holes not passing entirely through the wall shall be filled with a small tool that will permit packing the hole solid with mortar. Any excess mortar at the surface of the wall shall be struck off flush with a cloth.

(35) Cleaning Walls—All concrete surfaces shall be cleaned with a solution of muriatic acid containing not less than 5 per cent nor more than 10 per cent of acid by volume. The solution shall be applied to the surface previously wetted with clear water by scrubbing vigorously with stiff bristle brushes. Immediately after cleaning, all surfaces must be drenched with an abundance of clear water to remove all trace of acid.

In addition to the above treatment all smooth finish surfaces shall be given the following treatment:

Prepare a grout of about the proportions of one part cement to one part fine sand. Grout shall be of a consistency that will permit its application to vertical surfaces with a stiff bristle brush. The grout shall be rushed on the previously dampened surface to fill completely all air bubbles and indentations in the concrete. Allow grout to remain on wall until the cement has partially set, then remove excess grout with a steel trowel. After drying for an hour or longer, depending on weather conditions, rub the wall vigorously with burlap or completely clean the grout from the surface leaving pits filled, but there shall not be a visible film or grout on the surface.

Deep stains and incrustations of mortar or grout shall be removed by scouring with steel wool or fine steel brushes.

* As a rule, vibration in one place should be continued not less than 15 seconds, and not more than 1 minute.

The color of the painted walls of Cincinnati Union Terminal is matched in the beautiful, wear-resistant terrazzo floor, made with white portland cement and colored marble aggregates. Alfred Fellheimer and Stewart Wagner, architects, New York; terrazzo by Martina Mosaic and Tile Co., Cincinnati.

TERRAZZO SPECIFICATIONS

(1) Base Slab—The surface of the base slab shall be struck off reasonably true at a level not less than 2 in. below the required finish grade for Method A and not less than 3 in. for Method B.

(2) Aggregates—No fine aggregate or sand shall be used in the terrazzo finish. The coarse aggregate shall be (insert here the kind and color of marble chips desired). The coarse aggregate shall be graded in three sizes: ⅛ in., ¼ in. and ½ in.

(3) Mixtures—The mortar base for the terrazzo finish shall be mixed in the proportions of one part of portland cement to 4 parts of clean, coarse sand, mixed with not more than 6 gallons of water per sack of portland cement.

The terrazzo mixture shall be one part of portland cement and 2 parts of stone chips.

Not more than 4 gallons of mixing water, including the moisture in the aggregate, shall be used for each sack of portland cement in the mixture.

(4) Consistency—The terrazzo concrete shall be of the driest consistency possible to work with a sawing motion of the strike-off board or straightedge. Changes in consistency shall be obtained by adjusting the proportions of aggregate and cement. In no case shall the specified amount of mixing water be exceeded.

(5) Placing—Method A—Bonded Finish—The surface of the structural concrete slab shall be thoroughly wetted. The mortar base shall then be uniformly spread and brought to a level ⅞ in. below the finished floor.

Method B—Broken Bond Finish—The surface of the structural concrete slab shall be covered with a uniform layer of fine sand ¼ in. thick, and covered with an approved tar paper overlapping at least 2 in. at all edges. The mortar base shall then be spread and screeded to an even surface ⅞ in. below the finished floor level.

Metal dividing strips about 1¼ in. wide, at least 20 gauge, shall be inserted in the mortar or supported on the slab to conform to the designs specified by the Architect. The top of the strips shall be at least $\frac{1}{32}$ in. above the finished level of the floor.

When in the opinion of the engineer the mortar base has hardened sufficiently to withstand rolling, the terrazzo mixture shall be placed to the level of the tops of the dividing strips.

(6) Finishing—After striking off to the finished level, the concrete topping shall be rolled length and crosswise so as to secure thorough compaction of the stone chips and cement paste. Additional stone chips of the larger size shall be spread over the topping during rolling until 85 per cent of the finished surface shall be composed of stone. Immediately after rolling, the surface shall be floated and troweled once. No attempt shall be made to remove trowel marks.

After the terrazzo concrete has hardened enough to prevent dislodgments of aggregate particles, it shall be ground down with an approved type of grinding machine shod with free, rapid cutting abrasive stones to expose the coarse aggregate. The floor shall be kept wet during the grinding process. All material ground off shall be removed by squeegeeing and flushing with water.

Air holes, pits and other blemishes shall then be filled with a thin grout composed of neat cement paste. This grout shall be spread over the surface and worked into the pits. After all patch fillers have hardened for seven (7) days the floor surface shall receive a second or final grinding to remove the film of cement paste and to give the floor a polish. It shall then be thoroughly washed and all surplus material removed.

(7) Curing and Protection—All freshly placed concrete shall be protected from the elements and from all defacements due to building operations. The contractor shall provide and use when necessary tarpaulins to cover completely or enclose all freshly finished concrete.

If at any time during the progress of the work the temperature is, or in the opinion of the engineer will, within twenty-four (24) hours, drop to 40 deg. F., the water and aggregate shall be heated and precautions taken to maintain the temperature of the concrete above 70 deg. F. for at least 3 days or above 50 deg. F. for at least 5 days when using standard portland cement and above 70 deg. F. for at least 2 days or above 50 deg. F. for at least 3 days when using standard high early strength portland cement.

As soon as the concrete has hardened to prevent damage thereby, it shall be covered with at least one (1) inch of wet sand, or other covering satisfactory to the engineer, and shall be kept continually wet by sprinkling with water for at least seven (7) days when using standard portland cement or for at least three (3) days when using high early strength portland cement.

(8) Cleaning—After removing all loose material, the finish shall be scrubbed with warm water and soft soap, and mopped dry.

SPECIFICATIONS FOR CONCRETE FLOOR FINISH

(1) **Base Slab**—The surface of the structural base slab shall be finished reasonably true and struck off at a level not less than 1 in. below the required finish grade.

As soon as the condition of the concrete base permits and before it has fully hardened, all dirt, laitance and loose aggregate shall be removed from the surface by means of a wire broom, which shall leave the coarse aggregate slightly exposed, or the surface otherwise roughened to improve bond with the topping.

When it is impossible to remove laitance and roughen the slab by brooming, the surface shall be cleaned and prepared for bond by chipping after the base has hardened.

Just prior to placing the finish, the base slab shall be thoroughly cleaned by scrubbing, to the satisfaction of the engineer.

(2) **Portland Cement**—Portland cement shall be of American manufacture conforming to the "Standard Specifications for Portland Cement" (Serial Designation C 9-30) or the "Standard Specifications for High Early Strength Portland Cement" (Serial Designation C 74-36) of the American Society for Testing Materials, and subsequent revisions thereof.

(3) **Aggregates**—Both fine and coarse aggregates shall be used in the finish. Fine aggregates shall consist of clean, hard sand or crushed stone screenings free from dust, clay, loam or vegetable matter. All particles shall pass a ¼-in. sieve and shall be graded from fine to coarse with the coarse particles predominating. Not more than 5 per cent shall pass a 100-mesh sieve and not more than 15 per cent shall pass a 50-mesh sieve.

Coarse aggregates shall consist of clean, hard gravel or crushed stone free from dust, clay, loam or vegetable matter, and from coatings which will tend to weaken the bond. It shall contain no soft, flat or elongated fragments and shall be graded from ⅛ to ⅜ in. with not less than 95 per cent passing a ⅜-in. mesh sieve and not more than 10 per cent passing a No. 8 sieve.

All aggregate shall be selected with care. Coarse aggregate shall be of an approved character and samples of proposed material shall be submitted to the engineer for approval prior to use.

(4) **Mixture**—The mixture shall be 1 part of portland cement, 1 part of fine aggregate and 2 parts of coarse aggregate by volume. This nominal mix may be slightly varied, depending upon the local conditions, and as the engineer may direct. If the aggregate is very coarse, the gravel or stone may be reduced, but in no case shall the volume of the coarse material be less than 1½ times the volume of the fine.

The mixture shall be determined by the engineer and once established shall not be changed except upon his written order.

Not more than 5 gallons of mixing water, including the moisture in the aggregates, shall be used for each sack of portland cement in the mixture. Mixing of the concrete shall continue for at least 1½ minutes after all ingredients are in the mixer.

(5) **Consistency**—The concrete shall be of the driest consistency possible to work with a sawing motion of the strike-off board, or straightedge. Changes in consistency shall be obtained by adjusting the proportions of fine and coarse aggregate within the limits specified. In no case shall the specified amount of mixing water be exceeded.

(6) **Placing and Compacting**—The base slab shall be thoroughly wetted just prior to the placing of the finish, but there shall be no pools of water left standing on the wetted surface. A thin coat of neat cement grout shall be broomed into the surface of the slab for a short distance ahead of the topping. The wearing course shall be immediately applied before the grout has hardened, and brought to the established grade with a straightedge. After striking off the wearing course to the established grade, it shall be compacted by rolling or tamping, and then floated with a wood float or power floating machine. The surface shall be tested with a straightedge to detect high and low spots, which shall be eliminated.

(7) **Finishing by Troweling**—Floating shall be followed by steel troweling after the concrete has hardened sufficiently to prevent excess fine material from working to the surface. The finish shall be brought to a smooth surface free from defects and blemishes. No dry cement nor mixture of dry cement and sand shall be sprinkled directly on the surface of the wearing course to absorb moisture or to stiffen the mix. After the concrete has further hardened, additional troweling may be required. This shall be done as may be directed by the engineer.

Note: Surfaces to be ground shall be swept with soft brooms after rolling to remove any water and surplus cement paste that may be brought to the surface. The wearing course shall then be floated and once lightly troweled, but no attempt shall be made to remove all trowel marks.

12 Years of Trucking Heavy Loads Did Not Injure this Concrete Floor Finish. Crushed trap rock aggregate was used in this wearing course and the surface was finished by troweling. The hard wearing quality of this floor is largely due to the control of the water-cement ratio in mixing and adequate curing. This floor is at the plant of the Columbia Can Company, St. Louis, Missouri.

(8) **Finishing by Grinding**—After the wearing course has hardened sufficiently to prevent dislodgment of aggregate particles, it shall be ground down with an approved type of grinding machine shod with free, rapid-cutting abrasive stones to expose the coarse aggregate. The floor shall be kept wet during the grinding process. All material ground off shall be removed by squeegeeing and flushing with water.

Air holes, pits and other blemishes shall then be filled with a thin grout composed of one part of No. 80 grain abrasive grit and one part of portland cement. This grout shall be spread over the surface and worked into the pits with a steel straightedge, after which the grout shall be rubbed into the floor surface with the grinding machine.

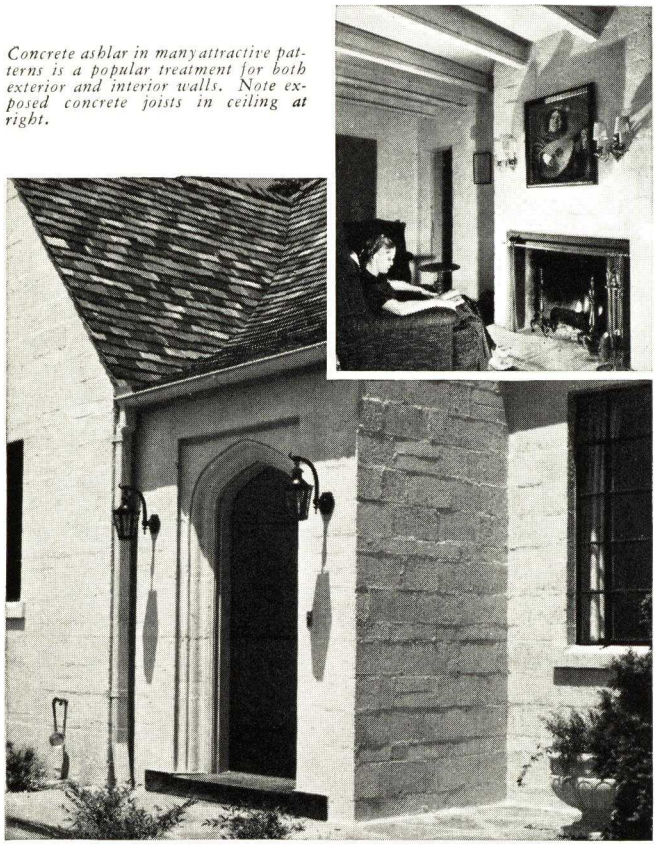
After all patch fillers have hardened for seven (7) days, the floor surface shall receive a second or final grinding to remove the film and to give the finish a polish. It shall then be thoroughly washed and all surplus material removed.

(9) **Curing and Protection**—All freshly placed concrete shall be protected from the elements and from all defacement due to building operations. The contractor shall provide and use tarpaulins when necessary to cover completely or enclose all freshly finished concrete.

If at any time during the progress of work the temperature is, or in the opinion of the engineer will, within twenty-four (24) hours, drop to 40 deg. F., the water and aggregate shall be heated and precautions taken to maintain the temperature of the concrete above 70 deg. F. for at least three (3) days or above 50 deg. F. for at least five (5) days when using standard portland cement and above 70 deg. F. for at least two (2) days or above 50 deg. F. for at least three (3) days when using standard high early strength portland cement.

As soon as the cement has hardened to prevent damage thereby, it shall be covered with at least one (1) inch of wet sand, or other covering satisfactory to the engineer, and shall be kept continually wet by sprinkling with water for at least seven (7) days when using standard portland cement or for at least three (3) days when using high early strength cement.

CONCRETE ASHLAR



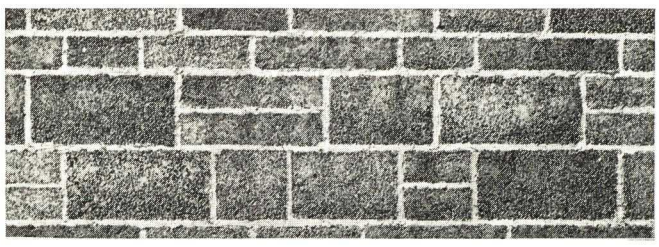
Concrete ashlar in many attractive patterns is a popular treatment for both exterior and interior walls. Note exposed concrete joists in ceiling at right.

Concrete ashlar is an exposed or painted concrete masonry wall employing one or more sized units in its construction. The units may be laid in regular courses, which is known as "coursed" ashlar. Laid in a random pattern, it is known as "random" ashlar. An almost endless number of attractive patterns can be produced by different arrangement of the units in the wall. The surface texture of the units can be varied over a wide range, from a smooth to a coarse, open texture, according to the effect the Architect wishes to produce.

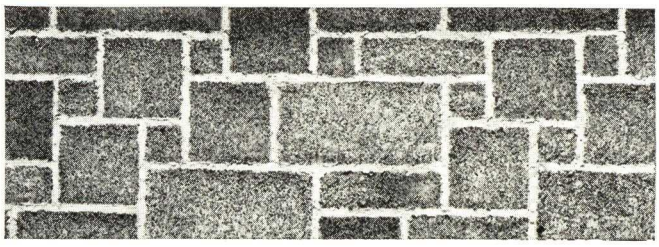
Usually the wall surface is given two or more coats of portland cement paint. For exterior exposed work, this paint helps seal the surface, producing a watertight wall. Any color desired can be obtained by adding proper mineral pigments to the paint. With many textures, patterns and colors available, this method of construction has become increasingly popular.

Suggested Concrete Ashlar Patterns—It is recommended that standard sizes of concrete masonry units or multiples of standard sizes be used wherever possible in ashlar work. The fewer sizes used, the greater the economy of the wall construction. Most manufacturers of concrete masonry units produce standard sizes and a number of multiples which may be worked into coursed or random ashlar patterns.

Many interesting wall variations may be developed by using only a few sizes of units. Mortar joints also may be handled to produce various effects, depending upon the size of the joints, the manner in which they are struck and the color of the mortar used.



Example of coursed ashlar. One 4-in. course to each pair of 8-in. courses. Formed by units with nominal face sizes of 8x16, 8x12, 8x8, 4x16, 4x12, and 4x8 inches.



Random ashlar effect achieved by use of only four nominal sizes of units—8x16, 8x8, 4x12, and 4x4 inches. Pattern repeats in each square yard of wall area.

PRECAST JOIST CONCRETE FLOORS

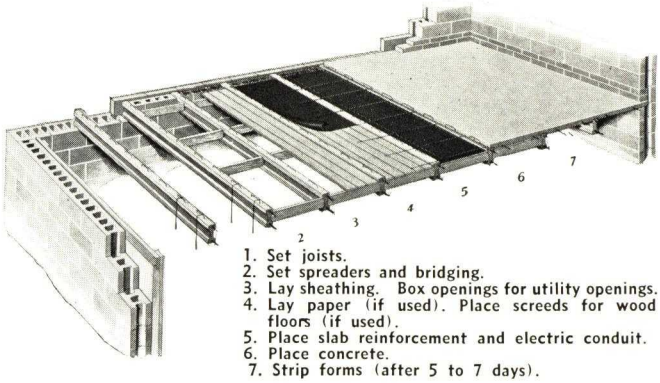
The precast joist concrete floor is a relatively new construction developed to lower the cost of concrete floors—especially suitable for dwellings, apartments and other buildings having relatively light loads. The floor consists of factory-made joists of reinforced concrete which support a concrete slab.

The joists are 8, 10 or 12 in. deep, according to the span and load to be carried, and are usually made in a products plant which delivers them to the site ready for the builder. Usual practice is to place a 2 or 2½-in. concrete slab over these joists. Slab and joists bond together, producing a strong, durable floor.

The underside of the precast joist floor may be left exposed, providing an attractive beamed ceiling effect. If color is desired, portland cement paint may be applied with spray or brush, or the joists may be stained and stenciled. The ceiling may be plastered if desired, plaster being applied on metal reinforcement attached to the underside of the joists.

With concrete as a subfloor any type of floor finish may be used—wood, concrete tile, carpet, linoleum, rubber tiling, terrazzo or any other popular covering. The concrete itself can be colored and marked off in square or other pattern, waxed and polished.

7 SIMPLE STEPS IN BUILDING A PRECAST JOIST CONCRETE FLOOR



1. Set joists.
2. Set spreaders and bridging.
3. Lay sheathing. Box openings for utility openings.
4. Lay paper (if used). Place screeds for wood floors (if used).
5. Place slab reinforcement and electric conduit.
6. Place concrete.
7. Strip forms (after 5 to 7 days).

PORTLAND CEMENT ASSOCIATION'S PUBLICATIONS OF INTEREST TO ARCHITECTS

S-4 SWIMMING POOLS

Fundamental principles in locating and constructing outdoor swimming and wading pools are described. Designs for rectangular and oval swimming pools and a circular wading pool are shown. Plumbing layouts and specifications are also included.

S-5 CONCRETE IN SCHOOLS

The designing of school plants to suit curricular programs is given a prominent place in this booklet. Structural layouts and details are illustrated showing architects and engineers how to use concrete to best advantage in design of schools. Contains 22 line drawings and 14 photographs.

S-8 CONCRETE FLOOR FINISHES

Contains information on construction, maintenance and repair of concrete floors. Specifications are included for bonded and terrazzo floor finishes.

S-28 BEAUTY IN WALLS OF ARCHITECTURAL CONCRETE

Booklet shows possibilities of concrete as an architectural material for buildings of all types of occupancy and styles of architecture.

T-1 CONCRETE GUIDE

A manual on production of quality concrete for use by contractors and foremen. (Contents largely reproduced on second and third pages of this catalog section.)

T-3 VIBRATION—A BETTER METHOD OF PLACING CONCRETE

Vibration makes stiff concrete workable and helps to produce dense, watertight, durable concrete. Book covers methods, equipment, test data, recommended practice, bibliography.

T-12 DESIGN AND CONTROL OF CONCRETE MIXTURES

Explains water-cement ratio, field control of concrete and methods of designing mixtures and making tests. A.S.T.M. Standard Specifications for Concrete and Concrete Aggregates are included.

T-18 ANALYSIS OF SMALL REINFORCED CONCRETE BUILDINGS FOR EARTHQUAKE FORCES

Presents designers with a method of analysis in simplified form for the complete design of small reinforced concrete buildings.

T-19 SIMPLIFIED DESIGN OF CONCRETE FLOOR SYSTEMS

Booklet discusses various concrete floor systems, shows their respective advantages and relative economies and illustrates the method of design by typical examples.

T-20 CONTINUITY IN CONCRETE BUILDING FRAMES

Presents analyses of building frames of reinforced concrete subject to either vertical or horizontal load—wind pressure and earthquake. Quick, easy and convenient procedures suitable for office design practice are illustrated by many numerical problems.

T-21 FORMS FOR ARCHITECTURAL CONCRETE

Contains information pertaining strictly to formwork for architectural concrete buildings. Discusses in detail the design, construction and erection of architectural concrete building forms, the technique and craftsmanship of which differs considerably from that employed on structural concrete.

T-22 CONCRETE PILES

Discusses pile foundations, pile driving and formulas. The manufacture, handling and driving of precast concrete piles is described and illustrated by photographs. Cast-in-place bearing piles and precast sheet piles are discussed and data for the design of sheet pile bulkheads is given.

P-2 CONCRETE ASHLAR WALLS

Features use of variable-sized masonry units to develop architecturally attractive walls for interiors or exteriors. Defines, describes and pictures concrete ashlar construction. Includes suggested patterns for random or coursed ashlar using standard-sized units and multiples thereof.

P-4 PORTLAND CEMENT STUCCO IN COLOR

Illustrates various types of stucco with color plates. Methods of applications and specifications.

P-25 CONCRETE FLOORS FOR RESIDENCES

A manual of residence floor construction describes the solid slab, concrete joist, tile and joist, precast concrete joist, and steel beam-concrete floors.

P-26 FACTS ABOUT CONCRETE MASONRY

Manual of reliable, authoritative data, featuring strength tests of concrete masonry walls, specifications and data on construction, fire-resistance, heat-insulation, sound-absorption and transmission, and design data.

P-101 HOW TO DESIGN AND BUILD PRECAST JOIST CONCRETE FLOORS

Manual for use by architects and contractors on the general characteristics, design and construction of floors built with premolded joists and job-placed reinforced concrete slabs. Typical specifications and details.

P-32 DESIGNED FOR CONCRETE

Fifty-five selected designs from the 1936 *Pencil Points*—Portland Cement Association architectural competition for the design of fireside concrete homes. Also includes photos of completed houses and information on popular finishes for concrete walls and floors.

P-143 REINFORCED CONCRETE HOUSES—DESIGN AND CONSTRUCTION DETAILS

Manual explaining the various construction details of the reinforced concrete house.

■ CONCRETE INFORMATION ■

PORTLAND CEMENT ASSOCIATION

33 WEST GRAND AVENUE • CHICAGO, ILL.

A National Organization to Improve and Extend the Uses of Concrete

The Portland Cement Association is a research and service organization, supported by companies manufacturing a large proportion of the domestic production of portland cement. Inquiries are invited on any question involving the uses of cement or concrete. Address the general office or nearest district office listed.

ATLANTA, GA.
Hurt Building

AUSTIN TEXAS
1301 Norwood Bldg.

BIRMINGHAM, ALA.
1202 Wafts Bldg.

CHICAGO, ILL.
33 W. Grand Ave.

COLUMBUS, OHIO
50 W. Broad St.

DES MOINES, IOWA
408 Hubbell Bldg.

INDIANAPOLIS, IND.
610 Merchants' Bank Bldg.

KANSAS CITY, MO.
Gloyd Building

LANSING, MICH.
Olds Tower Bldg.

LINCOLN, NEBR.
321 Terminal Bldg.

LOS ANGELES, CALIF.
816 W. Fifth St.

MILWAUKEE, WIS.
735 N. Water St.

MINNEAPOLIS, MINN.
814 Northwestern Bank Bldg.

NEW YORK, N. Y.
347 Madison Ave.

OKLAHOMA CITY, OKLA.
1421 First National Bldg.

PHILADELPHIA, PA.
1528 Walnut St.

PORTLAND, ORE.
618 Southwest Fifth Ave.

RICHMOND, VA.
812 State Planters Bank & Trust Bldg.

SAN FRANCISCO, CALIF.
564 Market Street

SEATTLE, WASH.
903 Seaboard Bldg.

ST. LOUIS, MO.
1306 Syndicate Trust Bldg.

VANCOUVER, B. C., CAN.
Birks Building

WASHINGTON, D. C.
837 National Press Bldg.

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THE CARNEY COMPANY

MANKATO, MINN.

DISTRICT SALES OFFICES

CHICAGO DES MOINES FARGO KANSAS CITY MILWAUKEE MINNEAPOLIS OMAHA ST. LOUIS

MILLS: MANKATO and CARNEY, MINN. QUARRIES: CARNEY, MINN.

CARNEY CEMENT for Masonry

The Pioneer of the Industry

THE CARNEY COMPANY has manufactured cement since 1883—and originated masonry cement as it is known today. Carney is unlike other cements—it is made from a deposit of natural cement rock particularly adapted to the manufacture of highly plastic, truly hydraulic masonry cement. This rock contains the correct proportion of lime and clay so that when burned and ground the resulting cement produces a lasting bond under all conditions of use—either above or below ground no further addition of lime is needed on the job. THE CARNEY COMPANY maintains elaborately equipped, efficiently manned chemical laboratories for the purpose of controlling constant uniformity of the product.

A Perfectly Balanced Mortar

Possessing all the desirable properties in masonry cement which embody ample strength, workability, and high water retaining capacity.

High, Water Retaining Capacity

The degree of plasticity or workability of a mortar is directly related to the water retaining capacity of the cement. Carney Cement has an extremely high, water retaining capacity. This attribute also assures a better bedding of the brick in the mortar—a feature which is particularly important where porous, highly absorbent brick is used.

Simple Mix

Correct mortar consistency is assured where Carney Cement is used. Mixing errors are avoided because of the simplicity of mixing. One part of Carney Cement mixed with three parts sand and water produces a perfect mortar. No other materials are required.

Tight, Efflorescence Resisting Joints

As stated above, the high water retaining capacity of Carney Cement assures better bedding of the brick in the mortar. This assures a tightly knitted wall. As a further precaution against water penetration through joints, calcium stearate, which is water repellent, is added to Carney Cement when manufactured. Efflorescence due to soluble salts which may be present in the sand or water is prevented by the calcium stearate component of Carney Cement.

Non-fading to Mortar Colors

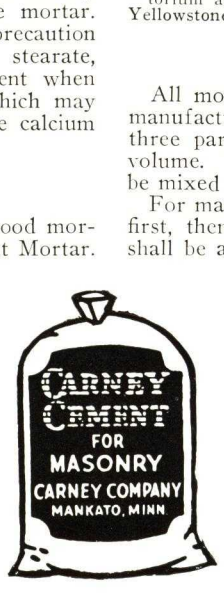
Laboratory and field experience have proven that good mortar colors will not fade when used with Carney Cement Mortar.

Resistant to Frost Action

Results over a period of more than thirty years in the Northwest, where mortar is subject to many cycles of freezing and thawing, have demonstrated conclusively that Carney Cement mortar is resistant to frost action.

Quantity Requirements

Carney Cement is packed in cloth or paper sacks—one cubic foot each—four sacks to the barrel. One barrel, mixed with three parts sand, will lay up 800 to 1000 brick, depending upon the thickness of the mortar joint. Furthermore, waste from dropping and wall cleaning is largely eliminated where Carney mortar is used, due to its excellent plasticity.



Prominent Buildings in Which Carney Was Recently Used

City and Project	Architect
Alton, Ill.—Milton Grade School Addition	James M. Maupin
Butte, Mont.—School	Bird & Van Teylingen
Calumet City, Ill.—Fractional High School	W. S. Hutton
Cambridge, Minn.—Epileptic Colony Cottages	Sullivan & Orrfalt
Canandaigua, N. Y.—Veterans' Hospital	Private Plans
Capitan, Ft. Stanton, N. M.—U. S. Marine Hosp.	Private Plans
Cheyenne, Wy.—Supreme Court Bldg.	Wm. DuBois
Chicago, Ill.—Leyden Grade School	John C. Christensen
Chicago, Ill.—Sanitary District Bldg.	F. L. Finlayson
Chicago, Ill.—U. S. Post Office	Graham, Anderson, Probst & White
Denver, Colo.—U. S. Custom House	Private Plans
Eau Claire, Wis.—Gillette Rubber Co. Factory	Private Plans
Elwood, Ind.—Continental Can Co. Factory	Battey & Kipp, Inc.
Fairfield, Ohio—U. S. Central Heating Plant	Private Plans
Fort Sill, Okla.—Officers' Quarters, etc.	Private Plans
Grand Forks, N. D.—Central High School	Jos. Bell De Remer
Harmony, Minn.—School	Croft & Boerner
Houston, Tex.—International Harvester Bldg.	Private Plans
Iowa City, Iowa—University Theater Bldg.	George L. Horner
Jacksonville, Ill.—State Dorm. and School Bldg.	C. Herrick Hammond
Knoxville, Iowa—U. S. Veterans' Hospital Bldgs.	Private Plans
Lewiston, Me.—U. S. Post Office	Private Plans
Manteno, Ill.—State Hospital Group	C. Herrick Hammond
Middletown, Pa.—Admin. Bldg. and Officers' Qtrs.	Private Plans
Milwaukee, Wis.—Bathhouse	Clas & Clas, Inc.
Minneapolis, Minn.—Bible Institute	Lang & Raugland
Minneapolis, Minn.—U. of M. Indoor Sports Bldg.	Clarence H. Johnston
Minneapolis, Minn.—Sumner Field Homes Housing Project	Magney & Tusler and Associates
Moose Lake, Minn.—Fourth State Insane Hospital	Sund & Dunham
Omaha, Neb.—Logan Fontenelle Homes Housing Project	Wm. L. Steel & Associates
Omaha, Neb.—University of Omaha Science Building	John Latenser & Sons, Inc.
Missoula, Mont.—Lowell and Central Schools	H. E. Kirkemo
Omaha, Neb.—Iten-Barmettler Biscuit Factory	James T. Allen
Rapid City, S. D.—School	Perkins & McWayne
Robbinsdale, Minn.—School	Haxby & Bissell
Rochester, Minn.—Library	H. H. Crawford and P. P. Bross
Roseburg, Ore.—Veterans' Hospital	Private Plans
St. Louis, Mo.—Laclede Gas Light Co. Power Plant	Private Plans
St. Paul, Minn.—City Hall and Court House	Ellerbe & Co.
Sheridan, Wy.—Veterans' Hospital	Private Plans
Sioux Falls, S. D.—Washington High School	Hugill & Blatherwick
Superior, Wis.—Parkland Sanitarium	R. C. Buck, Inc.
Waverly, Iowa—Court House	Mortimer B. Cleveland
Wichita, Kan.—University of Wichita Auditorium and Commons Bldg.	Glen H. Thomas
Yellowstone Park, Wy.—U. S. Post Office	Private Plans

Specifications

All mortar shall be composed of one part Carney Cement, manufactured by THE CARNEY COMPANY, Mankato, Minn., and three parts clean, well-graded sand, mixed and measured by volume. The Carney Cement and sand, if mixed by hand shall be mixed thoroughly in a dry state.

For machine mix put sand and a portion of water in machine first, then add Carney Cement, after which additional water shall be added to produce a mortar of the desired workability under the trowel. When color is added, an approved brand of good double strength color shall be used in accordance with the directions of the manufacturer of the particular color used. Color should always be used as an addition and not as a replacement of cement.

In warm weather common brick shall be wetted; in cold weather sand and water shall be heated, and wall units kept dry and free from frost before being placed in wall.

Additional Information

Our technical staff will be glad to help with your masonry cement problems. Write THE CARNEY COMPANY, Mankato, Minnesota.

HY-TEST CEMENT COMPANY

Manufacturers of Hy-Test Masonry Cement

GENERAL OFFICES
PHILADELPHIA, PA.

Product

HY-TEST MASONRY CEMENT, a finely ground waterproofed plastic smooth-working cement for laying brick, stone, tile, terra cotta and other masonry units, combining the smoothness in lime and the strength in Portland cement.

MORTAR B VI
TRADE MARK

Composition

Hy-Test Masonry Cement is an intimate mixture of portland cement and hydraulic lime, into which is ground at the mill a recognized waterproofing compound which not only waterproofs but tends to reduce shrinkage of the mortar and increases bonding efficiency between the mortar and brick.

How It Is Used

The proper proportion is one part Hy-Test with three parts clean graded sand, by volume, with sufficient water added to bring to proper consistency. No admixtures of any kind necessary to produce a plastic mortar.

Advantages

The main function of any mortar is to efficiently and durably bond the brick together in order to keep water from penetrating through the joint.

Instead of making our own claims as to the advantages secured with Hy-Test cement, send 5¢ to the Superintendent of Documents, Washington, D. C., for a copy of U. S. Research Paper No. 683 which will give you unbiased facts of the results produced with 50 different kinds of mortars tested at the National Bureau of Standards in a three year investigation supported by the National Lime Association, Portland Cement Association, American Face Brick Association, and a group of Masonry cement manufacturers,—or write to the American Society for Testing Materials for copy of "Permeability Tests of Eight Inch Brick Walls," by L. A. Palmer, describing the amount of water passing through 240 eight-inch brick walls laid with different kinds of mortars.

Hy-Test Masonry Cement was used in the tests conducted at the Bureau of Standards and is described in the above mentioned papers as Mortar No. B VI.

The investigation definitely established that most water penetrates a wall "between the mortar and the brick" and that therefore a mortar must have (a) bonding efficiency, (b) flexibility, (c) low shrinkage (volume change) subsequent to hardening, (d) must be able to maintain the bond under weather exposure of freezing and thawing, (e) high water retaining capacity.

(a) Bonding Efficiency—The American Society for Testing Materials Reprint containing the article "Permeability Tests of 8-In. Brick Wallettes," by L. A. Palmer, prints tables showing Mortar No. B VI as having produced the greatest extent of adhesion with a diversified range of brick, because the figures definitely show that the average penetration of water through a series of brick walls laid with Mortar No. B VI was less than with any other type of mortar.

(b) Flexibility—U. S. Research Paper No. 683, page 641 rates Mortar No. B VI as one of the mortars that gave the most concordant results on flexibility, or stretching properties.

(c) Low Shrinkage—U. S. Research Paper No. 683, page 636 rates Mortar No. B VI among those mortars having low volume change (low shrinkage) subsequent to hardening.

(d) Bond Durability—U. S. Research Paper No. 683, page 638 rates Mortar No. B VI as having the highest possible record in durability of bond after freezing and thawing for a period of one year.

(e) Water Retaining Capacity—U. S. Research Paper No. 683, page 641 rates Mortar No. B VI as one of the mortars having high water retaining capacity or the power to resist undue suction by highly porous brick.

Strength

The highest stress on brickwork permitted by any Building Code in America is 250 lbs. per square inch or 18 tons per square foot at 28 days. Hy-Test mortar will withstand 6 times this load in the same period when cured under normal conditions. It has been approved by the Building Departments of every important city in the United States.

Specification

Mortar—"All mortar for interior and exterior brickwork below and above grade, for rubble stone, interior partitions and other masonry units shall be composed of Hy-Test Waterproofed Masonry Cement (B VI grade) and clean graded sand, with enough water to bring to proper consistency. Three cubic feet of sand shall be added to each bag of Hy-Test cement. If mortar is mixed by hand the cement and sand shall first be thoroughly mixed dry before the water is added.

Waterproofing must be ground into the cement at the mill. It is of utmost importance to thoroughly wet all brick that absorb water rapidly. In cold weather proper precautions shall be taken to protect the green work from freezing."

General Information

Write to the HY-TEST CEMENT COMPANY, 1616 Walnut Street, Philadelphia, and we will send gratis a copy of U. S. Research Paper No. 683, and American Society for Testing Materials booklet containing the article "Permeability Tests of Eight-Inch Brick Walls" by L. A. Palmer.

KOSMOS PORTLAND CEMENT COMPANY

INCORPORATED

Manufacturers

Kosmos Portland Cement—Kosmos High Early Strength Cement

Kosmortar—Kosmos Waterproofed Portland Cement

SALES OFFICE
LOUISVILLE, KY.

MILLS
KOSMOSDALE, KY.

KOSMORTAR—A MASONRY CEMENT

The Product

Kosmortar is essentially a carefully proportioned mixture of portland cement and hydrated lime. Kosmos Portland Cement is the basic material and a plastic hydrated lime is intimately pulverized with it. This mixture is scientifically blended with a water repellent material.

Kosmortar is made especially for masonry work of all kinds. When mixed with sand and water only, it is ready for immediate use.

Uses

Kosmortar is specified in the place of job-mixed portland cement-lime mortars because of its demonstrated advantages. Kosmortar is used with equal success in mortar for laying masonry units of all types—brick, tile, terra cotta, stone, concrete, and for stucco. It is suitable for load-bearing, foundation, or parapet walls and even free-standing stacks.

To Mix

Kosmortar should be mixed as needed, 1 sack of Kosmortar with 3 cu. ft. of sand with water added for proper consistency. No further additions are required. No slaking or soaking.

Package and Shipments

Each sack of Kosmortar weighs 75 lbs. gross and contains approximately 1 cu. ft.; 4 sacks make a barrel of 300 lbs., which is the unit of sale. 167 barrels is a minimum carload.

Note: Kosmos Products may be shipped in mixed carloads.

Quantity

When mixed with 3 parts of sand, 4 to 6 sacks of Kosmortar (5 sacks on the average) will lay 1000 bricks. The actual quantity depends on the quality of the sand, thickness of the wall, width of the joints, etc.

Plasticity

Any one who sees Kosmortar being used is impressed both by the ease with which the mortar is handled and the excellent results obtained with this exceptionally plastic cement.

Waterproofed

Kosmortar contains an efficient water repellent material. Besides increasing the impermeability of the mortar, this ingredient gives a water-retaining capacity to the mortar so essential when laying porous masonry units. No admixtures are needed on the job.

Strength

Because of its portland cement content, a Kosmortar bond increases in strength with age, becoming stronger than the brick itself. Kosmortar mixed 1:3 develops strength greater than that required by the building code of any city and exceeds requirements adopted by the American Society for Testing Materials (Specification C 91-32T) and by the United States Government (Federal specification SS-C-181a for masonry cements).

Bond

The qualities essential for a strong, tight and durable mortar bond are contained in Kosmortar: (1) Because it is extremely plastic and allows even distribution of mortar and uniform bedding of brick; (2) because its water retaining capacity prolongs the mortar hardening period, thus improving curing and preventing too rapid stiffening of the mortar; thus insuring maximum adhesion and a minimum of volume change resulting in practical elimination of shrinkage cracks; (3) the basic materials have an important influence—portland cement increases strength and durability (weather-resistance); lime increases plasticity, elasticity and watertightness.

Color

Kosmortar is very light gray in its natural state. Colored joints may be obtained by the use of pure mineral pigments. Kosmortar itself will not cause fading or efflorescence. Furthermore, the water repellent material in it tends to prevent efflorescence from any cause.

Uniformity

Kosmortar gives assurance that the mortar will be uniform; it is proportioned at the factory. Mortar cannot be used satisfactorily in an oversanded or excessively wet condition. It is necessary to use the proper amount of Kosmortar.

Below Grade

Kosmortar is a hydraulic, water repellent cement. In masonry below ground the mortar will satisfy the most stringent requirements.

Specifications

(1) All mortar shall consist of Kosmortar (manufactured by the Kosmos Portland Cement Company) and sand.

(2) Use clean, sharp mason's sand, mixed by measure in the proportion of 1 sack of Kosmortar to 3 cu. ft. of sand.

(3) The Kosmortar and sand shall be mixed dry until the mixture is of a uniform color throughout.

(4) Only enough clean water shall be added to make mortar of the proper consistency for the work at hand.

(5) Kosmortar shall be delivered in the original containers and from fresh stock.

(6) Mortar colors, if required, shall be mixed with the mortar in the proportion and manner specified by the color manufacturer.

(7) In freezing temperatures the sand and water shall be heated and the work protected, if necessary, to assure setting of the mortar before the water in it freezes. Masonry units and sand containing any frost shall not be used. In hot weather common brick shall be wetted.

Note: Sand for all mortar shall be well graded and with sharp angular particles, free from vegetable matter, loam (not over 5%), and large pebbles.

Additional Information

On any feature not covered above to your satisfaction, will be gladly sent upon request. We can send you a list of prominent Kosmortar buildings erected since 1922.

LOUISVILLE CEMENT COMPANY
INCORPORATED

GENERAL OFFICES

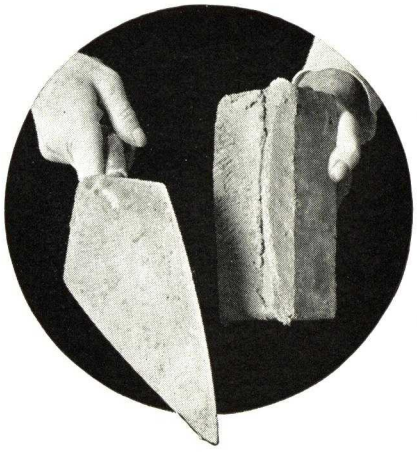
Speed Building, LOUISVILLE, KY.

DISTRICT SALES OFFICES

CHICAGO, ILL., 228 No. La Salle St. DETROIT, MICH., 600 Murphy Building NEW YORK, N. Y., 101 Park Ave.

MILLS: BRIXMENT, N. Y., and SPEED, IND.

BRIXMENT for Masonry



Brixment for Masonry

Brixment is a waterproofed mason's cement that combines the characteristics of portland cement and lime, having both strength and plasticity.

When mixed with sand and water, it makes perfect mortar for any type of brick, tile, or stone masonry and for stucco.

How to Mix

The proper mix is 1 part Brixment and 3 parts sand, measured by volume, with water added for proper consistency. Neither portland cement nor lime is added.

How to Estimate

Brixment is packed in cloth or paper sacks. Each sack contains 1 cu. foot. There are 4 sacks to a barrel.

When mixed with 3 parts of sand, a barrel of Brixment will lay, approximately 800 brick.

Uniformity

The use of Brixment is the architect's assurance that all mortar will be uniform in strength and color and that his specifications will be accurately followed. If oversanded, Brixment mortar works short and, since there is no lime in the mix, the necessary plasticity can be had only by using the proper amount of Brixment.

Strength

Mortar made of 1 part Brixment, 3 parts sand (no lime, no portland) has greater strength than that required for the heaviest load-bearing walls.

Its strength increases with age, becoming greater than that of the brick itself. When tested in piers, it approaches that of straight 3-to-1 portland cement mortar. This makes it suitable for foundation, load-bearing, or parapet walls and even for tall, free-standing stacks.

Plasticity

Any bricklayer will testify to the outstanding plasticity of Brixment mortar. This plasticity assures neat, economical brickwork.

Waterproofed

Brixment is waterproofed *at the factory,* with the most effective waterproofing agent known.

No waterproofing admixtures are necessary on the job.

Bond

Brixment mortar assures a strong, durable bond with the brick: (1) Because it is so plastic that it allows a more complete bedding of the brick; (2) because it hardens slowly enough to permit deeper penetration into the pores of the brick and (3) because it has high water-retaining capacity. This keeps the brick from sucking the water out of the mortar too fast, thus preventing the mortar from congealing and shrinking away from the brick.

No Efflorescence

Brixment is virtually free from the soluble salts which cause efflorescence. Furthermore, the waterproofing in Brixment also tends to prevent salts in the sand and brick from working to the surface.

Mortar Colors

Brixment does not fade mortar colors. It contains none of the strong acids, alkalis or salts so frequently the cause of fading and of efflorescence in other mortars.

The waterproofing combined with Brixment when manufactured is a further protection to the color because it prevents water from penetrating the mortar and leaching out the pigments.

Below Grade

Being a true hydraulic cement, water-repellent and used without lime, Brixment mortar is ideal for walls below grade.

Specifications

(1) All mortar shall be composed of Brixment, manufactured by the Louisville Cement Company, and sand. (2) The mortar shall be mixed by measure in the proportions of 1 part Brixment to 3 parts clean, sharp sand. (3) The Brixment and sand shall be mixed dry until the color of the mass is uniform. Clean water shall then be added to make mortar of the proper consistency for the work to be done. (4) If mortar colors are used, they shall be mixed with the mortar in the proportion and manner specified by the manufacturer of the particular color used. (5) In freezing weather the sand and water shall be heated.

Additional Information

about any of the above points, will be gladly sent you on request. We have available also a list of several thousand Brixment buildings.

MEDUSA PORTLAND CEMENT COMPANY

Manufacturer of Medusa Products

1000 Midland Building, CLEVELAND, OHIO

SALES OFFICES

CHICAGO, ILL., 1530 Builders Bldg.
GRAND RAPIDS, MICH., Grand Rapids Trust Bldg.
MANITOWOC, WIS., 16th and River St.
MINNEAPOLIS, MINN., 803 Pence Bldg.
NEW YORK, N. Y., 1521 New York Central Bldg.
PITTSBURGH, PA., Oliver Bldg.
WASHINGTON, D. C., 817 Woodward Bldg.
YORK, PA., 25 North George St.
TOLEDO, OHIO, 912 Ohio Bldg.

PLANTS

BAY BRIDGE, OHIO
WAMPUM, PA.
TOLEDO, OHIO
MANITOWOC, WIS.
DIXON, ILL.
YORK, PA.
NEWAYGO, MICH.

THE 12 MEDUSA PRODUCTS

MEDUSA GRAY PORTLAND CEMENT.

MEDUSA WATERPROOFED GRAY PORTLAND CEMENT.

MEDUSA "MEDCO" HIGH EARLY STRENGTH CEMENT.

MEDUSA WHITE PORTLAND CEMENT.

MEDUSA WATERPROOFED WHITE PORTLAND CEMENT.

MEDUSA STONESET, the Non-staining Waterproofed Cement.

MEDUSA BRIKSET, the Waterproofed Masonry Cement.

MEDUSA PORTLAND CEMENT PAINT.

MEDUSA FLOOR COATING.

MEDUSA-LITE, the Super Flat Wall Finish.

MEDUSA WATERPROOFING POWDER.

MEDUSA CONCENTRATED WATERPROOFING PASTE.

MEDUSA WHITE PORTLAND CEMENT

Plain and Waterproofed

Medusa Plain White Portland Cement

The MEDUSA PORTLAND CEMENT COMPANY was the first manufacturer to produce for commercial purposes a true white portland cement. The material has been sold and shipped continuously to all parts of the world since 1907.

Quality—MEDUSA WHITE PORTLAND CEMENT is a true portland cement which passes the requirements for portland cement of the United States Government and the American Society for Testing Materials. The only difference between gray portland cement and Medusa White is that the white is *pure white* and non-staining.

Where to Use—It produces a concrete and mortar of the same great strength as regular gray portland cement and should be used in place of gray cement when pure white or colored effects are desired. Many beautiful colored effects can be secured through the use of colored aggregates or pure mineral colors.

Mortar Specifications—For a non-staining mortar for the setting and pargeting of cut stone, we recommend:

1 part Medusa White Portland Cement

3 parts clean sand, crushed white marble or screened limestone chips, graded so that all coarse particles will pass a 1/8-in. screen with no more than 15% passing a No. 60 screen.

With every bag of MEDUSA WHITE PORTLAND CEMENT use 10 lbs. of hydrated lime or one-fifth part by volume of the cement. Properly slaked and aged lime putty may be used instead of hydrated lime.

Swimming Pools—MEDUSA WHITE PORTLAND CEMENT is used for plaster coating the inside of concrete swimming pools on the sidewalls and floors. Also in pouring the entire walls of the tank. Complete specifications will be found in our book *"How to Make Good Waterproofed Concrete,"* A.I.A. File No. 4.

Stucco—Complete specifications for Portland Cement Stucco will be found in our book *"Portland Cement Stucco with Medusa Waterproofed White Portland Cement,"* A.I.A. File No. 21-d-1.

Terrazzo—For complete specifications, see our book "The Beauty of Terrazzo," A.I.A. File No. 22-e-1.

Cast Stone—MEDUSA WHITE PORTLAND CEMENT (Plain or Waterproofed) should be used for facing of cast stone. Complete specifications can be secured from the Cast Stone Institute, Chicago, Ill.

Other Uses—Interior plastering; curbs; white concrete for buildings; sidewalks; steps; art marble; floor tile; runways for airports; highway markers, etc.

Medusa Waterproofed White Portland Cement

This is our regular white portland cement with which MEDUSA WATERPROOFING POWDER is mechanically ground during manufacture, insuring a complete dispersion of the powder and obtaining its maximum waterproofing value. We recommend its use for all work requiring white portland cement.

The use of MEDUSA WATERPROOFED WHITE PORTLAND CEMENT reduces absorption and penetration of water to a negligible degree. In pargeting mortar it will prevent the staining elements in other masonry material from passing into the stone.

The workability is enhanced by the waterproofing content.

Residence Made of Medusa White Portland Cement
ATLEE B. and ROBERT M. AYRES, Architects
JOHN WESTERHOFF, Contractor

MEDUSA PORTLAND CEMENT PAINT

For Concrete, Brick and Masonry

Medusa Portland Cement Paint Covers Exterior of This Home
NAIRNE W. FISHER, Architect JOSEPH SCHELLINGER, Contractor

Description

MEDUSA PORTLAND CEMENT PAINT is a material having as its base MEDUSA WHITE PORTLAND CEMENT specially prepared, with which we have ground chemicals and color pigments of a permanent nature. It contains no oil, glue, lime, casein or other material affected by the chemical action of lime, alkali or water.

Where to Use

MEDUSA PORTLAND CEMENT PAINT is used on concrete, stucco and masonry surfaces including cement block, brick, stone and tile. The presence of dampness in the surface to be painted is an advantage. Unless the surface is damp, it should be wet down before applying the paint. This paint will not bond permanently with non-absorbent surfaces such as enameled brick, vitrified tile, glazed brick or hard burned, non-porous tile. It should not be applied to previously painted masonry without getting special directions. It cannot be applied to lime or gypsum plaster walls or concrete floors except floors of swimming or wading pools. It is widely used for painting interiors of basements, exteriors of concrete, stucco and masonry homes, buildings, smoke stacks, silos, etc.

Swimming Pools

MEDUSA PORTLAND CEMENT PAINT has been extensively used for swimming pools and the success of this work has been demonstrated by the thousands of satisfied customers. Being immune to the effect of water containing the proper amount of chemicals used to keep the pool sanitary, presenting a surface readily cleaned by scrubbing, containing no adulterant that could become the breeding place for germs, this paint is a most satisfactory product for use in swimming pools.

Packages

Shipped in 5-lb., 10 and 50-lb. metal cans and 350-lb. barrels.

Full directions for application will be found in each container.

Covering Capacity

For ordinary smooth masonry surfaces the covering capacity will range from 200 to 350 sq. ft. per 10 lbs. of paint for one coat. Before applying paint to cinder and Haydite blocks, give a wash coat of neat cement.

Colors

See opposite page for colors of MEDUSA PORTLAND CEMENT PAINT.

MEDUSA-LITE, THE SUPER FLAT WALL FINISH

One Coat, Quick Drying, Economical

MEDUSA-LITE is a casein paint in paste form that gives a truly durable, economical, flat finish painted surface. It can be successfully used on interior walls and ceilings of plaster, brick, concrete, tile, stone, wood, wallboard, insulating board, metal, canvas, etc.

Where to Use

MEDUSA-LITE is used on interior walls and ceilings of residences, stores, theaters, hotels, apartments, hospitals, office and industrial buildings. Owing to its quick drying qualities and the fact that there are no lingering, disagreeable odors, interiors can be painted and ready for occupancy within a few hours. Hotel and apartment owners find this paint ideal because it enables tenants to move in on time. This paint can be used on fresh plaster or concrete without waiting for it to dry. WHITE MEDUSA-LITE is widely used for industrial interiors because of its economy in first cost and application, and because it is unaffected by light, heat, fumes and chemicals.

Advantages

MEDUSA-LITE dries to a permanent, colorful finish and is limeproof. Colors are intermixable, non-fading and are unaffected by light, heat or fumes. White has a 90% and greater reflective value and does not turn yellow.

MEDUSA-LITE is economical because one coat covers. There are no expensive thinners to buy. Fifty per cent more surface can be painted than with ordinary paints in the same time. It never flakes or checks and stays clean longer. MEDUSA-LITE will not powder, peel or crack. Surface requires no sizing or previous treatment either on old or new walls. It dries to the touch in forty minutes and does not have any disagreeable odors. It is non-inflammable and is unaffected by acid fumes and most chemicals.

Packages

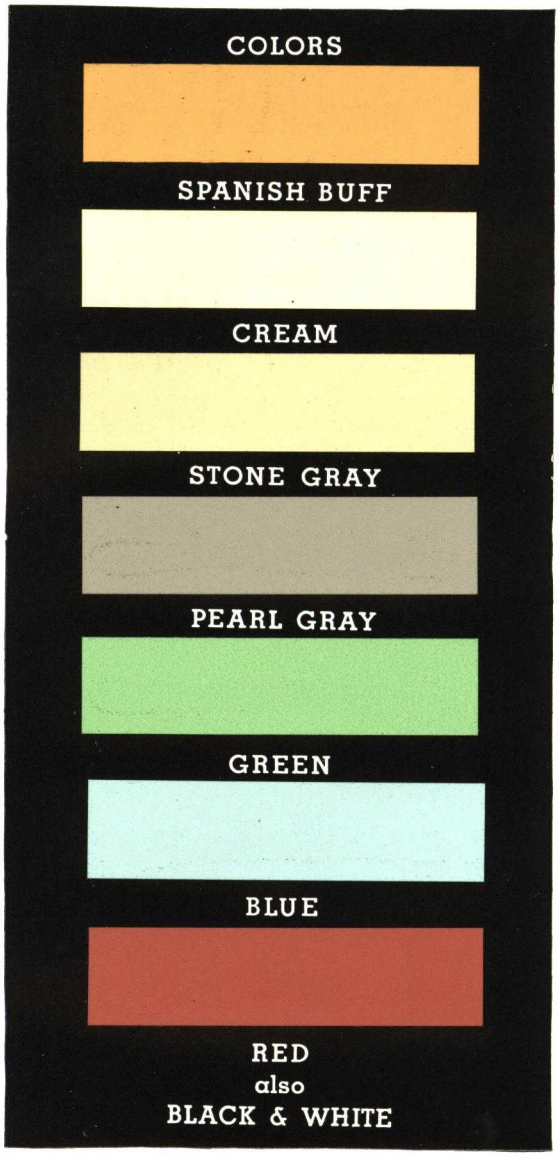
MEDUSA-LITE comes in ¼, 1 and 5-gal. cans.

Colors

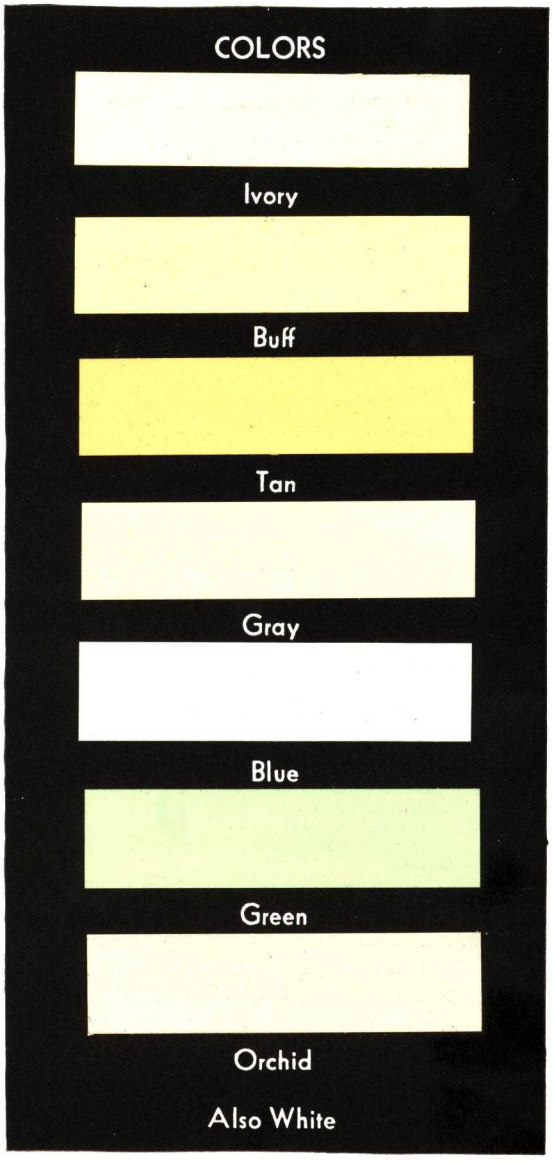
See opposite page for MEDUSA-LITE colors.

Recreation Room Painted with Medusa-Lite, the Super Flat Wall Finish

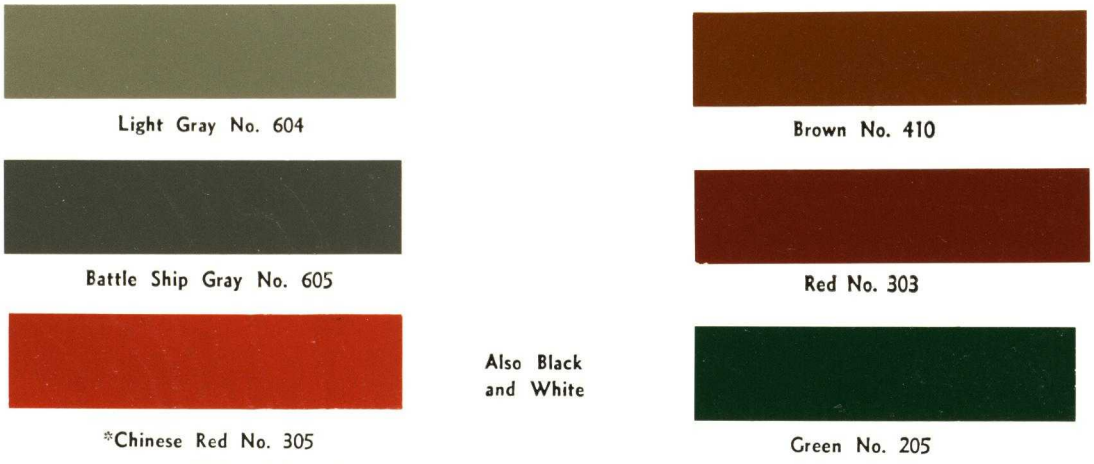
MEDUSA PORTLAND CEMENT PAINT



MEDUSA-LITE FLAT WALL FINISH



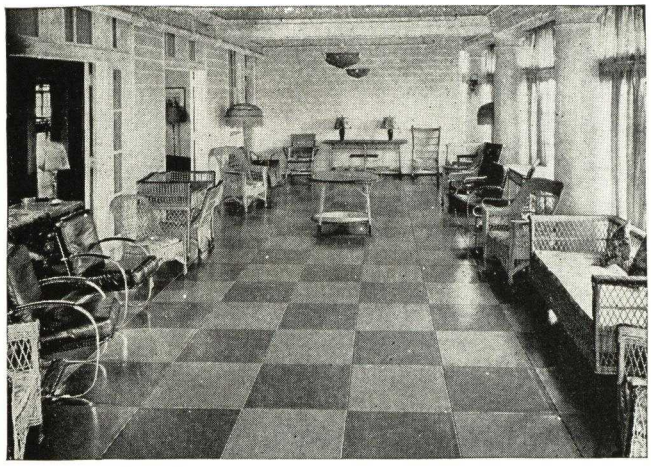
MEDUSA FLOOR COATING—IN THESE COLORS



*When Red or Chinese Red is used, follow with an application of emulsified or paste wax (not liquid) three weeks after final coat. Rewax as necessary.

MEDUSA FLOOR COATING

For Concrete Floors



Medusa Floor Coating Beautifies This Porch in a Country Club

Description

MEDUSA FLOOR COATING overcomes the difficulties usually encountered in painting concrete floors. It makes a colorful finish that is absolutely moistureproof, eliminating surface dusting. The paint is made with a vehicle that is unaffected by alkalies or lime in cement. These alkalies saponify the oils in ordinary coatings and break down the paint film so that the paint comes off in patches, necessitating costly refinishing. MEDUSA FLOOR COATING has an extreme hardness and resists not only ordinary wear, but also the grinding action of dust and dirt.

Where to Use

MEDUSA FLOOR COATING can be used on any porous concrete floor into which water can be absorbed quickly. It is highly recommended for use in auto display rooms, corridors, washrooms and in manufacturing plants where clean, painted concrete floors are essential. This paint eliminates surface dusting. For floors below grade, MEDUSA FLOOR COATING should be applied, if possible, when the heating system is in use, otherwise positive ventilation should be afforded by the use of an electric fan placed on the floor. MEDUSA FLOOR COATING, under ideal conditions, is ready for service in 24 hours after the first coat is applied. Where service is to be severe, wait two or three days.

Colors

MEDUSA FLOOR COATING is furnished in the six colors shown on the preceding page and black and white. These colors are permanent and resist alkaline cleaning or washing compounds.

Packages

Shipped in containers of 1 qt., 1 gal., 5 gal. and 55-gal. drums.

Covering Capacity

On the average troweled floor, the covering capacity for the second or third coats is about 600 sq. ft. per gallon.

MEDUSA STONESET CEMENT

A Non-staining, Waterproofed, Mortar Cement

What It Is

MEDUSA STONESET CEMENT is a non-staining mortar cement which has been waterproofed by the addition of the proper amount of MEDUSA WATERPROOFING mechanically ground in at the mill during the process of manufacture.

It is manufactured from the same raw materials as MEDUSA NON-STAINING WATERPROOFED WHITE PORTLAND CEMENT. These raw materials are free from the elements which cause staining, and waterproofness is assured.

MEDUSA STONESET CEMENT has minimum shrinkage, smooth workability and great plasticity which is so necessary in stone setting mortar.

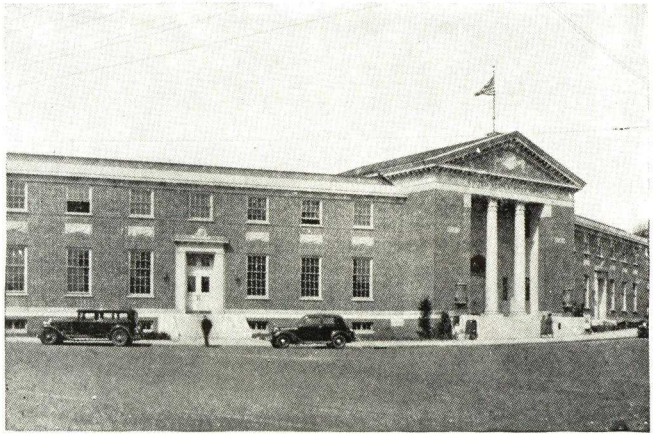
Where to Use

MEDUSA STONESET CEMENT is to be used in mortar for setting, pargeting, and pointing of cut stone, and for laying up face brick. Its low cost also permits its use for mortar in the backup wall as well as for the exterior wall.

The use of one mortar throughout the wall has many advantages from the standpoint of economy and convenience. The use of non-staining, waterproofed mortar throughout the wall provides additional assurance against staining and efflorescence.

We do not recommend MEDUSA STONESET CEMENT for any other use except masonry mortar. MEDUSA PORTLAND CEMENTS, White and Gray (Plain or Waterproofed), should be used for other purposes.

Because of its white color and great plasticity MEDUSA STONESET CEMENT is ideal for laying up face brick. It can be easily tinted to the desired shade.



United States Post Office, Pawtucket, R. I.
JAMES A. WETMORE, Supervising Architect
EDWARD S. MOORE & SON, Contractor
Medusa Stoneset used

Non-staining

A non-staining cement means a cement that will not stain the stone with which it comes in contact. Long and exhaustive tests have proved that MEDUSA STONESET CEMENT is non-staining.

Waterproofed

Authorities agree that it is absolutely necessary that all non-staining mortars be waterproofed to prevent the staining elements in other materials in backup masonry from passing into the stone.

The fact that MEDUSA WATERPROOFING is mechanically ground into MEDUSA STONESET CEMENT during the process of manufacture is assurance that the cement is absolutely waterproofed.

Workability

MEDUSA STONESET CEMENT produces a mortar of great workability and plasticity. Stone setters will find the workability and plasticity of MEDUSA STONESET CEMENT to be of particular advantage in the placing of stone. Its easy spreading qualities make it especially adaptable for pargeting and for use in mortar for the backup wall.

Color

The color of MEDUSA STONESET CEMENT is white, which harmonizes well with all shades of limestone, granite, marble, etc.

Specifications for Mixing

MEDUSA STONESET CEMENT is to be mixed in approximate proportions of 1 part of MEDUSA STONESET CEMENT to 3 parts of sand, by volume. The sand should be well graded, clean, and free from organic matter. To facilitate hand mixing, the sand should be dampened before MEDUSA STONESET CEMENT is added.

No Admixtures Are Necessary

When using MEDUSA STONESET CEMENT no admixtures are necessary to secure waterproofness or plasticity. This fact is extremely important to the architect, contractor and owner.

The contractor is saved the expense and labor of adding admixtures and the architect is assured that the proper amount of waterproofing has been added.

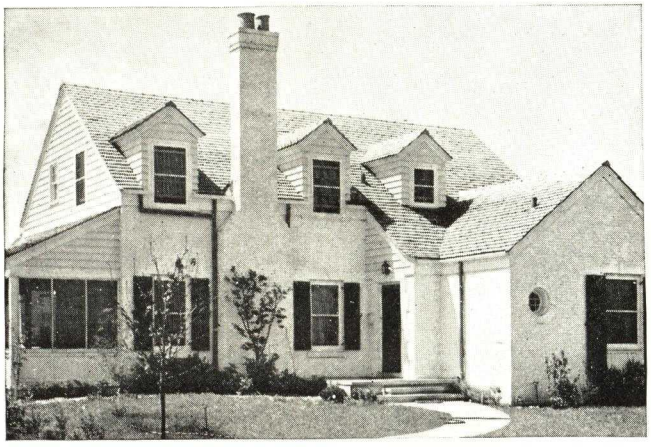
Setting Time

The setting time of MEDUSA STONESET CEMENT is approximately:

Initial—3 hours 40 minutes. *Final*—7 hours 15 minutes

MEDUSA BRIKSET—MASONRY CEMENT

Waterproofed



Medusa Brikset, the Waterproofed Masonry Cement, Used in Building This Home

L. COSBY BERNARD, Architect
H. B. OLNEY, Contractor

A waterproofed masonry cement with a portland cement base for lay-up brick, concrete units, tile and other masonry units. This cement has minimum shrinkage. MEDUSA BRIKSET provides the essentials of a good masonry mortar—workability, plasticity, waterproofness, strength and durability. Great plasticity and workability are obtained without the addition of lime. Its color is a striking advantage when used with or without mortar colors.

Saves Time

MEDUSA BRIKSET spreads easily and smoothly and permits joints to be struck cleanly and rapidly, eliminating waste from dropping. This feature, coupled with the fact that no hydrated lime is required, effects a considerable saving. It has an *initial* set of approximately 4 to 4½ hours and a *final* set of approximately 6 to 8 hours.

Directions for Use

Mix 1 part of BRIKSET with 3 parts of clean, well-graded masons' sand, and add enough water for the desired consistency.

Four sacks of BRIKSET (66 lbs. gross, each) mixed with sand in 1:3 proportions will make ½ cu. yd. of mortar.

TENSILE AND COMPRESSIVE STRENGTH

1 part Medusa BrikseT, 3 parts standard sand

Days	Pounds per square inch	
	Tensile	Compressive
3	128	633
7	197	1371
28	267	1795

Note: Medusa BRIKSET conforms to the United States Government Master Specifications SS-C-181 covering requirements of a masonry cement, which provides for a compressive strength of not less than 175 lbs. per sq. in. at the age of 7 days, for a 1:3 mortar.

MEDUSA WATERPROOFING FOR CONCRETE AND MORTAR

Powder and Concentrated Paste

Description

All concrete and mortar below grade or exposed to the elements should be waterproofed to give insurance against wet and damp walls and floors, to retard disintegration due to the freezing and thawing of absorbed moisture—and ground acids.

Authorities on waterproofing agree that the most effective way to prevent water absorption in concrete and mortar is to incorporate a water repellent material which breaks down capillary attraction on the surface. This method is most economical and assures the user that the entire mass of concrete or mortar is thoroughly and permanently waterproofed.

MEDUSA WATERPROOFING (Powder or Paste) is the original water repellent waterproofing for concrete and mortar. It has been used for more than 30 years under severe water conditions and always gives satisfaction. It contains a large percentage of stearate. Stearate is recognized as the best waterproofing agent known.

Directions for Use

Powder—Use two lbs. of MEDUSA WATERPROOFING POWDER to each sack of portland cement used. MEDUSA WATERPROOFING POWDER is added dry to the cement and aggregate. Mix dry with cement alone where hand mixing is employed.

Concentrated Paste—One gallon of MEDUSA CONCENTRATED PASTE weighs eight lbs.—enough to properly waterproof thirteen sacks of cement. We recommend 1 gal. (8 lbs.) of Concentrated Paste be dissolved in 12 gal. of water at 60° F. or above. Add 1 gal. of this waterproofing paste solution for each sack of cement when mixing the concrete or mortar.

The same waterproofing results are obtained with either Powder or Paste.

The use of MEDUSA WATERPROOFING is recommended only in territories where MEDUSA WATERPROOFED GRAY PORTLAND CEMENT or MEDUSA WATERPROOFED WHITE PORTLAND CEMENT is not obtainable. MEDUSA WATERPROOFED CEMENTS—Gray and White—are our regular portland cements with which the correct amount of MEDUSA WATERPROOFING is mechanically ground during the process of manufacture, insuring a complete dispersion and obtaining the maximum waterproofing value.

The use of MEDUSA WATERPROOFED CEMENTS eliminates the use of admixtures on the job and the expense of supervision to insure that the correct amount of waterproofing has been added.

Specific Uses

MEDUSA WATERPROOFING should be used in all concrete and mortar below grade when exposed to the elements or moisture. A few specific uses are:

Mortar	Cast Stone	Storage Silos
Swimming Pools	Concrete Products	Tunnels
Basement Walls	Shower Baths	Subways
Basement Floors	Terrazzo	Dairy Barns
Retaining Walls	Stucco	Dairy Plants
Plaster Coats	Elevator Pits	Burial Vaults

Waterproofed Mortar

The use of MEDUSA WATERPROOFING in portland cement mortar will tend to prevent the subsequent discoloration and unsightly appearance of brickwork caused by efflorescence which may be attributed to the mortar.

The use of MEDUSA WATERPROOFED MORTAR prevents the absorption of moisture through the joints. Unless the mortar is waterproofed, it is possible that such a quantity of water will be absorbed as to cause considerable inconvenience and damage.

MEDUSA WATERPROOFED CEMENTS and WATERPROOFING POWDER or CONCENTRATED PASTE have proved successful for 30 years.

Packages

MEDUSA WATERPROOFING POWDER is shipped in 40-lb. paper bags. MEDUSA CONCENTRATED WATERPROOFING PASTE is shipped in 8-lb. (1 gal.) cans; 40-lb. (5-gal.) cans and 225 and 400-lb. steel drums.

Literature

Our books "How to Make Good Waterproofed Concrete," A.I.A. File No. 4, containing full specifications and "Medusa Waterproofing for Concrete and Mortar" will be mailed free upon request.

NEW ENGLAND LIME COMPANY

Producers of High Calcium and Dolomitic Limes

ADAMS, MASSACHUSETTS

NEW YORK OFFICE: 52 Vanderbilt Avenue

PLANTS: ADAMS, MASS. and CANAAN, CONN.

Products

GRANULAR FINISHING LIME (Adams).
SNOWITE PULVERIZED FINISHING LIME (Adams).
WATERPROOF QUICK LIME (Granular or Pulverized), (Adams).
GRANULATED MASONRY LIME (Adams).
ADAMS MASONS' HYDRATED LIME (Adams).
FIRST QUALITY LUMP LIME (Canaan).
PULVO—All Purpose Pulverized Lime (Canaan).
NELCO FINISHING HYDRATED LIME (Canaan).
CANAAN MASONS' HYDRATED LIME (Canaan).
NELCO PLASTIC PAINT.

The NEW ENGLAND LIME COMPANY produces both high calcium and dolomitic limes. All products produced at Adams are high calcium and all those at Cannan are dolomitic.

All lime produced is manufactured from a crystalline limestone or marble. A lime produced from crystalline stone is usually faster slaking and tends to yield more putty than that produced from a non-crystalline stone. High putty yield is in turn accompanied by fine particle size (as indicated by microscopic study) and also by high plasticity. This is of great importance both in laying brick and in plastering.

Today there are many brick buildings over fifty years old, and still standing in good condition, in which the brickwork was laid up with straight lime-sand mortar, the lime being supplied from plants now owned by the NEW ENGLAND LIME COMPANY.

Function of Lime in Building

The function of lime in the building industry is primarily that of an adhesive. Lime does not set without drying as do such materials as portland cement or gypsum. Lime and water form a semi-colloidal paste which adheres and bonds upon drying in a somewhat similar manner to starch paste or glue. There is, then, a secondary further hardening over a long period of time through the absorption by the lime of carbon dioxide in the air, forming calcium carbonate.

Lime is the only non-setting adhesive—obtainable at a cost making it available for brick mortar—which combines the properties of plasticity and bonding with the surface of brick or stone and which, on continuous wetting and drying, becomes progressively harder and stronger.

How Lime Avoids the Causes of Leaky Masonry

Leaky masonry is nearly always due to cracks, often of minute size, between brick and mortar. Such a crack may be due to lack of original bond or it may be due to the breaking of the bond which was originally formed.

Lack of original bond may be due to:

(1) Lack of contact between brick and mortar—due to poor workability as a mortar, poor workmanship, or both.

(2) Too rapid removal of water from the mortar by highly porous brick.

(3) The formation of a film of water between the brick and the mortar—owing to insufficient porosity of the brick and separation of the water from the mortar.

A high lime content mortar protects against these failures:

(1) It gives workability to the mortar; this helps the brick mason in filling the joints.

(2) Its tendency to retain water against suction is a safeguard with a porous brick.

(3) This same tendency to retain water helps to prevent separation of a film of water between mortar and a brick of too low porosity.

In this connection it should be stated that bricks of extreme porosity or bricks of practically no porosity, are unwise to use with any mortar.

To obtain the maximum benefits of lime for above purposes it is of great importance that the lime used has high plasticity.

Holds the Bond During Expansion and Contraction

Breaking of the bond after the hardening of the mortar is usually caused by too great a difference in expansion and contraction on wetting and drying between the mortar and the brick. Here again a straight lime mortar or a high lime content mortar comes nearer to the same volume change, with respect to brick, on wetting and drying, than any other standard mortar.

Recommended for Masonry Mortar

Granulated Masonry Lime (Adams).
Pulverized Masonry Lime (Adams).
Waterproof Masonry Lime (Adams).
Pulvo Lime (Canaan).
First Quality Lump Lime (Canaan).
Nelco Masons' Hydrate (Canaan).
Proportions from 1 cement—1½ lime—5 sand to 1 cement—2 lime—7 sand.

Recommended for Plastering

Scratch and Brown—Pulvo Lime (Canaan), Nelco Masons' Hydrate (Canaan).
Scratch—1 lime—2 sand—¾ bushel hair.
Brown—1 lime—3½ sand—⅜ bushel hair.
Finish—Granular Finishing Lime (Adams), Snowite, Pulverized Finishing Lime (Adams), Nelco Finishing Hydrate (Canaan).

Recommended for Concrete Work

50 lbs. Canaan Masons' Hydrate on 1 cu. ft. of quicklime putty per cu. yd. of concrete will increase the density and water tightness of the concrete.

Note—All of the above Limes correctly slaked and soaked to a putty will show a plasticity on the Emley plasticimeter of over 500. When correctly slaked or soaked the putties are sound under the Autoclave test.

Manufacturing Control and Research

Each of the Company's plants has a well equipped control laboratory and uniformity of product is absolutely insured.

In addition, the company maintains a well equipped research laboratory for the study and improvement of manufacturing methods, for the improvement of its products and for the development of new fields for their use.

NORTH AMERICAN CEMENT CORPORATION

285 Madison Avenue, NEW YORK, N. Y.

SALES OFFICES

ALBANY, N. Y. BOSTON, MASS. NEW YORK, N. Y. BALTIMORE, MD. WASHINGTON, D. C.

PLANTS

CATSKILL, N. Y. HOWES CAVE, N. Y. SECURITY, MD. MARTINSBURG, W. VA.

A Combination of Two Standard Products

BLUE BOND Mortar Cement is an accurately controlled mixture of NORTH AMERICAN Portland Cement and BERKELEY Hydrated Lime ground together with a waterproofing ingredient. Special processing methods and consistent testing and control contribute towards making BLUE BOND uniform in quality and color—the ideal bonding material for masonry construction.

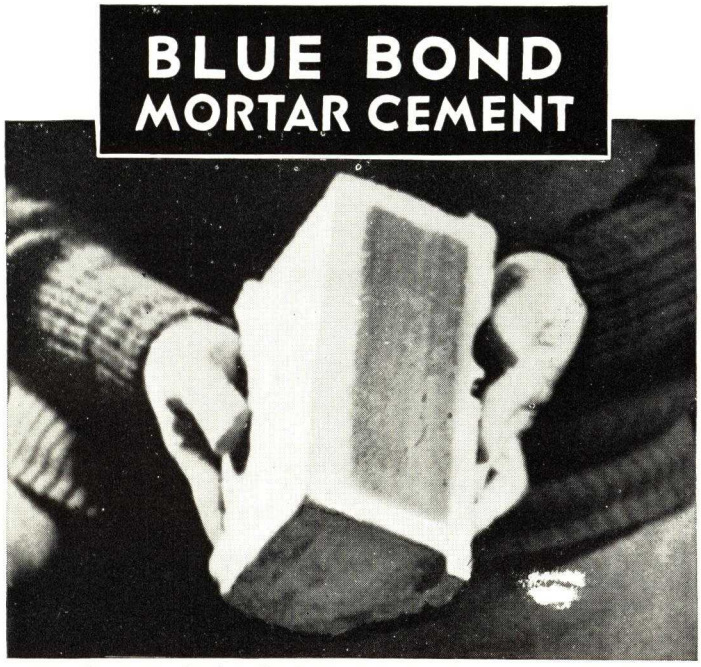
Exceeds All Specifications

BLUE BOND Mortar Cement passes Federal Specification SS-C-181a for masonry cement and meets the requirements of specifications of the American Society for Testing Materials.

Directions for Use

Mix one part BLUE BOND Mortar Cement by volume with three parts of clean, well graded sand by volume, adding sufficient water to secure the desired consistency.

The proportion of sand to cement is subject to variation depending on the quality of the sand used. The use of damp sand will decrease the time required for mixing.



Blue Bond—the Perfect Bond—Brick broken from a test wall, with surrounding brick chipped away showing mortar and brick forming an integrally bonded unit without cleavage or shrinkage—evidence that Blue Bond Mortar Cement in the hands of a skilled mason gives durable, watertight construction.

Moisture-proof Package

BLUE BOND Mortar Cement is packed in a strong, multiwall, moisture-proof paper bag, each bag containing 1 cu. ft. of material. The type of container used insures the cement storing well at job site or in dealer's warehouse.

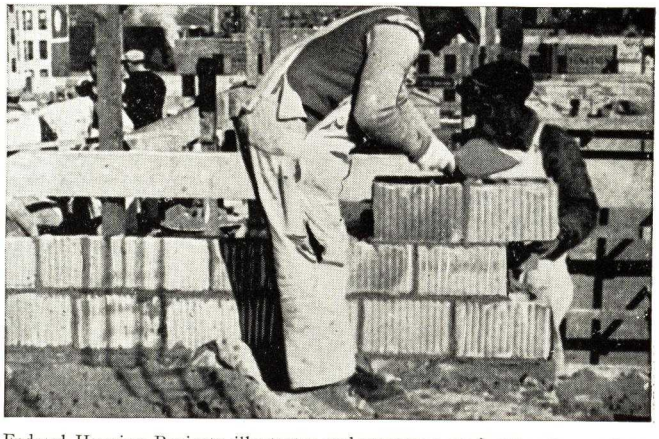
Physical Tests

In physical tests, BLUE BOND mixed in the proportion of one part to three parts of Standard Ottawa sand by weight, and having a mortar flow of 100 to 115, shows the following results:

Compressive Strength—In pounds per square inch: 7 days, 1400; 28 days, 1800.

Advantages of Blue Bond

Besides absolute uniformity, BLUE BOND has many other qualities that appeal to the mason, masonry contractor, architect and owner. The man with the trowel likes BLUE BOND because plastic qualities make his work easy. The contractor likes it because he can speed up his job and keep cost down. Architect, builder and owner like the water repellent feature of BLUE BOND—it insures watertight walls and reduces efflorescence. Because it is light in color, BLUE BOND Mortar Cement makes an excellent base for use with pigment coloring, uniform shades of mortar being readily obtained.



Illustrations are taken from our sound motion picture "BLUE BOND FOR MASONRY" which is available for showing to architects, engineers and builders upon request. The film features use of BLUE BOND on one of the major Federal Housing Projects, illustrates and compares good and poor construction methods, and shows how constant control over every step in the manufacture of BLUE BOND contributes toward its working qualities on the job.

Send for booklet "Blue Bond for Masonry" which gives more detailed information on product and picture.

North American Products for Construction Use

NORTH AMERICAN Portland Cement
BLUE STREAK High Early Strength Portland Cement
BLUE BOND Mortar Cement
Crushed Stone
BERKELEY Lump Lime
BERKELEY Pebble Lime
BERKELEY Masons Hydrated Lime

16T

A Few Representative Blue Bond Jobs

U. S. Department of Interior Building, Washington, D. C.
James F. Bundy School, Washington, D. C.
Land Ventilation Building (Port of New York Authority), New York, N. Y.
Federal Housing Project, Macombs Place and 153rd St., New York, N. Y.
Approaches, Lincoln Tunnel, 38th St., New York, N. Y.
Regional Market Buildings, Syracuse, N. Y.
U. S. Post Office, Arlington, Mass.
City Incinerator, Rochester, N. Y.

RIVERTON LIME & STONE COMPANY, INC.

MAIN OFFICE, QUARRIES AND KILNS
RIVERTON, VIRGINIA

FLAMINGO *HYDRAULIC* LIME PRODUCTS

"Flamingo" is the trade name applied to the easy-working, waterproofing and quick hardening *hydraulic* lime (which will set and harden even under water) produced by the Riverton Lime & Stone Company, Inc., at Riverton, Virginia.

Flamingo is manufactured by direct process from the *hydraulic* limestone from their own quarries, and their processes are protected by patent.

Sixty-six years' experience in burning lime and over twenty years' research and investigation stand behind the manufacturers of Flamingo Products and their guarantee. They have been operating their quarries and kilns at Riverton continuously since 1871.

Hydraulic Lime is not a new product. It has been, and is being used as a masonry cement in all types of buildings in England and European countries. Buildings erected hundreds of years ago with *hydraulic* lime mortar demonstrate its permanence, its waterproofing qualities and its ability to resist the ravages of time.

There are three products, Flamingo for Concrete, Fibered Flamingo for Stucco, and Waterproofed Flamingo for Masonry Mortar.

Flamingo for Concrete

Makes concrete more dense, workable, mobile and uniform and gives marked increase in strength. It reduces shrinkage and cracking, and is more resistant to weathering.

For watertight concrete add 11 lbs. of Flamingo for Concrete per bag of portland cement in a 1:2:4 mix (with a minimum of 5½ bags portland cement per cu. yd.) and take usual precautions regarding water used, thorough spading, etc.

Flamingo for Stucco

The latest development for modern stucco, as used on the Model Home of America at Atlantic City, N. J. It is plastic, permanent, economical and waterproofed.

For scratch coat on metal lath use 2 cu. ft. of sand to each bag of Fibered Flamingo. For all other coats, use 3 cu. ft. of sand to each bag of Waterproofed Flamingo for Masonry Mortar.

WATERPROOFED FLAMINGO FOR MASONRY MORTAR

Flamingo will meet all the U. S. Government "Master Specifications for Masonry Cement." Number 443, Circular, Bureau of Standards Number 321, and all amendments and replacements, including "Federal Specifications for Masonry Cement" SS-C-181 and SS-C-181a.

Prevents Leaky Walls and Dampness

The use of Flamingo does away with water seepage through the mortar joints, and puts an end to dampness on the inside walls. Modern research has demonstrated that, assuming good workmanship, leaky walls are due either to lack of proper bond or to cracks or fissures in the mortar itself, sometimes left when brick is laid in harsh, stiff working mortar, and often due to the expansion and contraction of the cementing material used in the mortar, after it has set. Flamingo is ground and milled so fine, and the mortar is so plastic and spreads so smoothly, that it sinks into the pores and adheres everywhere to the surface of the brick and fills every crevice in the joint, thus making so perfect a bond that water seepage between the brick and the mortar is wholly eliminated. *Furthermore (due to its composition), Flamingo is not subject to the extremes of contraction and expansion after it has set which often result in cracks and fissures found in many mortars.* Flamingo for Masonry Mortar contains a carefully proportioned amount of a standard waterproofing, which is ground in and further improves its waterproofing qualities. Flamingo mortar is watertight, and is for use below as well as above grade.

Strength

Flamingo mortar meets not only the standard building code strength requirements for the heaviest load-bearing walls, but those prescribed by the Bureau of Standards and the United States Government for the masonry cement used in Government buildings.

Flamingo mortar takes its initial set in from 2½ to 3½ hours, and its final set in from 6 to 8 hours, and progressively increases in strength until it is as hard as the brick itself.

Uniformity of Strength and Color

The color of Flamingo mortar is notably and consistently light and uniform. The architect and builder may be sure that uniformly sanded Flamingo mortar will be uniform in both strength and color at all times, and under all conditions. The natural color of Flamingo mortar approximates that of straight lime mortar, modified and softened by the light cream tint of the neat Flamingo. Standard mineral mortar colors may be used if guaranteed by the manufacturers for use with cement and lime mortar, and added to the mortar as directed by the manufacturers. We are prepared to do this at the plant to your order.

Clean Joints and Perfect Bed

Because Flamingo strikes up "neat and slick" it gives a clean, firm, and neat joint. It is of a buttery consistency, and spreads so smoothly that perfect bedding is insured. It slides freely and works its way into all the crevices that cannot be reached with a trowel. Its notable fatness keeps the mass plastic during the process of laying the masonry unit.

Efflorescence

Numerous tests in laboratory and field have definitely proved that Flamingo *will not cause efflorescence,* and because of its waterproofing qualities it greatly reduces the tendency of efflorescence even in those brick high in soluble salts.

Mixing

The standard mix is 1 Flamingo to 3 sand, by volume; or 1 bag Flamingo to 3 cu. ft. of sand. Mix the sand and Flamingo thoroughly, add water and complete the mixing. The mortar is ready for use immediately.

How Packed

Flamingo is put up in 62½-lb., multiwall paper bags, containing 1 cu. ft. (plus) of material. Four bags to the barrel of 4 cu. ft. (plus) weighing 250 lb.

Where Obtainable

Flamingo can be procured from the Riverton Lime & Stone Company, Inc., Riverton, Virginia, through Building Material dealers, either from their stock, or on special order. If unable to secure through your dealer, write us; or wire us collect if in immediate need.

Typical Flamingo Jobs

Flamingo is approved and has been used on projects of the U. S. Treasury, Veterans' Bureau, War Department, Department of the Interior, etc. Large numbers of schools, hospitals and private buildings prove the high quality of Waterproofed Flamingo for Masonry Mortar.

Lists of projects on which Flamingo has been used, with the names of the architects and builders, will gladly be furnished.

SUPERIOR CEMENT CORPORATION

PORTSMOUTH, OHIO

SUPERIOR CEMENTS

Superior Portland Cement; Superior Waterproofed Portland Cement; Superior Colored Portland Cement; Wifco Mortar Cement Plain; Colored Wifco Mortar Cement; Tri-cal High Early Strength Portland Cement.

Superior Portland Cement

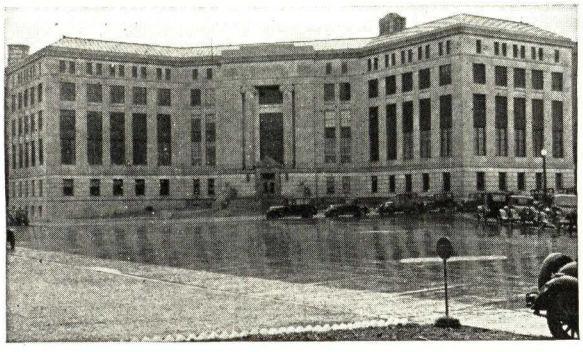
A high quality product meeting all standard specifications and having many years of successful use as a basis for its general acceptance for all kinds of work. It is recognized by the building industry as an outstanding material because of its exceptionally high strength, uniformity and plasticity—these items contributing to better and easier handled concrete.

Superior Low Heat Portland Cement

A cement developed to meet the U. S. Government specifications for low heat cement for use in heavy concrete masonry work, has been used on several major projects and been very successful.

Superior Waterproofed Portland Cement

Another successful Superior product embodying the same high qualities as regular Superior Portland Cement, and adapting itself to those uses demanding this type of material.



Wifco Mortar Cement Used on Central Police Station, Columbus, Ohio

Allied Architects Association of Columbus, Architects
Boyajohn & Barr, Inc., General Contractors

Wifco Mortar Cement

Wifco which is waterproofed and non-staining, has all the valuable strength characteristics of portland cement together with the plasticity demanded by the mason. It is ground to uniform fineness and produces uniformly high strength. Due to this combination of high strength and excellent plasticity, Wifco may be selected with confidence for load-bearing walls. It has been in successful use for over ten years and has established a reputation for excellence throughout the building field.

Wifco Mortar Cement is a quality product in every respect and its economy will be reflected not only in the cost of the material itself, but in the excellent workability which it produces, insuring better workmanship and lower labor costs.

Wifco Specifications and Tests

Economy—Repeated tests indicate that 800 to 1000 bricks are laid with the mortar from four sacks of Wifco.

Compression Strength—Strength in pounds per square inch based on a 1:3 mix by weight, using standard sand; 7 days 883 lbs., 28 days—1870 lbs.

Setting Time—*Initial Set:* 3 hours, 30 minutes. *Final Set:* 10 hours, 5 minutes.

Fineness—93% passing 200-mesh screen.

Non-staining—Wifco is classified as a non-staining cement, for all general uses.

Waterproofed—Keeps water from entering the joint; thus makes for durability and dry wall construction.

Packages—Wifco is packed in multiwall paper bags, holding 74 lbs. net weight—approximately 1 cu. ft.

Specifications—Mix one part of Wifco Mortar Cement with three parts (by volume) of clean, well graded mortar sand which is free of any organic material. Add sufficient water for proper consistency.

BEAUTY AND DURABILITY WITH COLOR

Concrete made with Superior Colored Portland Cement gives new charm to pools, walks, drives, terraces, steps and other home and business improvements by adding beauty to permanent construction. Colored Wifco Mortar Cement enables a distinctive touch to be given to masonry work, making each job individual, and combines beauty with proven Wifco durability.

Superior Colored Portland Cement—Produced in our own mill. The highest quality mineral oxides obtainable are thoroughly ground into the cement under laboratory supervision in uniform quantities so that the resulting color may be reproduced at any time, and that the concrete made from it will be permanently strong as well as beautiful. It is regularly made in the following colors: Red, Blue, Green, Black, Yellow, Brown.

Colored Wifco Mortar Cement—Also manufactured under close laboratory control. Carefully measured quantities of standard mortar colors completely ground into Wifco Mortar Cement, and the entire process of manufacture, enables duplication of results at future times, and prevents loss of strength—assuring durable construction and lasting color. It is regularly made in the following colors: Red, Black, Chocolate Brown, Buff, Light Buff, Green.

Tri-Cal High Early Strength Portland Cement

Tri-Cal, a rapid hardening portland cement, conforming to the tentative specifications for High Early Strength Portland Cement (C74-30T) is manufactured under the most careful and scientific control to insure absolute uniformity. It is a true portland cement containing no admixture or adulteration. It is ground to a high degree of fineness and produces dense impermeable concrete of exceptionally high strength at the early ages and better concrete at all ages. It has a high content of tri-calcium silicate which is the influencing factor in its rapid hardening characteristics.

TYPICAL PHYSICAL ANALYSIS

Initial Set Hrs.	*Final Set Hrs.*	*Fineness Passing 200 M*
1:45	3.25	98.

Tensile Strength

(Lbs. per Sq. In.—1:3 Sand Mortar Briquettes)

1-Day	*3-Day*	*7-Day*	*28-Day*
315	413	489	550

Concrete

	Approx. Field Mix	*Cement Sacks Cu. Yd.*	*Water Gals. per Sack*	
Real Mix				*Slump*
1:4.3	1:2¼:2¾	5.3	6	3 in.

Compressive Strength

(Lbs. per Sq. In.—6x12-in. Cylinders)

1-Day	*3-Day*	*7-Day*	*28-Day*
2008	3320	4597	4910

UNITED STATES GYPSUM COMPANY

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see File Index for USG Catalog on Roof, Floor and Partition Products

MASON'S LIME

Use

As a mortar for setting brick, stone, etc., and for mixing with Portland cement, concrete, and stucco.

Brands

Mason's Hydrate—

Red Top* Mason's Hydrate (High Calcium and Dolomitic)
Snowdrift* Mason's Hydrate (High Calcium)
Marble Rock Mason's Hydrate (High Calcium)

Mason's Quicklime—

USG* Superfine Mason's Quicklime (High Calcium)
USG Pulverized Mason's Quicklime (High Calcium and Dolomitic)
USG Fine Grain Mason's Quicklime (High Calcium)
USG Pebble Mason's Quicklime (Dolomitic)
USG Crushed Mason's Quicklime (Dolomitic)
Peerless* Pulverized Mason's Quicklime (High Calcium)
Peerless Crushed Mason's Quicklime (High Calcium)
Marble Rock Pulverized Mason's Quicklime (High Calcium)
Marble Rock Pebble Quicklime (High Calcium)
USG Lump Lime (High Calcium and Dolomitic)

Description

The advantages of lime mortar for use in brick, tile, or stone masonry are economy, strength, plasticity, and waterproofing. Either a high calcium or dolomitic lime can be used for masonry.

USG Mason's Hydrated Limes are scientifically slaked by the manufacturer and are ready for mixing and use after soaking.

USG Mason's Quicklimes are thoroughly burned from carefully selected rock and produce a mortar with high plasticity and excellent workability with high sand carrying capacity.

Quicklime must be slaked and aged before using in mortar.

Directions—Hydrated Lime

Hydrating—First pour water into box, then add Hydrated Finishing Lime to the water, distributing it uniformly. The water must cover the lime. Use sufficient water—about 6½ gallons to 50 pounds of hydrate, an amount sufficient for a soft, wet paste.

Soaking—Allow to remain undisturbed for at least 6 hours, preferably over night. Protect from frost and drying up until used. Soaking develops plasticity, and putty should not be allowed to dry after it has reached the correct buttery consistency.

Mixing—Mix putty with sand or with sand and cement, adding sufficient water to bring mix to a hodable consistency.

Directions—Quicklime

Slaking—Add water and lime gradually while mixing, constantly agitating mixture to prevent burning of unslaked portion. Mix to a thin consistency and screen through a quarter-inch mesh screen.

If dolomitic lime is used, the lime must not be hoed or stirred except to level out any hot, dry areas which do not receive water.

Aging—After screening, run mixture into aging box. Lime must be aged until it is cool and the putty is hodable. Lime putty produced from quicklime should never be used until aged at least one week, and a longer time is preferable to assure complete slaking.

Mixing—Mix putty with sand or with sand and cement, adding sufficient water to bring mix to a hodable consistency.

Package

Red Top Mason's Hydrate.....50-lb. paper bags
Snowdrift Mason's Hydrate.....40-lb. paper bags
Marble Rock Mason's Hydrate.....50-lb. paper bags
USG Superfine Mason's Quicklime.....80-lb. paper bags
USG Pulverized Mason's Quicklime.....50-lb. and 80-lb. paper bags
USG Fine Grain Mason's Quicklime.....80-lb. paper bags
USG Pebble Mason's Quicklime..180-lb. net wood barrels or steel drums
USG Crushed Mason's Quicklime..180-lb. net wood barrels or steel drums
Peerless Pulverized Mason's Quicklime..100-lb. paper bags and 180-lb. net wood barrels or steel drums
Peerless Crushed Mason's Quicklime....100-lb. paper bags and 180-lb. net wood barrels or steel drums
Marble Rock Pulverized Mason's Quicklime...60-lb. paper bags, 60-lb. and 90-lb. steel drums
Marble Rock Pebble Mason's Quicklime..90-lb. paper or Calsax bags, 60-lb. and 90-lb. steel drums, 180-lb. net wood barrels
USG Lump Lime is shipped in bulk.
All above brands may be shipped in bulk.

MORTAR MIXES FOR VARIOUS TYPES OF MASONRY

Masonry Type	Type of Construction	Loading	Mortar Proportions (Volume) Lime: Cement: Sand	Remarks
Common and face clay, shale or sand-lime brick	Dwellings, garages and similar construction	Any condition of loading for such types of construction	1 : 0 : 3	
Clay or shale brick	Walls and piers below grade continuously exposed to wet or damp conditions	Ordinary distributed Heavy concentrated Earthquake tremors	1 : 1 : 6* 1 : 1 : 6* 1 : 1 : 6*	
Common and face clay, shale or sand-lime brick	Exterior walls and piers above grade	Ordinary distributed Heavy concentrated Earthquake tremors	2 : 1 : 9* 2 : 1 : 9* 2 : 1 : 9*	2:1:5 Mortar domestic and power plant chimneys
Granite, limestone, marble, sandstone, terra cotta facing and trim	Exterior walls and piers above grade	Ordinary distributed Heavy concentrated Earthquake tremors	2 : 1 : 9* 2 : 1 : 9* 2 : 1 : 9*	Use non-staining portland cement and washed sand
Common and face clay, shale or sand-lime brick, concrete brick	Interior walls and piers above and below grade	Ordinary distributed Heavy concentrated Earthquake tremors	2 : 1 : 9* 2 : 1 : 9* 2 : 1 : 9*	
Hollow clay tile, concrete block, concrete tile, cinder block	Exterior walls above grade and interior partition walls	Non-bearing partitions, exterior and bearing walls and partitions	2 : 1 : 9* 2 : 1 : 9* 2 : 1 : 9*	

Notes: Materials to conform to current "A.S.T.M. Standard Specifications".

Mortar containing portland cement to be used within one hour after mixing.

*One volume of cement is the maximum quantity which should be used. The sand content is to be varied in accordance with its quality in the particular market involved and its proportion may be reduced if greater mortar strength is desired. From "Masonry Mortar, Bulletin 321" published by National Lime Association.

*Registered trade-mark.

CLINTON METALLIC PAINT COMPANY

Mortar Colors, Cement Colors, Protective Paints and Roofing Cement

100 Clinton Road, CLINTON, N. Y.

NEW YORK OFFICE: 84 William Street—Telephone, Beekman 3-4091

Products

Clinton

Manufacturers of CLINTON MORTAR COLORS and CLINTON CEMENT COLORS.

Also manufacturers of the following Clinton Specialties:
Clinton Silk Fibre Elastic Slaters Roof Cement.
Clinton Asbestos Furnace and Retort Cement.
Metallic and Venetian Roof and Barn Paints.
Clinton Hermetic-Seal Liquid Roof Cement.
Clinton High Temperature Fire Brick Cement.
Send for descriptive literature and prices.

Experience

Ever since 1887, the CLINTON METALLIC PAINT COMPANY has served the architectural profession and the building trade. Nearly 50 years of scientific research and manufacturing experience are reflected in the uniform excellence of Clinton products.

Permanent and Uniform

Clinton Mortar Colors are mineral colors, as permanent as the colors in natural rock. Rigid laboratory tests keep them absolutely uniform from shipment to shipment and from year to year. They are free from any form of adulterant.

Directions for Estimating and Using CLINTON Mortar Colors

To get a mortar joint of intense color it is advisable to use approximately 100 lbs. of dry mortar color per 1000 brick laid in running or common bond, with half-inch mortar joints. If mortar joints are wider or narrower, or if a bond requiring more or less mortar per 1000 brick is used, the amount of mortar color required per 1000 brick should be increased or decreased proportionately. Following are two formulas for mortar of deep intense color:

CEMENT MORTAR

Clinton Mortar Color (dry)	25 lbs.
Portland cement	1 bag (1 cu. ft.)
Sand	3 cu. ft.
Hydrated lime	1/10 sack

The above is sufficient to lay approximately 250 brick in running or common bond with half-inch mortar joints.

CEMENT LIME MORTAR

Clinton Mortar Color (dry)	30 lbs.
Portland cement	1 bucket (16 qts.)
Hydrated lime	1 bucket (16 qts.)
Sand	6 buckets (96 quarts)

The second formula is sufficient to lay approximately 300 brick in running or common bond with half-inch mortar joints.

As it is not always convenient to weigh color on the job, we tabulate below various shades of Clinton Mortar Color, showing the number of quarts of dry Clinton Mortar Color *(struck measure)* which are equivalent to 25 and 30 lbs.

Caution: This table applies only to genuine Clinton Mortar Colors

	Number of quarts	
	Equivalent to 25 lbs.	Equivalent to 30 lbs.
Clinton Hermatite Red No. 10	10	12
Clinton Mortar Brown No. 400	8½	10½
Clinton D. S. Chocolate No. 402	9	11
Clinton Special Chocolate No. 404	9	11
Clinton Colonial Buff No. 700	19	23
Clinton Pompeiian Buff No. 600	19	23
Clinton Dark Buff No. 717	16½	20
Clinton Mortar Black No. 900	18½	22½
Clinton D. S. Black No. 800	19	23
Clinton D. S. Olive Green No. 1503	17½	21

Pearl Gray Mortar may be produced by using one-eighth as much Clinton Double Strength Black No. 800 as is recommended above to produce intense black mortar.

Clinton Mortar Black No. 900 or Single Strength Black, as it is sometimes called, will not give a jet black mortar. For best work use Clinton Double Strength Black No. 800.

For Cream Colored Mortar a cement lime mortar or a cement mortar made with white cement and sand should be used, adding about half as much Clinton Colonial Buff No. 700 or Dark Buff No. 717 as recommended above.

Many contractors get good results with smaller proportions of Clinton Mortar Colors than those above recommended. This is possible if coarse sand is used and all ingredients are mixed, remixed, then mixed again. Experience, however, proves that the amounts of color recommended will give good results under all conditions and we cannot assure satisfaction if less color is used.

Money spent for a little extra color more than pays for itself in power and wages saved at the mixer, and in the owner's satisfaction with the finished job.

CLINTON Pulp Colors

Many users of mortar colors desire the colors in pulp form. Clinton Pulp Colors are of the same high quality as Clinton Dry Colors. Further detailed information with prices will be furnished upon request.

Directions for Estimating and Using CLINTON Cement Colors

The suggestions given below apply only to Clinton Colors mentioned.

The user is cautioned against applying them to other colors.

The amount of Clinton Cement Colors given in the following table produces concrete of intense color tone. The full value of the color used is only obtained by thorough mixing. Careless mixing not only wastes the color, but also may result in spots and streaks in the concrete produced. Each batch should be mixed an equal length of time.

For convenience in estimating and for use when color is weighed on the job, the approximate weight of the volume of color recommended is given. This based on measure filled full and struck off without shaking down or otherwise packing it.

Clinton Color	Tone produced	Volume color per bag cement	Approx. weight color per bag cement
No. 92 Red	Red	7 qts.	18 lbs.
No. 82 Red	Deep Intense Red	7 qts.	6¾ lbs.
No. 61 and 64 Red	Bright Intense Red	7 qts.	14¾ lbs.
No. 1150 Brown	Deep Brown	7 qts.	10½ lbs.
No. 714 Yellow	Bright Yellow	7 qts.	7 lbs.
No. 715 and 723 Yellow	Yellow	7 qts.	7 lbs.
No. 1502 Green	Deep Green	7 qts.	14¾ lbs.
No. 1603 Blue	Deep Intense Blue	7 qts.	8¾ lbs.
No. 902 Black	Black	7 qts.	1½ lbs.
No. 909 Black	Deep Black	7 qts.	10½ lbs.
Cem-Black	Deep Black (Paste)		6 lbs.

One bag cement and 2 cu. ft. sand yield about 2½ cu. ft. concrete.

We welcome comparison of color effects produced with our products against all other mineral colors sold at equal prices and used weight for weight against Clinton.

Specification

All coloring material to be manufactured by CLINTON METALLIC PAINT COMPANY, Clinton, N. Y., to be delivered on the job in original packages bearing their labels, and to be used according to directions which they will furnish.

RICKETSON MINERAL COLOR WORKS

Manufacturers of Mortar, Cement and Plaster Colors

Makers of Good Mortar Colors Since 1885

229 East Wisconsin Avenue, MILWAUKEE, WIS.

RICKETSON CEMENT COLORS

For Stucco, Exteriors, Floors, Sidewalks, Driveways, Porches, Tennis Courts, Tile, Brick and all cement products.

Beautifying concrete with Ricketson's Cement Colors has won the popular acclaim among architects and contractors all over the country. Colored concrete is in vogue today, more than ever. Costs less than any other form of surface. Avoids painting, easy to keep clean, and will make an otherwise drab-looking concrete show life and pleasing effects. Ricketson's Cement Colors are known for their superior strength, color brilliance of tone, and absolute proof against heat, alkali or atmospheric conditions. Adds strength to the concrete and makes a harder surface.

How to Obtain Best Results

The following quantities of Cement Color are required for laying 100 sq. ft. of floor topping, ½ in. thick. Standard 1 to 2 mix.

Gray Portland Cement, 2 sacks (½ bbl.)
Clean, sharp sand, 4 cu. ft. (375 lbs.)
Ricketson's CP Cement Color, 18 lbs.

For ¾-in. topping add 50% and 1-in. topping add 100% to above quantities. Establish mixture from samples built up under job conditions and allow to dry, because by this method you will know in advance what the job will look like when completed. Measure every ingredient in each batch of color mortar, including water.

Use 9 lbs. of Ricketson's Cement Color to each bag of Portland Cement. Always use clean sand.

Final troweling should be done after concrete has stiffened; this assures a smooth, polished finish. Integral waterproofing hardener can be added to mix materials, also polishing or a surface treatment can be applied if necessary.

RICKETSON MORTAR COLOR
Directions for Estimating and Using

To get colored mortar joints of intense color, it is necessary to use approximately 100 lbs. of dry Ricketson Mortar Color per 1000 brick, ½-in. mortar joint. If mortar joints are wider or narrower it will require more or less color per thousand brick. This should be increased or decreased proportionately.

Following is a formula for a deep intense color:

Do not rake joints until the mortar has begun to set. The following formula will lay 1,000 brick, ½-in. joint, with a deep, intense shade.

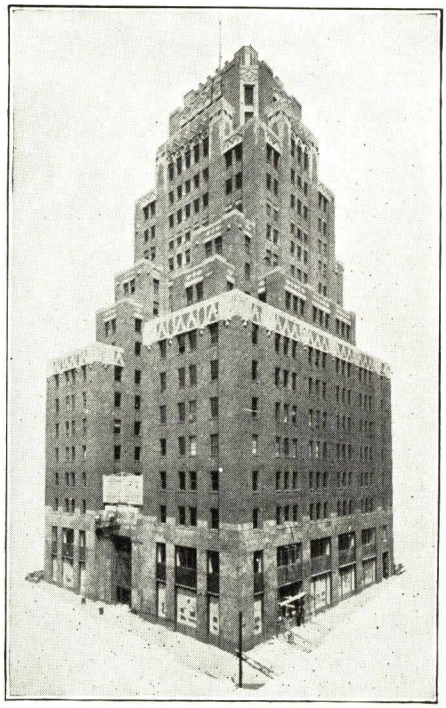
Sand, 1,200 lbs.	Cement, 376 lbs.
Lime, 125 lbs.	Color, 100 lbs.

Except: Green, use only 25 lbs.

Slack Lime—Should be allowed to cool not less than 48 hours before adding to the mix, sand and color in making mortar.

Permanent and Uniform—Ricketson's Mortar Colors are mineral colors as permanent as the color in natural rock. Rigid laboratory tests keep them absolutely uniform from shipment to shipment, and from year to year.

Regular Colors—Double strength Red, Brown, Light and Dark Buff, Pompeian Buff, Chocolate, Black and Green.



New Milwaukee Gas Light Building

Made possible by the use of 18 shades of Ricketson Mortar Colors.

Mortar colors used in the above will retain their hues as long as the building stands. They are derived from Nature's fadeless ores and processed by experts who have made this work their life study. Ricketson's Mineral Colors do not weaken efficiency of mortar in any way, and they are supplied in a variety of colors to harmonize with any conceivable combination of colors in the bricks

RICKETSON PLASTER COLOR

Make your own Colored Plaster and Stucco at a saving of 40%.

How to Obtain Best Results

Formula No. 1, Hard Finish:
Based on average mortar box capacity of 600 lbs.

Keene's Cement,	125 lbs.
Finishing lime,	175 lbs.
White silica sand,	300 lbs.
	600 lbs.

To the above add 3 cans of Ricketson's Color.

Formula No. 2, Common Finish:

Hydrated finish lime,	450 lbs.
Plaster of paris,	150 lbs.
	600 lbs.

To the above add three 4-lb. cans of Ricketson's Color.

The above formulas are standard mixtures for permanent beautiful plasters and stuccos in Homes, Office Buildings, Churches and Theatres. Six hundred pounds is the capacity of the average mortar box and requires three standard packages of Ricketson's Plaster Color to match the colors shown in this folder. For one-third this amount, use one can and to increase the size of the batch, increase all ingredients in proportion.

If preferred, you can use your own formula; the same colors as those shown will result regardless of the formula used. Merely keep the proportion of one can of color to each 200 lbs. of plaster. If stronger shades are desired, increase the amount of color. It is understood, of course, that the lime, gypsum, Keene's cement, sand and all ingredients other than the color should be as nearly white as obtainable.

ONE COAT FLAT WALL PAINT

Ricketson gives the architects what has long been needed—a paint with greater decorative value. It can be applied over new plaster, masonry, insulating board, and previously painted surfaces. It is easy to apply, dries in 40 minutes—odorless. This material is a heavy casein paste paint and only clear water is required to thin for the proper consistency for either brushing or spraying. One gallon of paste makes 1½ gals. of paint ready to use.

White and 8 beautiful shades. Large coverage per gallon.

Application—Use a wide brush, Dutch calcimine type—gives a substantial saving in the material and labor.

Color Cards and Samples

Color cards, samples, and technical information gladly furnished upon request. We can give excellent service from warehouse stocks available in all principal cities in the United States.

Experience

Since 1885 the RICKETSON MINERAL COLOR WORKS has been serving the architectural profession and building trade. Fifty-two years of scientific research in manufacturing of Mortar, Cement and Plaster Colors.

PECORA PAINT COMPANY, INC.

Mortar Stains and Sash Putty

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Member of Producers Council, Incorporated

ESTABLISHED 1862
By Smith Bowen

Products

PECORA MORTAR STAINS, PECORA METAL SASH AND CASEMENT PUTTIES, PECORA SUCTION MASTICS, PECORA CALKING AND GLAZING COMPOUND, PECORA TRANSPARENT LIQUID WATERPROOFING COMPOUND.

Also Mill White, Enamels, Asbestos Furnace Cement, Stove Putty, Paints and Varnishes. Detailed information on request.

Pecora Mortar Stains

Uses—Made to be mixed with lime or cement mortar, or with the two combined, for facing exterior or interior brick walls regardless of the type of structure. Also for mantel facings, fireplaces and hearths of brick, tile, marble, slate, or other material, for pointing or joining stonework, and for introducing color tones into exterior "whitewash."

Properties and Advantages — Offered only in form of pulp or paste; manufactured from selected, finely ground ores combined with extenders and fixatives making non-acid solution; "hoe in" with minimum handling and form strong chemical union with the mortar; produce tones that are rich, uniform, fade-proof; do not cause or increase efflorescence; economical.

Pecora Dark Brown Mortar Stain

Colors—Stock shades: Black, Brown, Dark Brown, Windsor, Red, Buff, Fern Green, Colonial Drab, Amber, Terra Cotta, French Gray. Special shades made to order.

Specifications—All mortar to be colored or stained with Pecora Mortar Stain, manufactured by PECORA PAINT COMPANY, INC., Philadelphia, Pa., using by measure 1 bucket of paste or pulp to 7 buckets of face wall mortar.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly. Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze before mixing with mortar. **Note:** Depending upon depth of shade desired, the following proportions per 1000 brick, ordinary stretches, will be found to approximate quantity desired:

Red, Buff, Terra Cotta and Amber—For ⅛-in. joint use 45 to 55 lb.

Brown, Windsor, Colonial Drab, Fern Green, French Gray and Dark Brown—For ⅛-in. joint use 35 to 45 lb.

Black—For ⅛-in. joint use 20 to 30 lb.

Mortar varies and takes more or less stain according to richness of lime and quality of sand. Before laying brick it is suggested that a small portion of the stained mortar be taken from the mortar bed and dried out thoroughly to determine whether the proper quantity of stain is being used to produce the shade desired.

Pecora Metal Sash and Casement Putties

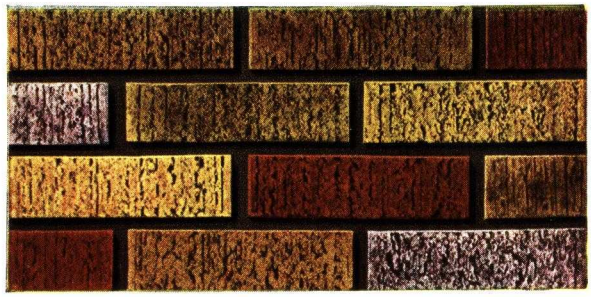
Manufactured in three grades to meet varying competitive conditions. They are easy to apply, work freely under the knife, set sufficiently on the surface for painting within a reasonable time and do not wrinkle, sag or form oil pockets. They dry readily by oxidation and will retain life through long period of most exacting conditions, due to vibration and expansion and contraction of metal and glass. Made of blended and processed oils, with first quality pigments and driers.

No. 100—Contains 100% linseed oil. Sets in approximately 48 hours, hardens throughout, yet retains elasticity. Recommended where highest type of glazing is necessary and cost is not a vital factor. Can be used successfully on wood sash also.

No. 70—Contains 70% linseed oil. Sets in approximately 24 hours. Price is attractive and putty will meet all around conditions.

No. 50—Contains 50% linseed oil. Sets in approximately 24 hours. Sets firm in joint, will not crack, creep or fall out. Will not harden in package. Popular for competitive work.

Note: When ordering, be sure to mention grade of putty desired.



Pecora Black Mortar Stain

Casement Putty—Especially designed for glazing of casement type metal sash. Sets in 24 to 48 hours and remains elastic in final drying. Will not fall out, nor will it disintegrate under exposure to weather conditions during setting period. As casement sash is puttied on the outside, be sure to specify "Pecora Casement Putty."

Pecora Suction Mastics

For use in erection of structural glass and other tile. Available in two types: one in grayish white and the other in black. The former, while quite sticky, is not difficult to handle and has been used extensively in connection with glass tile. Suitable for exterior and interior work and can be made in practically any color desired. In the erection of black tile, some contractors claim black putty more suitable—our Black Suction Mastic has proved satisfactory in every respect. Details on request. Pecora Black Liquid Bond Coat also furnished for use in connection with Pecora Black Suction Mastic.

Pecora Klere-Seal Dampproofing Liquid

Made of a combination of best water-resisting and waterproofing materials known to present-day science.

Properties—A colorless, liquid compound, limpid as water and absolutely free of jell or stringing; free-flowing, easy working and adaptable to brush or spray gun. Dries to a flat finish in 10 to 30 minutes depending on weather. Remains unchanged on long standing and under normal temperature conditions. Will not get white or thick in package, nor cause discoloration by whitening or grease on the surface to which it is applied. Estimated covering, average, about 200 sq. ft. per gal., using 2 coats, with greater or lesser coverage depending on porosity and other surface conditions.

Results—First, seals all pores against any penetration of dampness or moisture. Second, eliminates disintegration action of weathering, freezing and the accompanying cracking and chipping, retards absorption and discoloration by dirt, soot, dust and fading. Also checks efflorescence. Full particulars on request.

PECORA CALKING COMPOUND: KNIFE CONSISTENCY. GUN CONSISTENCY

Pecora Calking Compound

A plastic material, impervious to heat, cold and moisture, or acid fumes. When set, it forms a tough skin on the surface but remains permanently pliable and elastic underneath. It adheres tenaciously to wood, stone, terra cotta, concrete, iron, steel, glass or any other building material, while its permanent elasticity adjusts itself under all ordinary conditions to movements, due to expansion and contraction or warping of the surfaces it joins. It is made in two consistencies; knife grade and gun grade. The knife grade is about the consistency of putty and is easily applied with a putty knife or a hand calking tool. The gun grade is lighter in weight and is generally applied with a hand-calking gun. Stock colors are battleship gray and cream white. Other shades furnished if ordered in not less than 30-gal. lots of the gun calking, and quart or pint cartridges for use in conjunction with our High Pressure Calking Guns; and 400-lb. to 500-lb. drums of the knife-calking compound. Gun grade put up in 1, 5, 10, 30, 55-gal. packages. Knife grade in 12½, 25, 50, 100, 500, 900-lb. packages.

PECORA — Rhino Brand — CALKING GLAZING — "Tough as his Hide" — COMPOUND

TRADE-MARK

Air Leakage Prevention and Air Conditioning:—It is used as a plastic filler for spaces between exterior window and door frames and the surrounding masonry to prevent the leakage of water, air and dust into a building from the outside and the leakage of warm air from the inside, thus reducing heating and air conditioning costs and other maintenance expenses. It is used on both new and old constructions. It is also used for calking joints in extending masonry members, such as cap stones, cornices, belt courses, water tables, balustrades, etc. This practical usage requires a material that will not stain the masonry, be it marble, limestone, granite, terra cotta, pre-cast stone or concrete. It will not run or melt, shrink or crack in extremes of temperature, caused by varying weather conditions. It adheres permanently to both sides of the joint, giving and taking with any movements due to contraction or expansion, thus making every joint so calked a permanent expansion joint. Pecora Calking Compound, whenever and wherever properly installed, has fulfilled all these requirements.

Application:—There are three recommended methods of application, viz:—(1) hand calking, (2) hand-gun calking, and (3) power-gun calking.

(1) A very satisfactory job can be done by a good conscientious mechanic, by forcing the compound into the joints with a hand tool, such as a putty knife, small trowel or calking key. For this method of application Pecora "Knife" consistency (sold by the pound) should be used.

These New Type High - Pressure Cartridge Calking Guns (patent applied for) are great Time and Material Savers. Manufactured in two sizes—"Senior"—approximately one quart capacity; "Junior"—approximately one pint capacity. For exclusive use in these guns, Pecora Gun Calking Compound is packed in Non - Refillable Metal Cartridges of approximately one quart and one pint capacities.

(2) The Pecora High Pressure Cartridge Calking Guns are the most modern in use. If care is taken to force calking compound back into the joint (not merely laying a thin strip of it on top) a good calking job can be done. For this method of application Pecora "Gun" consistency (sold by the gallon) should be used.

(3) Power-gun calking (whereby the gun calking compound is forced into the joint under heavy pneumatic pressure) is recognized by all authorities as the most efficient method of calking. Installations done by this method will cost somewhat more because of the greater amount of calking compound that can be forced into any given depth of a joint, but on large construction projects many of the leading architects insist on this method of application, especially for the calking of masonry joints.

Joints to be calked most efficiently should be at least ½ in. in width and preferably not less than ½ in. in depth. If wider than ½ in. or deeper than 2 in., these should be packed with calking cotton to within not less than ½ in. of the face surface and the remaining space should be filled with calking compound. Use of oakum for packing a joint (especially a masonry joint) should be avoided, as oils in the oakum are likely to stain stone.

All joints to be calked should be built up or cut out square down the sides (not V-shape), and they should be thoroughly cleaned of all dust, dirt and loose matter before the calking compound is forced in. Otherwise the calking compound cannot bond properly.

If the calking compound is to come in contact with material that is of a very porous nature, the joint should be brushed or sprayed with a coat of Pecora Klere-Seal Dampproofing Liquid that will close the pores, thus preventing undue "suction," which would have a tendency to lessen the life of the compound.

Suggested Calking Specifications

Materials and Methods:—Calking material shall be Pecora Calking Compound as manufactured by the Pecora Paint Co., of Philadelphia. (Specify color and consistency.)

Calking Wood Frames:—After staff beads have been removed by the carpenters, all exterior wooden window frames and wooden door frames shall have joints between wood and masonry (including at heads and sills) thoroughly air cleaned and calked, after which the staff beads shall be set in place by the carpenters. In all joints between wood frames and masonry, the calking compound shall be forced to a depth of at least ½ in. in spaces to be provided when frames are set (see "Masonry Work").

Calking Metal Frames:—All exterior metal frames for steel sash or for doors shall have joints between metal and masonry (including at heads and sills) thoroughly cleaned and calked. In all joints between steel frames and masonry, the calking compound shall be forced to a depth of at least ½ in. in spaces to be provided when frames are set (see "Masonry Work").

Masonry Work

Jointing of Terra Cotta and Masonry for Calking:—The joints of all copings, cornices, gutters, belt courses, base courses, or other projecting members as specified under "Calking" shall generally be not less in width or thickness than ½ in., unless otherwise shown or specified. The mortar of all such joints shall be kept back or raked out to a depth of not less than 1 in., nor more than 1½ in., and left ready to receive the calking compound as specified.

Calking Joints in Masonry and Terra Cotta:—Thoroughly clean and calk all open joints (see "Masonry Work") in copings, cornices, gutters, belt courses, base courses and any projections beyond the vertical wall whether in terra cotta, stone or other masonry materials. Joints to be calked shall be all those, whether horizontal or vertical, on tops, faces and soffits of all copings and of every projecting member, except vertical faces of base courses. The calking shall not be commenced until after the building is cleaned down and shall start at the top and be continued until completed.

(NOTE. If columns, pilasters or balusters are included in the design, the calking of same, including capitals and bases, should be separately referred to.)

Carpentry Work

Removing Staff Beads for Calking:—At the proper time remove staff beads (unless detailed for reception of calking) from all wooden window frames or wooden door frames to allow for calking as specified under "Calking" and after calking is completed, securely and neatly replace the staff beads and leave ready for painter to putty nail holes and complete painting.

Jointing of Window and Door Frames for Calking:—The mortar of all exterior joints between masonry and window or door frames, both wood and metal, shall be kept back or raked out to a depth of not less than ½ in. nor more than ¾ in. and left ready to receive the calking compound as specified under "Calking."

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See Brick—Cleaning Compound

Deterrents

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Asphalt

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FELT

Waterproofing

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American Crayon Co. 17/35
Anti-Hydro Waterproofing Co. 5/3
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Hydratite 5/14
Master Builders Co. 5/18
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Agatex 5/29
American Crayon Co. 17/35
Anti-Hydro Waterproofing Co. 5/3
Aquabar Waterproofing Products, Inc. 5/4
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Hard-n-tyte 5/7
Hillyard Sales Co. 17/40
Horn, A. C., Co. 5/14
Hornstone Crystals 5/14
Hurundum 5/29
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Kompolite Co., Inc. 11/49
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Loomite 5/16
Master Builders Co. 5/18
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Toch Brothers Inc. 5/27
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Waterproofing

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OIL

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PAINT

Asphalt

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Aquabar Waterproofing Prducts, Inc. 5/4
Aridtite 5/3
Barrett Co. 6/2
Beaver 10/27
Ceresit Waterproofing Corp. 5/9
Dens-tect 5/30
Des Moines Elaterite 5/11

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Goldsmith Metal Lath Co. 9/7
Hydrocide 5/24
Master Builders Co. 5/18
Par-Lock Plaster Key 5/30
Plastertox 5/27
Plastoform 9/7
R.I.W. 5/27
Reilly Tar & Chemical Corp. 6/8
Rocktite Corp. 5/20
Sonneborn, L., Sons, Inc. 5/24
Statite 5/4
Toch Brothers Inc. 5/27
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Coatings or Compounds—Steel, Concrete, etc.

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WATERPROOFING

Admixtures

Accello 5/3
Anti-Hydro Waterproofing Co. 5/3
Aquabar Waterproofing Products, Inc. 5/4
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B. C. C. 5/7
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Loomite 5/16
Master Builders Co. 5/18
Medusa Portland Cement Co. 4/53
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Poncho 5/7
Quick Set 5/4
Rex 9/22
Riverton Lime & Stone Co., Inc. 4/56
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B.C.C. 5/7
Bondex 17/28
Building Chemical Corp. 5/7
Cementex 5/4
Elasticote 5/4
Horn, A. C., Co. 5/14
Hornrock 5/14
Hydrolithic Waterproofing Co., Inc. 5/13
Ironite 5/31
Minwax Co., Inc. 17/43
Par-Lock 5/30
Poncho 5/7
Reardon Co. 17/28
Rocor 17/3
Staybrite 5/14
Symentrex 5/14
Tamms Silica Co. 11/21
Tamtex 11/21
Truscon Laboratories 5/29
Vortex Mfg. Co. 5/30
Webster, W. F., Cement Co. 5/32
Webtex 5/32
Western Waterproofing Cos. 5/31
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Anaconda 10/4
Brisk Waterproofing Co. 5/6
Electro-Sheet 10/4
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Anti-Hydro Waterproofing Co. 5/3
Brisk Waterproofing Co. 5/6
Building Chemicals Corp. 5/7
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Hydrolithic Waterproofing Co., Inc. 5/13
Larson 5/6
Master Builders Co. 5/18
Minwax Co., Inc. 5/17
Obelisk Waterproofing Co. 5/19
Poncho 5/7
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Barco-Dex 6/20
Barnett Canvas Goods & Bag Co., Inc. 6/20
Barrell, William L., Co., Inc. 6/19
Barrett Co. 6/2
Bird & Son, inc. 6/3
Brisk Waterproofing Co. 5/6
Carey, Philip, Co. 6/4
Certain-teed Products Corp. 6/5
Cheney Co. 6/52
Con-Ser-Tex 6/19
Copper Armored Sisalkraft 10/2
Copper Kote 6/52
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Flintkote Co. 6/13
Genasco 6/1
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J-M 6/6
Johns-Manville 6/6
Koppers Co. 6/7
Larson 5/6
Minwax Co., Inc. 5/17
Neponset 6/3
Sandell, H. N., Co. 5/22
Sisalkraft Co. 10/2
Spando 6/52
Triple-Flex 5/14
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Aquabar Waterproofing Products, Inc. 5/4
Aquatite 5/4
Armstrong Cork Products Co. 11/70
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Building Chemicals Corp. 5/7
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Des Moines Elaterite 5/11
Elaterite Paint & Mfg. Co. 5/11
Horn, A. C., Co. 5/14
Hydratite 5/14
Hydrocide 5/24
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Kuhls, H. B. Fred 5/15
Leakproof 5/18
Loomis, W. H., Talc Corp 5/16
Loomite 5/16
Master Builders Co. 5/18
Maximent Co. 11/19
Medusa-BrikseT 4/53
Medusa Portland Cement Co. 4/53
Mortaron 5/4
Mortite 5/29
Poncho 5/7
R. I. W. 5/27
Ru-Ber-Oid 6/17
Ruberoid Co. 6/17
Sec Mfg. Co. 5/21
Sika Inc. 5/23
Sonneborn, L., Sons, Inc. 5/24
Standard Waterproofing Corp. 5/25
Stanwaco 5/25
Staybrite 5/14
Stearate 5/1
Stearox "30" 5/18
Superior Cement Corp. 4/57
Toch Brothers Inc. 5/27
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(For Surface Treatments or for use with Membrane Systems)
(See also Dampproofing)

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Adensite Co., Inc...... 5/1
American Bar Lock Co., Inc... 5/2
Amurseal 5/3
Anti-Hydro Waterproofing Co. 5/3
Aquabar Waterproofing Products, Inc. 5/4
Aridclear 5/3
Aridtite 5/3
Arnesto Paint Co., Inc...... 17/2
Artstone Rocor Corp. 17/3
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Barrett Co. 6/2
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Bird & Son, Inc. 6/3
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BriXope 5/7
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Hornrock 5/14
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Kaukit 5/24
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Midland Chemical Laboratories, Inc. 17/42
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Obelisk Waterproofing Co...... 5/19
Omicron 5/18
Par-Lock Plaster Key..... 5/30
Pecora Paint Co., Inc...... 4/61
Penetex 5/29
Pierce, F. O., Co. 17/25
Piertung 17/25
Pittsburgh Plate Glass Co......17/24
Plastic XC 6/2
R. I. W. 5/27
Reardon Co. 17/28
Reilly Tar & Chemical Corp. .. 6/8
Resto-Crete 5/31
Ric-wiL 26/82
Rocor 17/3
Rocktite Co. 5/20
Ruberoid Co. 6/17
Ru-Ber-Oid 6/17
Sec Mfg. Co. 5/21
Self Healing Bridge Cement 5/27
Semi-Mastic 5/4
Sonneborn, L., Sons, Inc...5/24; 17/45
Standard Waterproofing Corp... 5/25
Stanwaco 5/25
Static 6/13
Statite No. 3.....5/4
Stearox "30" 5/18
Stone Backing No. 3B..... 5/4
StoneTex 5/29
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Pre-Formed Unit

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See Waterproofing—Felt, Cloth, Fabric, etc.

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Ablo 5/2
All-Weather 5/18
American Bar Lock Co., Inc.... 5/2
Adensite Co., Inc...... 5/1
Anhydrosol 5/27
Anti-Hydro Waterproofing Co... 5/3
Aquabar Waterproofing Products, Inc. 5/4
Aridclear 5/3
B. C. C. 5/7
Billings-Chapin Co. 5/5
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Cabot, Samuel, Inc. 5/8; 17/6
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Clear Coat 5/4
Clerseal 5/1
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Horn, A. C., Co. 5/14
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Master Buiders Co. 5/18
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Minwax Co., Inc. 5/17; 17/43
Pecora Paint Co., Inc...... 4/61
Poncho 5/7
R. I. W. 5/27
Sec Mfg. Co. 5/21
Sika Inc. 5/23
Sonneborn, L., Sons, Inc...... 5/24
Standard Waterproofing Corp... 5/25
Stanwaco 5/25
Super-Por-Seal 5/29
Toch Brothers Inc. 5/27
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ADENSITE CO., INC.

Manufacturers of Concrete Waterproofings and Hardeners

152 West 42nd Street, NEW YORK, N. Y.

LABORATORY: 25-25 51st Avenue, LONG ISLAND CITY, N. Y.

Products

ADENSITE, Liquid Integral used in gauging water for Hardening and Waterproofing portland cement concrete and mortar.
PURTONE COLORS, mineral color in powder form for portland cement Floor Finish.
ADAFLINT, a flush-on Floor Hardener in crystal form.
CLERSEAL, a colorless Waterproofer.
STEARATE PASTE, an integral Waterproofing in paste form.

ADENSITE—A LIQUID INTEGRAL WATERPROOFER

Uses — Waterproofing concrete walls below grade, either in mass concrete or in plaster coat.

Hardening and dustproofing cement floor finish.

Waterproofing portland cement stucco.

For brick masonry, Adensite gauged mortar is smooth working, does not drag and prevents "riding."

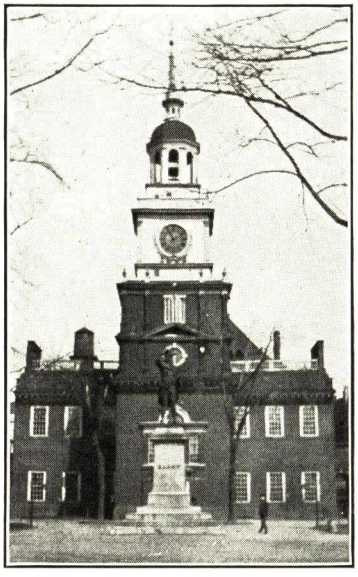
Authoritative Tests—Upon request, we shall be pleased to furnish the architect with authoritative test data on Adensite, compiled from testing laboratory results and research work carried out at the U. S. Bureau of Standards for the A. S. T. M.

Guarantee—Adensite is unconditionally guaranteed to produce positive and permanent results by the manufacturers, the ADENSITE CO., INC. Surety maintenance bonds furnished on waterproofing jobs.

Service—Our field men visit construction operations while Adensite is in use.

A LIQUID INTEGRAL ADENSITE ITS FUNCTION GUARANTEED

TRADE-MARK



Independence Hall, Philadelphia
Waterproofed with Adensite gauged plaster coat

Adensite Specifications

Waterproofing Mass Concrete — The gauging liquid for concrete shall be prepared by placing from 3 to 4 gal. of Adensite in a 52-gal. barrel and adding water. Adensite can be added direct to the water in mixer before letting in the dry mix. For every 1-bag batch, use between 3 and 4 gal. of the prepared liquid (amount of liquid varies with fineness of aggregate and temperature).

Joints Between Pourings—Shall be thoroughly grouted with Adensite grout.

Waterproof Plaster Coatings—Shall be ⅝ in. in thickness, applied in 2 coats and properly coved and bonded to the floor.

Bonding New to Old Concrete—All surfaces before application of new work shall be thoroughly roughed, cleaned and dampened with Adensite grout to insure perfect bond.

Adensite Grout—Add 1 part Adensite to 3 parts water and enough cement to give mixture a creamy consistency.

Protection of Green Work—To protect green work against action of water, the pump shall be kept in operation 24 hours after pouring or troweling of work.

Floor Hardening—Upon the plain concrete floor slab shall be laid a 1-in. topping of 1 part cement and 2 parts clean sand.

This dry mix shall be tempered with a liquid composed of 3 gal. of water to 1 qt. of Adensite for every 1-bag batch. No dryer shall be used.

Gauging Liquid for Floor Finish—Gauging liquid may be prepared by putting 4 gal. of Adensite into a 52-gal. barrel and adding water (no stirring required).

Bond—When slab is over 48 hours old, before topping is stretched, it shall be given a coating of Adensite grout.

When slab is over 7 days old, before topping is stretched, it shall be roughed with a pick or chisel, cleaned and given a coat of Adensite grout.

Brick Masonry—The mortar shall be composed of 1 part portland cement, and 3 parts clean sand, tempered with a liquid composed of 1 part Adensite to 12 parts water.

Shipments

Adensite is shipped in 5, 30 and 50-gal. containers.

PurTone Color is shipped in 550-lb. barrels.

Adaflint is shipped in 2-lb. boxes, 25 to a case.

Clerseal is shipped in 5, 30 and 50-gal. barrels.

Some Users of Adensite

Grosvenor Atterbury, New York, N. Y.
Alfred C. Bossom, New York, N. Y.
Harold B. Brady, Elizabeth, N. J.
Bureau of Yards & Docks, Washington, D. C.
Clinton & Russell, New York, N. Y.
George W. Conable, New York, N. Y.
Day & Klauder, Philadelphia, Pa.
Delano & Aldrich, New York, N. Y.
Dennison & Hirons, New York, N. Y.
I. E. Ditmars, New York, N. Y.
C. E. C. Dyson, Toronto, Ont., Canada
J. H. & W. C. Ely, Newark, N. J.
J. W. Ferguson Co., Paterson, N. J.
Fletcher-Thompson Co., Inc., Bridgeport, Conn.
D. R. Franklin, Toronto, Ont., Canada
John F. Jackson, New York, N. Y.
Mack & Sahm, Wilkes-Barre, Pa.
John Molitor, City Architect, Philadelphia, Pa.
New York Central Railroad Co., New York, N. Y.
John T. Rowland, Jr., Jersey City, N. J.
F. B. & A. Ware, New York, N. Y.
Warren & Wetmore, New York, N. Y.
F. W. Wentworth, Paterson, N. J.

PurTone Colors for Cement Floors

PurTone colors are specially prepared for use with portland cement in floor finish and are used integrally throughout entire top finish, assuring permanent and positive results. Specifications on request.

Adaflint—An Applied Hardener for Cement Floors

Adaflint, dissolved in water, 2 lb. to the gallon and slushed over an old or new floor, will render a cement finish hard and dustless. Furnished in natural gray, oak and green.

Clerseal—Colorless Waterproofing for Masonry Above Grade

Clerseal can be applied with brush or spray. One gallon is sufficient for 200 to 300 sq. ft. of surface in one application.

AMERICAN BAR LOCK CO., INC.

"ABLO" PRODUCTS DIVISION

"Ablo" Waterproofing and Preservative

LONG ISLAND CITY, N. Y.

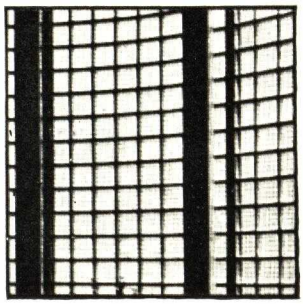
For Our Other Products, see File Index

THE PRODUCT

"Ablo" Waterproofing and Preservative is an immediately effective and permanent waterproofing.

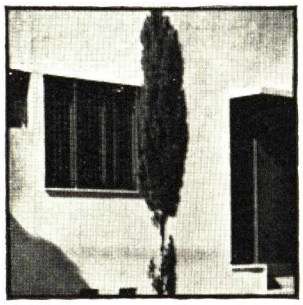
"Ablo" is entirely and radically different and will efficiently waterproof and keep waterproofed, any material that will absorb moisture. Specify and recommend "Ablo" for new as well as old construction.

ABLO WATERPROOFING *and Preservative*



Glass Blocks

The main cause of breakage of glass is moisture-expansion of mortar between the blocks. "Ablo" Permanent Waterproofing applied on the mortar (after it has dried) will prevent this expansion



Stucco and Concrete

New or old construction is permanently waterproofed by the application of "Ablo"

Brick

"Ablo" Waterproofing is strongly recommended for brickwork. *Efflorescence* is also prevented. The color of the brick is intensified

OUTSTANDING ADVANTAGES OF "ABLO" WATERPROOFING

"Ablo" penetrates deeply into the material protected. "Ablo" preserves the material protected—not only against obsorption of moisture, but in turn prevents freezing and consequent cracking or breakouts.

"Ablo" is colorless upon application and actually intensifies and sets the color, texture and beauty of the surface protected.

The use of "Ablo" Waterproofing costs little or nothing when protection insurance against moisture absorption and elimination of trouble, damage and maintenance costs, and savings in other materials, are considered.

IT PENETRATES

"Ablo" is not simply a "surface-saver" or thin surface skin—it penetrates deep into the pores of materials, small holes and cracks. It will not disintegrate. "Ablo" base materials are permanent as they comprise no oils, chemicals, lacquers, etc. to dry out or disintegrate.

"Ablo" prevents plaster from absorbing moisture on surface protected. Makes excellent prime.

SIMPLE TO USE

"Ablo" Permanent Waterproofing has the consistency of water. It can be applied by spray gun, or brush. "Ablo" should be applied to a clean, dry surface.

Spread it on as heavily as necessary. Large cracks, of course, should be filled before applying "Ablo".

One gallon covers approximately from 100 to 300 sq. ft. depending upon the porosity of the material to which it is applied.

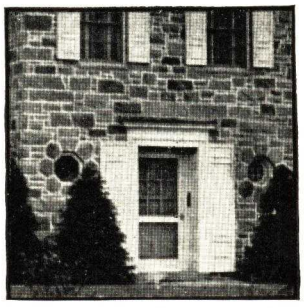
USES

But a few of the hundreds of uses of "Ablo" Waterproofing are illustrated and briefly explained on this page. "Ablo" makes a perfect moisturetight prime. Efflorescence is prevented on brickwork. An outstanding use of "Ablo" is in connection with the protection of glass block installations set directly in cement mortar.

Asbestos and Wood Shingles, also unglazed roof or floor tile. Here is a splendid use for "Ablo." Snow will not stick as readily and rain will run off like water from a duck's back when "Ablo" is applied. "Ablo" kills "attic dampness."

COMPLETE DETAILS ON REQUEST

Advice and information on the use of "Ablo" for any specific purposes will be gladly supplied. Folders upon request.



Stone Walls, Cement Blocks and Hollow Tile

Modern use of stone and block construction requires an application of "Ablo." "Ablo" penetrates deep into materials

Cement Floors

Office and factory building floors and cellar floors, benefit by a coating of "Ablo." Floor paints look brighter and wear longer when applied over "Ablo"

Wood

Apply "Ablo" Permanent Waterproofing on wood surfaces. The wood is waterproofed and preserved without altering its appearance. Outlasts certain types of wood preservatives many years and saves painting costs

ANTI-HYDRO WATERPROOFING CO.

TELEPHONE
Bigelow 3-5440

295 Badger Avenue, NEWARK, N. J.

ESTABLISHED 1904

REPRESENTATIVES, SERVICE AND STOCK IN ALL LARGE CITIES

ANTI-HYDRO OF CANADA LTD., 5585 Delorimier Avenue, W., MONTREAL, CANADA

Products and Services

"ANTI-HYDRO," a Liquid Integral Compound for *Waterproof* and *Durable* Concrete or Mortar; increases and hastens *Hardening* and *Strength* for portland cement mixtures.

ARMORTOP, a penetrating liquid applied *Hardener* and *Dust Preventer* for *Cement Floor* Surfaces.

AMURSEAL, a black liquid *Dampproofing* applied to exterior of *Foundation Walls and Footings.*

ARIDTITE, a black liquid *Dampproofing* and *Plaster Bond* coat for interior of *Walls above Grade.*

ARIDCLEAR, a transparent liquid *Dampproofing* for *Stone, Brick, Stucco* or *Cement Walls above Grade.*

ACCELLO, a water solution of calcium chloride for *Accelerating* the *Set of Concrete* in *Cold Weather* and *Preventing Freezing.*

ADMIXTURE, a finely divided silica admix, used to increase plasticity and durability of concrete.

CALKING COMPOUNDS—*Plastic Material for Knife or Gun Application:* made in black or gray and shipped in 1-gal., 5-gal., 30-gal. and 55-gal. containers. It adheres perfectly to all construction materials.

CONSULTING WATERPROOFING ENGINEERS for consultation and design for all waterproofing constructions.

25-Year Guarantee

Written guarantees to maintain waterproof concrete for 25 years have been furnished on many important installations, installed under our supervision.

A surety bond will be furnished on all waterproof installations supervised by the Anti-Hydro Engineering Department.

"ANTI-HYDRO" INTEGRAL WATERPROOFING AND HARDENER

Description—"Anti-Hydro" is a liquid compound, reacting chemically with portland cement. There are no alums, hydrate of lime, greases, oils, stearic acid, iron admixtures or other decomposable ingredients. "Anti-Hydro" causes cement to hydrate to a far greater percentage than with water alone and speeds the hardening of the cement. The result is dense, hard waterproof cement masonry of increased compressive and tensile strength, impervious to water, moisture, frost, oils, sugar solutions, alkalis, sea water and remarkably resistant to acid action.

"ANTI-HYDRO" FOR PERMANENT CONCRETE HARDENS WATERPROOFS

Tests—Reports of comparative tests made at the following laboratories are available:

California Institute of Technology; Case School of Applied Science; Columbia University; E. L. Conwell & Co.; Georgia School of Technology; David Kirkaldy Laboratories, London, England; H. C. Nutting Co.; Pittsburgh Testing Laboratories; University of Michigan; National Bureau of Standards.

Functions of "Anti-Hydro"—

(1) *Waterproofs* concrete and mortar.

(2) *Increases the plasticity and workability* of concrete and cement mortars.

(3) Produces *durable concrete, permanent* against *water, weather,* and *frost.*

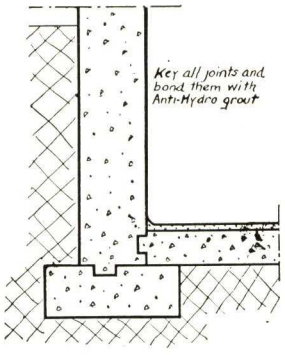
(4) *Increases* and *speeds compressive* and *tensile strength* of mortars and concrete, with *increased ultimate strength.*

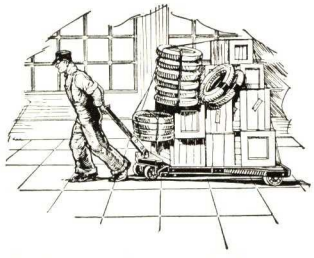
(5) *Hardens* and *dustproofs* cement floor toppings.

(6) *Prevents corrosion* of steel reinforcing.

(7) Protects concrete against *freezing,* during and after placement.

(8) *Bonds* securely concrete between pourings and permanently holds cement toppings to slabs.





Hardens and Dustproofs Concrete Floors

"Anti-Hydro" Specifications

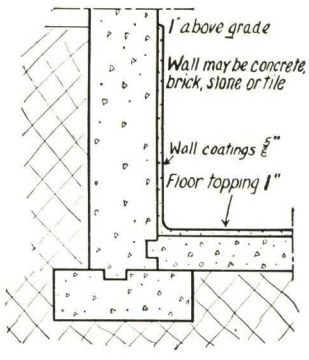
Waterproofing Mass Concrete—For 1:2:4 concrete not over 5½ gals. of water per bag of cement shall be used for gauging and 1 qt. of "Anti-Hydro" shall be added to the mixture with or immediately after the water. Not less than 1½ gals. of "Anti-Hydro" shall be used per cubic yard of concrete. Concrete shall be well spaded when placed in forms. All surface and ground water must be pumped or drained away from the forms during pouring and for 24 hours thereafter. All joints shall be keyed and bonded with "Anti-Hydro" grout. (See bonding directions following.)

Hardening and Waterproofing Floors—Cement floor toppings of 1:2 mix shall be of 1-in. thickness and shall be hardened and waterproofed by the addition of 1 gal. "Anti-Hydro" per barrel (4 bags) of cement. Proper consistency of the mortar will be obtained by gauging the mixture with not over 3½ gals. of water per bag of cement and 1 qt. of "Anti-Hydro" added with or immediately after the water. This procedure insures the double purpose of hardening and waterproofing cement surfaces exposed to wear in one operation. The topping shall be bonded to underlying masonry according to bonding directions following.

Waterproofing Wall Coatings—Wall coatings of cement plaster shall be of 1:2 mix and gauged by the addition to the water of 1 gal. of "Anti-Hydro" per barrel (4 bags) of cement. They shall be applied in 2 coats (scratch and finish), shall be ⅝ in. thick above the floor level to at least 1 ft. above grade, and shall be coved at base and bonded to the floor and underlying masonry.

Waterproofing Brick Mortar—Cement and sand mortar for use with brick, block or stone shall be of 1:3 mix, gauged and tempered with a solution of 1 volume of "Anti-Hydro" in 15 volumes of water. The mortar is waterproofed by this addition.

For complete waterproofing of brick walls, the same mortar shall be parged between the face brick and back-up masonry.



Dampproofs Brick Mortar and Reduces Efflorescence

Calking Leaks Under Pressure—"Anti-Hydro," undiluted, can be added to *fresh* portland cement to the consistency of a thick paste, for plugging leaks against water pressure in concrete or masonry. Ask for special instructions.

Bonding Old and New Concrete—To assure perfect bond to abutting masonry, all old surfaces shall be roughened thoroughly, cleaned, dampened and grouted. The grout shall be made by stirring ½ to ⅔ bag of portland cement gradually into a solution of 1 gal. of "Anti-Hydro" in 3 gals. of water until a thick, creamy consistency is obtained. After applying this grout to the prepared surface, the concrete or mortar shall be placed *while the grout is still wet.*

Note: Other specifications for waterproofing furnished on request: *Cast Stone, Stucco, Dampproof Paint, Road Work, Acid Resistance.*

"ANTI-HYDRO" QUANTITIES

Kind of work	Quantity Anti-Hydro per bbl. cement	Covering capacity
Waterproofing in mass 1:2:4 concrete	1 gal.	2½ cu. yd. concrete
Waterproofing ⅝-in. plaster coat	1 gal.	100 to 125 sq. ft.
Waterproofing 1-in. floor topping	1 gal.	100 to 80 sq. ft.
Waterproofing stucco ⅞ in.	1 gal.	100 sq. ft.
Waterproofing brickwork ⅜-in. joint 1:2	1 gal.	700 brick or 35 cu. ft.
Dampproofing brickwork ⅜-in. joint 1:3	1 gal.	1000 brick or 50 cu. ft.
Dampproofing in cement wash	8 gal.	2400 sq. ft.—2 coats
Dampproofing in ¾ in. cement plaster	1 gal.	150 sq. ft.
Hardening cement floor 1-in. topping	1 gal.	100 to 80 sq. ft.

How Shipped. "Anti-Hydro" is shipped in standard containers of 5 gal., 20 gal., and 30 gal.

OTHER "ANTI-HYDRO" PRODUCTS

Aridclear Dampproofs Exterior Masonry

ARIDCLEAR
THE TRANSPARENT DAMPPROOFING
TRADE-MARK

Aridclear, a transparent dampproofing, prevents the penetration and absorption of driving rains into exposed masonry of brick, stone, stucco, or cement. One gallon dampproofs from 70 to 120 sq. ft.

Specifications—Cut out open joints and remove loose mortar. Point up with trowel using cement and sand mortar waterproofed with "Anti-Hydro". To the clean, dry masonry apply two saturating coats of Aridclear with brush or spray. Allow at least 12 hours between coats.

How Shipped—Aridclear is shipped in 1-gal., 5-gal., 30-gal. and 50-gal. containers.

Armortop, Applied Hardener and Dustproofer for Concrete

ARMORTOP
THE APPLIED HARDENER FOR CONCRETE
TRADE-MARK

Description—Armortop is a liquid compound, which, applied to new or old concrete surfaces, changes soft granular topping into a granite-like mass that resists most severe wear and abrasion without dusting. It saves tearing up and relaying old floors beginning to rut. The complete transformation can be accomplished in the evening after closing hours, by unskilled labor.

Armortop penetrates into the concrete and reacts chemically with the cement, binding the loose disintegrating particles of the dry concrete into a dense, hard mass, with permanent results. Armortop should not be confused with temporary paint coatings.

The covering capacity of Armortop varies with the density of the floor. One gallon will completely harden from 70 to 150 sq. ft. of floor surface.

A concrete test slab showing the results of Armortop treatment will be sent on request.

Specifications—Upon the clean, dry floor apply a solution of 1 part Armortop and 1 part water in 2 or more coats, depending upon the density of the floor. Allow 4 hours to elapse between applications.

How Shipped—Armortop is shipped in containers of 5 gal., 30 gal. and 50 gal.

Amurseal Dampproofing

AMURSEAL
THE FOUNDATION DAMPPROOFING
TRADE-MARK

Amurseal, a black liquid asphaltic dampproofing, may be applied cold with spray or brush to the exterior of foundation walls or exposed concrete. Two coats give a solid, elastic film. Covering capacity approximately 80 sq. ft. per gallon, single coat; 50 sq. ft. per gallon, two coats.

How Shipped—Amurseal is shipped in drums of 5 gal., 30 gal. and 55 gal.

Aridtite Dampproofing and Plaster Bond

ARIDTITE
THE DAMPPROOF PLASTERBOND
TRADE-MARK

A black liquid asphaltic dampproofing and plaster bond applied cold to the inside surface of exterior walls in a single coat. Aridtite provides a perfect bond for plaster and assures a lasting job. It prevents moisture passing through the walls and thus eliminates stains and discolorations on plaster. Also used for coating unexposed sides of cut stone. Covering capacity, approximately 80 sq. ft. per gallon, single coat.

How Shipped—Aridtite is shipped in drums of 5 gal., 30 gal. and 55 gal.

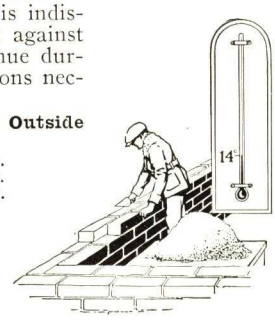
Accello, Concrete Accelerator and Anti-Freeze

ACCELLO
For Accelerating the Set of Cement
TRADE-MARK

Description—Accello, a standardized solution of calcium chloride, uniform in quality and strength, is used to accelerate the set of cement in concrete, mortar and floor finish in very cold weather, and to prevent freezing of portland cement mixtures at temperatures as low as 14° F. In plain concrete, cement plaster, floor toppings, brick mortar and road work, the use of Accello during the winter months, when the temperature falls as low as 14° F., is indispensable. It insures masonry work against freezing and permits work to continue during the cold weather. The proportions necessary are shown below:

Proportions Accello and Water at Outside Air Temperatures—

35° F., 1 part Accello to 20 parts water.
32° F., 1 part Accello to 15 parts water.
28° F., 1 part Accello to 12 parts water.
25° F. (or less), 1 part Accello to 10 parts water.
14° F. (or less), mechanical heat is necessary.



How Shipped—Accello is shipped in 50-gal. barrels and 5-gal. drums.

Detailed Information

Write for complete data and specifications for any work within the scope of "Anti-Hydro" products.

Dealers Everywhere Carry Stock

A complete stock of "Anti-Hydro" products is carried by dealers throughout the country.

The Services of Our Engineers Are Available at All Times

AQUABAR WATERPROOFING PRODUCTS, Inc.

Waterproofings, Dampproofings, Floor Hardeners, Technical Paints
"Known the World Over"

Perry Building, PHILADELPHIA, PA.

Representatives in All Principal Cities—Nearest Dealers Name Furnished on Request

Products

AQUABAR

TRADE MARK

- AQUABAR INTEGRAL COMPOUND NO. 1 WATERPROOFING PASTE.
- AQUABAR DURACRETE PLASTICIZER.
- AQUABAR AQUATITE INTEGRAL LIQUID WATERPROOFING.
- AQUABAR CONCENTRATED INTEGRAL WATERPROOFING POWDER.
- AQUABAR MORTARON SHRINKPROOFING.
- AQUABAR CLEAR COAT NO. 2 COLORLESS WATERPROOFING LIQUID.
- AQUABAR FERROCON METALLIC WATERPROOFING.
- AQUABAR STATITE PLASTER BOND NO. 3 DAMPPROOFING PAINT.
- AQUABAR MARINE CEMENT NO. 3A.
- AQUABAR STONE BACKING NO. 3B.
- AQUABAR MASTIC INSULITE CEMENT NO. 4.
- AQUABAR SEMI MASTIC.
- AQUABAR EMULSIFIED ASPHALT.
- AQUABAR IRON-CLAD CRYSTALS NO. 7B FLOOR HARDENER.
- AQUABAR DURO-MIX INTEGRAL LIQUID FLOOR HARDENER.
- AQUABAR DUROCON METALLIC HARDENER.
- AQUABAR QUICK-SET ANTI-FREEZE and ACCELERATOR.
- AQUABAR FLOORTEX WOOD FLOOR PRESERVATIVE.
- AQUABAR WALWITE FLAT and ENAMEL (Mill White).
- AQUABAR CONCO CEMENT FLOOR PAINT.
- AQUABAR CEMENTEX CEMENT PAINT.
- AQUABAR ROOF COATING NO. 5.
- AQUABAR FABRICATORS RED OXIDE, CARBONITE STEEL COATING (Structural Steel Coatings).
- AQUABAR ELASTICOTE NO. 6 WATERPROOFING PAINT.
- AQUABAR AQUATEX ELASTIC CAULKING COMPOUND.
- AQUABAR IRONCO NON-SHRINK AGGREGATE and BONDING IRON.
- AQUABAR GLASTEX FLOOR WAX.

THIRTY-SEVEN YEARS OF QUALITY AND SERVICE, 1901-1938

Over a quarter of a century resistance to storm, sleet and rain, as well as torrid suns, is the test to which AQUABAR PRODUCTS have successfully been subjected. The methods described are the development of the best practice known to waterproofing engineering and cover practically every field encountered in building construction and maintenance. Each product is the result of many years' careful research in our laboratories, and is added to the AQUABAR line only after the most exhaustive tests have shown each to be the most efficient in its respective field. Architects' and Engineers' specifications, test data, testimonials, etc., furnished upon request without obligation.

INTEGRAL WATERPROOFINGS

Integral Compound No. 1—A soft semi-paste which is easily dissolved in water for waterproofing foundation walls, floors, roof slabs, and all other forms of plain and reinforced concrete where absolute watertightness is essential; lubricates, increases slump from 50% to 100% with no increase of water, without affecting tensile strength; renders surface free from honeycomb by increased density.

Specifications for Waterproofing Mass Concrete—A dry mixture of cement, sand and stone 1:2:4 mix, shall be tempered to a medium wet consistency with water to which 1 part of AQUABAR Integral Compound No. 1 has been added to every 50 parts of water in strict accordance with manufacturer's directions.

Machine Mix—Figuring ½ gal. basis, add ⅔ pt. to each bag cement for mass concrete 1:2:4 mix, etc.

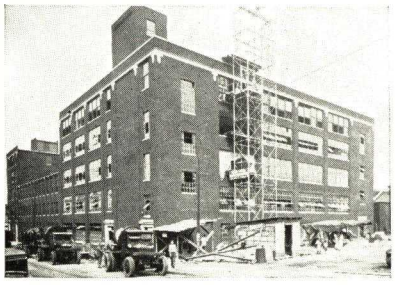
Covering Capacity—Use approximately ½ gal. per cu. yd. mass concrete 1:2:4 mix for ordinary moisture conditions; where water pressure exists, use ⅔ to 1 gal. per cu. yd.

Specifications for Waterproofing Cement Mortar and Stucco—The waterproofed cement mortar, consisting of 1 part cement, 2 parts sand with water shall be prepared by tempering to the proper consistency, to which 1 part of Integral Compound No. 1 has been added to every 25 parts water, in strict accordance with manufacturer's directions.

Covering Capacity—Approximately 1 gal. will waterproof 150 to 225 sq. ft. stucco (depending upon wetness of mix) ¾ plaster coat.

Aquatite Integral Liquid Waterproofing—A liquid compound for waterproofing, hardening and accelerating all concrete mixtures and cement mortar. It mixes readily and uniformly, insuring strength and hardness to concrete. Lubricates and enriches cement mortar, permitting quicker and easier troweling and, due to this plasticity and reduced amount of gauging water, prevents shrinkage from joints and efflorescence.

Specifications for Waterproofing Mass Concrete—To the 1:2:4 mixture for gauging add 1 gal. of Aquatite for every cubic yard concrete. Proper consistency will be obtained if for each barrel of cement 1 gal. of Aquatite and from 10 to 15 gal. of water be used. If forms are below water level, an extremely stiff mixture should be poured.



Wilson Products Co., Reading Pa.
MUHLENBERG BROTHERS, *Architects*
EDWARD A. REIDER, Contractor
Entire sub-structure waterproofed with Integral Compound No. 1 (hydrostatic pressure). Durocon used in the concrete floors.

Machine Mix—Figuring on 1-gal. basis add ⅔ qt. each bag cement for mass concrete 1:2:4 mix.

Covering Capacity—Use 1 gal per cu. yd. mass concrete 1:2:4 mix for ordinary moisture conditions. Where water pressure exists, use 1½ gal. per cu. yd.

Specifications for Waterproofing Cement Mortars—The 1:2 mortar shall be gauged by the addition of Aquatite to all water used in the proportion of 1 gal. each barrel (4 bags) cement.

Machine Mix—Add 1 qt. to each bag cement.

Covering Capacity—1 gal. will waterproof 100 sq. ft. 1 in. top coat 1:2 mortar or waterproof sufficient mortar to set up 1000 brick.

WATERPROOFINGS

Clear Coat No. 2 Colorless Waterproofing—Colorless transparent liquid for waterproofing, preserving, stainproofing exterior masonry walls above grade, cement, brick, stone masonry, limestone, concrete, stucco, terra cotta, etc. Does not change the appearance of the coated surface, nor leave a film upon application. Penetrates, filling all pores, rendering surface impervious to moisture and driving rains, permanently.

Covering Capacity—Approximately 125 sq. ft. per gal. 1 coat, 80 sq. ft. 2 coats, depending upon porosity.

Ferrocon Metallic Waterproofing—Iron method for waterproofing concrete, brick and similar surfaces on interior against pressure. Finely powdered iron mixed with sand, cement and water, and applied with brush to the inside surface of the foundation to waterproof against absorption of moisture and seepage of water. For use on old and new structures. Three to five coats recommended for pressure. Detailed specifications furnished upon request.

Specifications—Clean and roughen all surfaces, making them free from all foreign matter by scraping all loose material off and wirebrushing if necessary. Cut out all cracks and openings to a depth of 1 in. and fill with stiff mortar. Wet entire surface to be waterproofed. Under no circumstances use Ferrocon on dry surface.

1st coat: Ferrocon and water mixed to creamy consistency.

2nd coat: Ferrocon and cement mixed with water brushed on.

3rd coat: Ferrocon and cement mixed with water troweled on.

Add Ferrocon to water slowly, stirring constantly. Should be well rubbed in with rotary motion. Allow to become thoroughly dry, assuming reddish brown color. For additional coats use mixture same as for second coat.

Covering Capacity—Approximately 10 to 15 lbs. per 100 sq. ft. depending upon porosity.

Statite Plaster Bond No. 3—A black compound for application to masonry wall surfaces of all kinds, so as to form a dampproofing and bond for plaster (not portland cement mortar). It eliminates furring and lathing. Apply by brush or spray. *Note: do not use for concrete walls or ceilings.*

Covering Capacity—Approximately 75 sq. ft. per gal. 1 coat; 50 sq. ft. 2 coats.

Marine Cement No. 3A—A black compound of heavy consistency for dampproofing exterior foundation walls below grade, also for application to floor slabs of ground floors, gymnasiums, etc. Applied cold with brush or spray.

Covering Capacity—Approximately 60 sq. ft. per gal. 1 coat; 40 sq. ft. 2 coats.

Stone Backing No. 3B—A black compound for dampproofing unexposed surfaces of cut stone and for rustproofing roofing metal surfaces. It is applied just as it comes from the container.

Covering Capacity—Approximately 125 sq. ft. per gal. 1 coat; 75 sq. ft. 2 coats.

Mastic Insulite Cement No. 4—A black mastic for waterproofing foundations, walls, tunnels, etc., against heavy water pressure; for overcoating, caulking and patching old roofs, ceiling cracks, open joints, etc. Applied cold (with trowel) ⅛ to 3/16 in. thick according to the smoothness of the surface. When set, it has the consistency of hard rubber, never gets brittle and is unaffected by changes in temperature. Very elastic and adhesive; works freely.

Covering Capacity—Approximately 15 sq. ft. per gal. ⅛-in. thickness 8-10 sq. ft. ¼-in. thickness trowel coat.

Semi-Mastic—A heavy bodied bituminous coating containing long staple asbestos fibre to produce a brush coating of definite thickness. For the dampproofing of masonry walls and floors above and below grade. Can be used on all masonry surfaces, but not concrete, nor can it be applied to ceilings.

Covering Capacity—Approximately 30 sq. ft. per gal. 1 coat. Approximately 20 sq. ft. per gal. 2 coats.

Emulsified Asphalt—Pure unadulterated asphalt scientifically emulsified so that it may be used cold and without heating when mixed with aggregate for repairing cement floors, all roads and by itself as a bonding and waterproofing agent.

Covering Capacity—Approximately 75 sq. ft. per gal. 1 coat; 50 sq. ft. 2 coats.

Asphalt Primer—A liquid asphalt undercoating which will provide a foundation bond between structural elements and other bituminous materials to be applied thereon. Penetrates deeply. Apply cold with brush on dry surface.

FLOOR HARDENERS

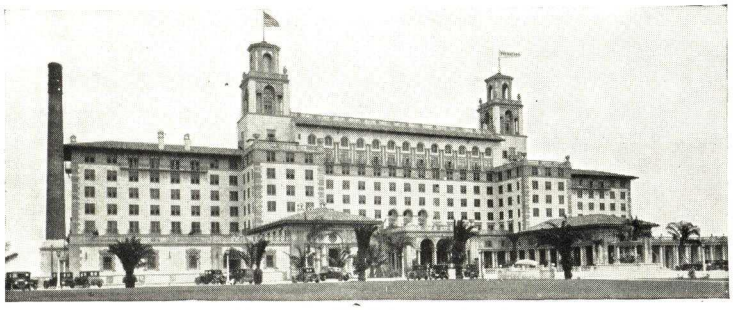
Iron-Clad Crystals No. 7B (Surface Treatment)—These crystals are dissolved in water, and applied to the concrete surface with a stiff brush or broom in two coats of equal strength for wearproofing, waterproofing and dustproofing of same.

Covering Capacity—Approximately 2 lbs. will treat 100 sq. ft. surface 2 coats.

Duro-Mix Integral Liquid Floor Hardener—A liquid added to water used in mixing cement top coat for wearproofing, waterproofing and dustproofing light duty and commercial floors. Adds to plasticity and density, increases strength and resistance to wear.

Specifications—Use 1 gal. per 100 sq. ft. top coat 1:2 mix, or add 1 qt. per bag cement.

Durocon Metallic Floor Hardener — A chemically treated all-ferrous water absorbent metallic hardener containing Ocon which gives advantages of low water-cement ratio, and provides a concrete of increased strength, resisting acid, alkali, etc. Easy to finish and free from dusting and crazing. Furnished in natural, gray, red, brown, or green. Also non-slip. Detailed specifications upon request.



Hotel Breakers, Palm Beach, Fla.

After exhaustive tests AQUABAR CLEAR COAT No. 2 Colorless Waterproofing Liquid was selected to waterproof exterior walls of entire structure against hurricane driving rains, high winds, etc.

QUICK-SET ANTI-FREEZE AND ACCELERATOR

This liquid is added to water used in mixing mass concrete cement mortar, etc., for accelerating the set to prevent freezing. Causes rapid evaporation of the water, and speeds final set, permitting work to continue in temperatures as low as 20° F.

FLOORTEX WOOD FLOOR PRESERVATIVE

A translucent liquid for preserving and dustproofing maple and yellow pine floors, without changing appearance of the surface. It prevents rotting and decay, and adds to wood those essential elements for preserving its life and appearance.

Covering Capacity—Approximately 350 sq. ft. per gal. 1 coat; 250 sq. ft. 2 coats, depending upon porosity.

PAINTS

Wal-Wite Flat and Enamel (Mill White)—A high grade mill white possessing high light reflecting qualities. Particularly useful for application to walls, ceiling and columns for daylighting interiors. It retains its whiteness and can be repeatedly washed without injuring it. Will not turn yellow.

Conco Cement Floor Paint—For protecting and decorating cement floors above or below grade, prevents dusting and disintegration, absorption of oils, greases and other foreign matter; is extremely durable, and resists wear to a remarkable degree. Light gray, lead, olive green, red brown and rust.

Covering Capacity—Approximately 250 sq. ft. per gal. 1 coat; 150 sq. ft. 2 coats.

Cementex Cement Paint—Cement paint in powder form for use over concrete, stucco and other virgin masonry surfaces, outside or inside. Adheres firmly—giving a waterproof decorative and lasting finish. Excellent for swimming pools, laundries, interior or exterior wet or dry surfaces. Made in various colors.

Covering Capacity—9 lbs. and 3 qts. water will make 1 gal which covers approximately 100 sq. ft. 2 coats.

Roof Coating No. 5—A pure Trinidad asphaltum product having remarkable adhesive and saturating properties for overcoating and waterproofing roofs of every description. It is applied cold with a brush.

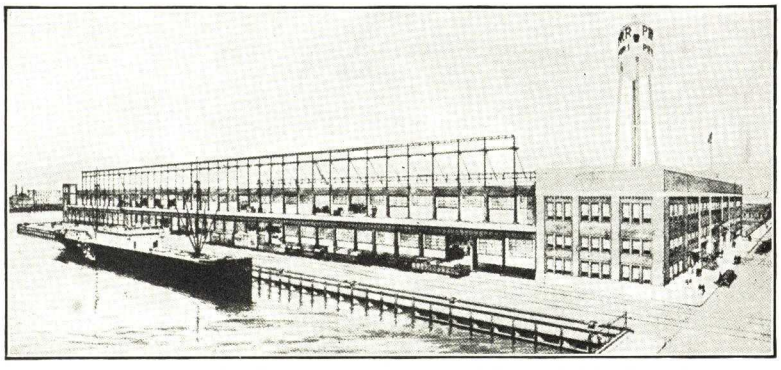
Covering Capacity—Approximately 100 sq. ft. per gal. 1 coat.

Elasticote No. 6 Waterproof Paint—A highly specialized liquid cement coating for waterproofing and dampproofing exterior and interior concrete, brick, cinder block, stucco, plaster and masonry walls. Gives a handsome appearance and offers excellent wearing qualities. Made in various colors. Recommended for swimming pools.

Covering Capacity—Approximately 150 sq. ft. per gal. 1 coat; 100 sq. ft. per gal. 2 coats.

AQUATEX ELASTIC CAULKING COMPOUND

For the caulking of window and door frames, pointing masonry and terra cotta joints and flashings of all kinds. A plastic material composed of weatherproof, waterproof and elastic bonding oils and gums, properly reinforced to permanently fill interstices and remains elastic and unaffected by weather. Absolutely stainproof. Gun or knife consistency in all colors.



Import Pier No. 1, Pennsylvania R. R., Canton, Baltimore, Md.

A. R. WILSON, Engineer of Bridges (P. R. R.) SINCLAIR & GRIGG, Contractors
Nearly half million square feet of Durocon-built floors

IRONCO NON-SHRINK AGGREGATE AND BONDING IRON

For bonding top finish and hardening concrete slab, patching and resurfacing old concrete floors, correcting concrete disintegration and surface spalling, interior and exterior, honeycombs and grouting bridge seats, rails, etc. Ironco increases strength 50%, eliminating shrinkage

and checking of gunned concrete; and it resists abrasion and corrosive agents.

Specifications—Ironco is an aggregate to be combined with cement gravel and sand in the following proportions (by weight): 1 part cement, 1 part clean sharp sand, 1 part Ironco where clearance is 1 in. or less, or 1 part cement, 1 part clean sharp sand, 1½ parts ¼-in. pea gravel, 1 part Ironco. For concrete pipe joints, 2 parts cement, 3 parts sand, 1 part Ironco. To any of these mixes, after turning it over enough times dry to insure the even distribution of aggregates and cement, add enough clear clean water to make the mix placeable, and in all cases avoid excess of water.

MORTARON SHRINKPROOFING

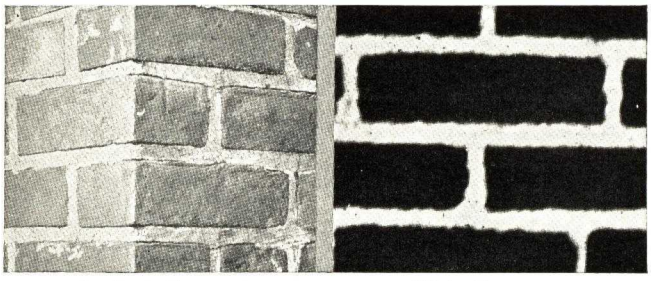
For Leakproof Brick Work and Masonry

Architects and builders agree that shrinkage of mortar which results in cracks between mortar and brick is the main cause of leakage. All mortars shrink excessively during first 24 to 48 hours before a strong bond is formed between mortar and brick. Shrinkage occurs regardless of whether patent masonry, cement or lime mortars or a combination of cement and lime are used, waterproofed or otherwise.

Shrinkage is inevitable in any mortar mix because more than twice as much water is required to provide workability than is needed to hydrate the cement.

Only by reduction of water content without loss of workability can shrinkage be checked.

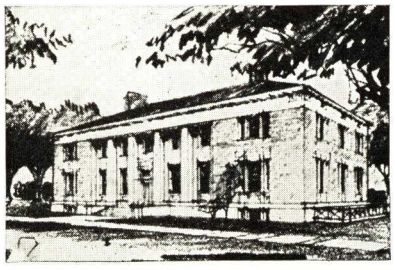
Reduces Shrinkage—Mortaron produces an ideal workable mortar with much less water and reduces shrinkage appreciably or below the critical point at which it breaks the bond.



Without Mortaron
Shrinkage Cracks—Leaky Walls

With Mortaron
Check Shrinkage—Perfect Bond

Increases Plasticity—Not only does Mortaron retain required workability with less water; it actually increases it. The gelatinous properties of Mortaron so increase plasticity that the mason must automatically reduce water or add sand, or both to obtain proper consistency.



Stockwell Memorial Library, Albion College, Albion, Mich.
Charles Z. Klauder, Architect
Charles R. Wermuth & Son, Inc. Contractors
350,000 brick shrinkproofed with Mortaron. Durocon floors.

Checks Efflorescence—The puzzolanic action of Mortaron reduces soluble salts which cause efflorescence originating from the mortar.

Reduces Water Absorption — Mortaron assists bond, checks capillary action and renders pores more water repellant.

Improves Adhesion—The puzzolanic effect of Mortaron increases the extent of bond.

Increases Strength—Greater density resulting from reduced water-cement ratio increases bond, shear and compressive strengths of mortar.

Shrinkage of Fresh Mortar—Shrinkage takes place during setting and early hardening period of the mortar. No appreciable shrinkage takes place after twenty-four to forty-eight hours.

MORTARON EFFICIENCY TESTS

E. L. CONWELL & CO., PHILADELPHIA, PA.
Nos. 230791-2-3

Mix	Shrinkage in Inches Specimens 3" (Diameter) x 60" (Original Height)	Bond Strength	Compressive Strength Specimens 3" x 6" Cylinder	
	48 Hours	28 Days	7 Days	28 Days
1:1:6 Plain	0.756**	33.0*	802*	998*
1:1:6 **With Mortaron**	**0.720**	**36.8**	**825**	**1093**
1:3 Plain	0.686	41.8	1779	2405
1:3 **With Mortaron**	**0.612**	**46.0**	**1864**	**2598**

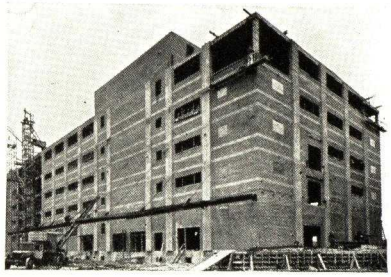
Average of three specimens. **Decrease in height. *Pounds per square inch.
Materials Used: Samples of standard brands of cement and hydrated lime, etc.
Admixture Added at the rate of 1 qt. per bag cement and 1 qt. per bag lime.
Mortars in comparison contained equivalent quantity of water, including the liquid content of the admixture.
Special Note—3-in. (diameter) x 60-in. (original height) cylinders used to check actual shrinkage in comparison far more accurate and practical than 2x4 or 3x6-in cylinders.

Note: All mixtures and tests as shown were devised by the Conwell Testing Laboratory. No one connected with our Company was permitted to interfere or make suggestions to the Testing Laboratory. We desired to present to the Architectural and Engineering profession the true advantages to be gained by the use of Mortaron Shrinkproofing as seen by absolutely disinterested parties.

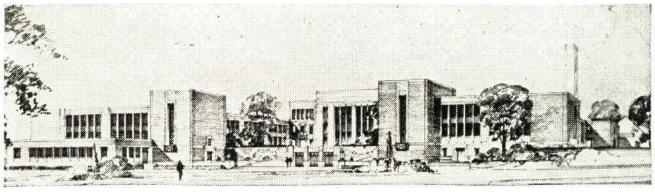
Checking the report you will note Bond Strength for 28 days shows considerable gain in strength of mortar when it has Mortaron in it. It is that characteristic which prevents masonry work breaking loose from the joint, allowing water to enter, and permitting distintegration to start and to continue. This gain in strength, considered in connection with the fact that Mortaron Shrinkproofing really does reduce shrinkage to an appreciable extent, is of material value.

Specifications—Mortar for all exterior exposed brick, backup tile or stone walls, full thickness of the wall, shall consist of 1 part cement, 1 part slaked lime putty, 6 parts sand — 1:2:7 — 1:3 (or other mixes as designated) or approved masonry cements, to which shall be added Mortaron Shrinkproofing in proportions of 1 qt. per each bag cement and 1 qt. per each cu. ft. lime putty.

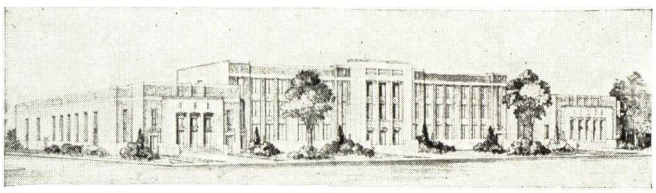
Should patent masonry mortar be used instead of cement and lime, Mortaron to be added in same proportion as above stipulated.



Warehouse Building No. 89, Congoleum-Nairn, Inc.
Zantzinger & Borie, Architects
Turner Construction Co., Contractors
1,000,000 brick shrinkproofed with Mortaron. Durocon floors.



Senior High School, Norristown, Pa.
Davis & Dunlap, Architects Ralph S. Herzog, Contractor
2,000,000 brick shrinkproofed with Mortaron. Entire sub-structure waterproofed with Integral Compound No. 1. Durocon used in concrete floors.



Senior High School, Lebanon, Pa.
Ritcher & Eiler, Architects Consolidated Engineering Co., Contractors
1,500,000 brick shrinkproofed with Mortaron. Colored Durocon used in concrete floors.

DURACRETE FOR DURABLE CONCRETE

A puzzolanic plasticizer in liquid form for concrete which increases plasticity and workability with much less volume of water, and reduces solubles by its puzzolanic action.

The aim in the production of good concrete is to use as little mixing water as possible; sloppy mixtures do not make a strong, durable or waterproof concrete. In a cubic yard of concrete approximately 2½ gal. of water per sack of cement is required to fully hydrate the cement. Any water in excess of that amount must be regarded as "placing" water, merely providing sufficient workability to make the use of the mix economical. This excess of "placing" water occupies about 10% of the total space of concrete of average design.

The loss of excess water means a corresponding loss in volume causing shrinkage in the mass and likewise in the formation of minute capillary pores. Pores in concrete not merely allow for the entrance of moisture, but actually absorb moisture through capillary attraction.

Duracrete automatically accomplishes a sharp reduction in total water, but provides a sharp increase in placeability in all practical concrete mixes.

Duracrete insures a greater density, greater strength, watertightness and corrosion-resistance, and because of its puzzolanic nature, it readily combines with the lime or calcium hydroxide set free in the formation of portland cement forming water insoluble compounds.

Disintegration of concrete is caused mainly by the action of sulphates and acids on the soluble calcium, therefore the advantage of Duracrete in this respect can be readily understood.

By reducing the solubles it not only makes the concrete resistant to chemical reaction, but also resistant to the destructive effects of freezing and thawing.

Duracrete increases slump 100% with no increase of water.

New York Central R. R. Coach Repair Shop, Buffalo, N. Y.
E. A. Dougherty, Designing Engineer

Specifications—Add 1 gal. Duracrete per cu. yd. of concrete for mixes using up to 6 sacks cement per cu. yd. For each sack of cement in excess of 6, add 1 qt. additional of Duracrete. Volume of clear water in all cases shall be reduced by not less than the volume of Duracrete added to the mix.

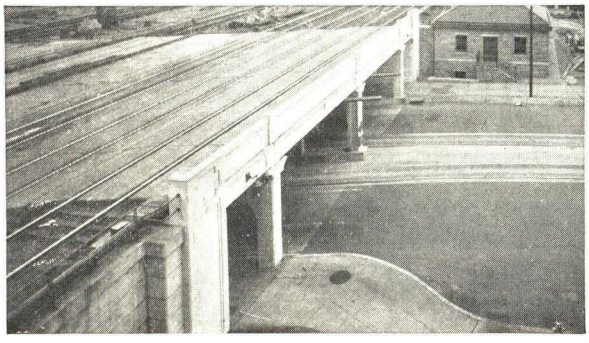
TEST SHOWING IMPROVED WORKABILITY BY USE OF DURACRETE

	Gals. water per sack of cement		Slump in in.	Design strength 28 days	Tested strength 28 days
	Net	Gross			
Plain Concrete	4	5½	3	3500	3800
	4.2	5½	2¾	3500	3750
	4.1	5½	1¾	3500	3820
Average			2½		3790
Same concrete with Duracrete	3.9	5½	6½	3500	4310
	3.9	5½	5	3500	4030
	3.9	5½	4½	3500	3860
Average			5⅓		4067

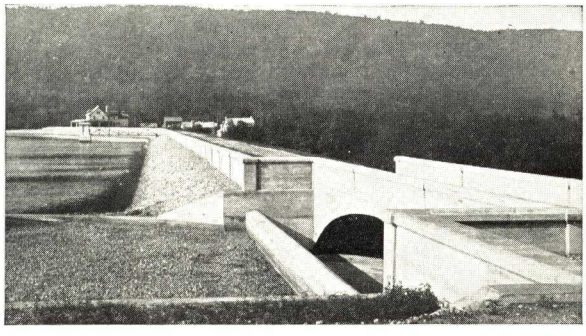
One gallon of *Duracrete* added per cu. yd. Volume of water equal to amount of admixture added.
Water-cement ratio maintained.
Workability by slump test increased 113% over plain mix.

PARTIAL LIST OF DURACRETE INSTALLATIONS

Champion Paper & Fibre Co., Pasedena, Tex.
J. E. Sirrine & Co., Engineers
Congoleum-Nairn, Inc., Marcus Hook, Pa.
Private Plans, Turner Construction Co., Contractors
Greening Wire Co., Hamilton, Ont., Canada
Prack & Prack, Architects
Union Gas Company, Brooklyn, N. Y.
Private Plans, John H. Deeves & Bro., Contractors
E. I. duPont deNemours & Co., Inc., Philadelphia, Pa.
Private Plans, Turner Construction Co., Contractors
Sewage Treatment Plant, Middletown, Del.
Albright & Friel, Engineers
Pennsylvania R. R. Engine Terminal Facility, Harrisburg, Pa.
A. R. Wilson, Engineer Buildings and Bridges
Reading R. R. Bridge, No. 89-05 Schuykill River, Schuykill Haven, Pa.
Clarke Dillenbeck, Chief Engineer
American Viscose Co., Front Royal, Va.
Ballinger Co., Architects
Scott Paper Co., Chester, Pa.
Private Plans, Robert E. Lamb & Co., Contractors.

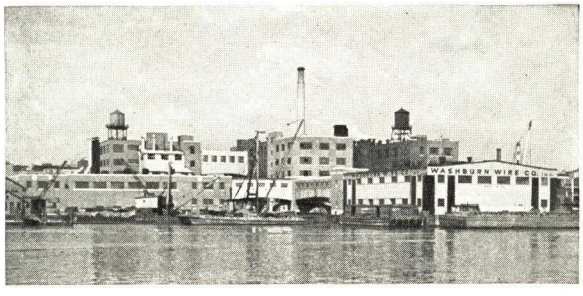


Pennsylvania R.R. Market Street Bridge, Harrisburg, Pa.
A. R. Wilson, Engineer Buildings and Bridges
Rails placed in troughs or slots in concrete slab.



Reservoir and Dam, Roaring Creek Water Co., Shamokin, Pa.
Gannett, Seeleye & Fleming, Engineers
Wm. H. Dechant & Son, Associates

Keebler Weyl Baking Co., Philadelphia, Pa.
Clarence E. Wunder, Architect



Washburn Wire Co., 116th St. and East River, New York, N. Y.
Subject to hydrostatic pressure—entire sub-structure, elevator pits below water level.

Duracrete used in all concrete on above structures

ESTABLISHED 1879

THE BILLINGS-CHAPIN CO.

Manufacturers of Damp-proof Coatings, Paints, Varnishes, Stains and Enamels

MAIN OFFICE AND FACTORIES
1163 East 40th Street, CLEVELAND, OHIO

NEW YORK BRANCH, 438 Pearl Street — BOSTON BRANCH, 7 Elkins Street

A LEADER IN DAMP-PROOFING AND STAIN-PROOFING

For over twenty-five years, Driwal has been the recognized leader in damp-proofing and stain-proofing materials. Specified by prominent architects and used on important buildings, it has always given the most thoroughly satisfactory results. Driwal becomes effective by penetrating into the pores of the material and lining them with an insoluble substance which makes them fully water repellent.

Driwal
TRADE-MARK

Driwal is made in four varieties: Clear, for limestone, sandstone, cast stone and brick; Heavy Bodied Clear, a heavier bodied form of Clear; White, for stucco, brick and concrete; and Black for below grade waterproofing.

Clear Driwal for Stain-proofing and Damp-proofing

Clear Driwal is a colorless liquid which effectively damp-proofs and prevents the staining of limestone, sandstone, cast stone, concrete and brick.

It keeps stone in its natural condition and is entirely safe for use on the lightest colored, finest textured quarry products.

Clear Driwal also retards the absorption by stone of dirt and grime from the atmosphere and materially assists in keeping buildings free from the city's dirt and grime.

Specifications for Stain-proofing— ***New Buildings***—(a) All stone dust must be thoroughly brushed off and the stone dry to a depth of at least ¼ in. before any attempt is made to treat the surface.

(b) All surfaces, except the outside face, of all cut stone shall be given one saturating coat of Clear Driwal, preferably with a flat brush.

(c) After the building has been cleaned and tuck pointed and allowed to dry, the face of the stone shall be given one or two coats (optional) of Clear Driwal, allowing at least one day to elapse between coats.

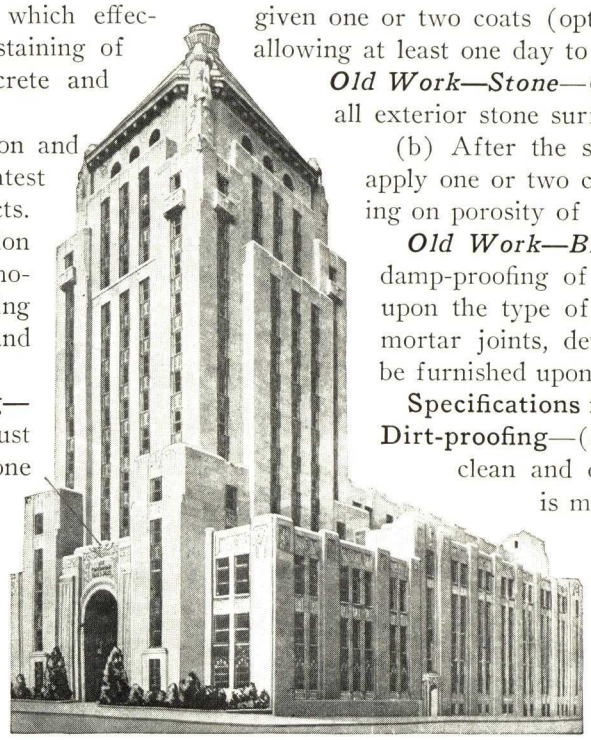
Old Work—Stone—(a) Prior to application, all exterior stone surfaces shall be cleaned.

(b) After the stone is thoroughly dry, apply one or two coats of Driwal, depending on porosity of surface.

Old Work—Brick—As the successful damp-proofing of brick surfaces depends upon the type of brick and condition of mortar joints, detailed specifications will be furnished upon request.

Specifications for Damp-proofing and Dirt-proofing—(a) The surface must be clean and dry before any attempt is made to apply Driwal.

(b) The exterior surface and all joints shall be given two saturating coats of Clear Driwal, applied with a flat brush or spray. At least one day shall be allowed to elapse between coats.



Cincinnati Times-Star Building, Cincinnati, Ohio
SAMUEL HANNAFORD & SONS, Architects
Damp-proofed with Clear Driwal

Heavy Bodied Clear Driwal

This material is a heavier bodied and more concentrated form of Clear Driwal. On all but the most porous surfaces Heavy Bodied Clear will satisfactorily damp-proof in one coat.

It can be used on the same surfaces as the Clear, and becomes effective in the same way.

On highly porous surfaces, where more than the usual number of coats would be required, anyway, Heavy Bodied Clear will fill the pores more quickly and more effectively damp-proof in fewer coats.

Black Driwal

Designed for below-grade waterproofing and supplied in three consistencies:

No. 1, for fairly smooth surfaces
No. 2, for rough surfaces
No. 3, a paste compound for surfaces subjected to heavy pressure

White Driwal

White Driwal decorates at the same time it thoroughly damp-proofs a surface, covering old stains and restoring the original fresh and attractive beauty of stucco and similar surfaces.

White Driwal becomes effective by penetrating into the pores of the surface and can be used on any surface where reasonable penetration can be secured, but should not, of course, be used on previously painted surfaces.

Billings-Chapin-Dri-Coat

Dri-Coat is a white pigmented damp-proof sealer for interior walls and cement floors with the unique quality that it may be applied to interior walls to stop the penetration of moisture from the exterior.

Dri-Coat in most ordinary cases will eliminate moisture trouble, but will not correct serious construction defects where there is water pressure from without.

To Specify—Not to be used over old coats of paints, kalsomine, or enamels. Normally dries hard over night for recoating. Any paint, flat wall, or enamel can be used over it when perfectly dry. Covers approximately 350 sq. ft. per gal., one coat.

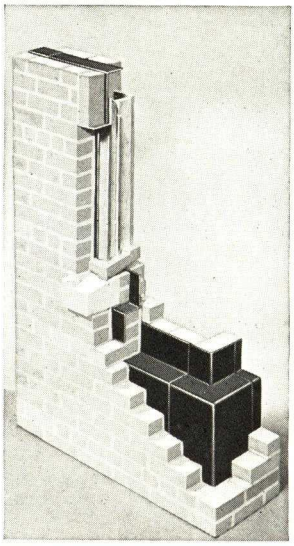
Write us for further information.

BRISK WATERPROOFING COMPANY

Specialists in Preventive and Remedial Waterproofing
Appliers of Larson Pre-Formed Waterproofing Units
103 Park Avenue, NEW YORK, N. Y.

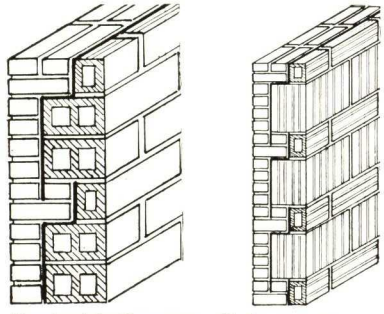
LARSON PRE-FORMED WATERPROOFING UNITS

(U. S. Patent No. 1970326)

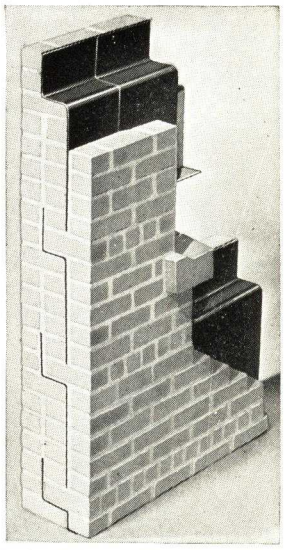


Section of External Corners

Larson Pre-Formed Waterproofing Units constitute a permanent and impenetrable barrier to any water leaking through masonry walls above grade.



Used with Concrete, Cinder or Terra-cotta Back-up



Section Through Completed Wall

This system of waterproofing is the only effective method that can be used where both inside and outside are finished brick or brick and face terra cotta.

Easily Handled—Completely Seals All Joints

The Units are of such size that they can be easily and quickly handled both on the scaffold and as they are built into the wall. The overlapping joints are completely sealed as they are laid and all corners are provided with specially formed units to insure a continuous water barrier locked to the standard wall units at these vulnerable points.

The design of Larson Waterproofing Units is such that the strength of brickwork is increased by their use. (See illustrations.) At each header course in the face, a corresponding header course laps it under the membrane of the unit from the inside of the wall. This results in a very sturdy bond in the wall and is easily accomplished.

Specially Formed Spandrel Units

Considerable difficulty has always been encountered in providing tight joints between window and door frames and surrounding masonry. Special units have been designed for this purpose which interlock with the standard wall units so as completely to seal the frame from all water or dampness.

Spandrels are protected in the same manner by special units which continue the membrane at these points.

A Specially Developed Material

Larson Pre-Formed Waterproofing Units are made of a specially developed material, extremely tough, and resilient enough to withstand the pre-forming processes and the handling and setting without injury. It is not only waterproof but resistant to corrosive action from either acid or alkali and will withstand all the chemical processes involved in the setting of cement or lime mortars. This material when embedded and sealed in the brickwork is as indestructible as the wall itself and is both impervious and impenetrable to water.

Shapes and Sizes

Only 5 shapes are required to meet any condition ordinarily encountered. A standard wall unit weighs approximately 2 lbs. and it is approximately 18½ in. high and 36 in. long. This provides a unit which is extremely handy and presents no difficulty when being placed in the wall. Units of special size and design can also be fabricated to meet unusual conditions.

Typical Larson Installations

Building	Architect
School, Bellport, L. I., N. Y.	William I. La Fon
River Avenue School, Patchogue, L. I., N. Y.	Tooker & Marsh
Hewitt School, Rockville Centre, L. I., N. Y.	Tooker & Marsh
Georgian Church, W. Sayville, L. I., N. Y.	Leslie M. Dennis
High School, Port Jefferson, L. I., N. Y.	Daniel Perry
High School, Monticello, N. Y.	Tooker & Marsh
Waverly School Addition, Eastchester, N. Y.	Tooker & Marsh
School No. 3, Long Beach, L. I., N. Y.	Wilson & Rahm
High School, Manhasset, L. I., N. Y.	Tooker & Marsh
Grade School, Selden, L. I., N. Y.	Lewis Inglee
High School, Riverhead, L. I., N. Y.	William I. La Fon
Grade School, Amagansett, L. I., N. Y.	Tooker & Marsh
Orange County Welfare Home, Goshen, N. Y.	Whitman S. Wick
School, Philadelphia, N. Y.	D. D. Kieff
W. C. Mepham School, Bellmore, L. I., N. Y.	F. P. Wiedersum
Wilsey Hall, Amityville, L. I., N. Y.	Lewis Inglee
School, Garden City, L. I., N. Y.	Tooker & Marsh
Orange County Office Bldg., Goshen, N. Y.	Whitman S. Wick
Infirmary and Home, Yaphank, L. I., N. Y.	Bishop & Metcalfe
Mall Building, Point Lookout, L. I., N. Y.	F. P. Wiedersum
Schubert School, Baldwin, L. I., N. Y.	F. P. Wiedersum
Plaza School, Baldwin, L. I., N. Y.	F. P. Wiedersum
Francis Wilson School, Rockville Centre, L. I., N. Y.	F. P. Wiedersum
High School, Summit, N. J.	Coffin & Coffin

Remedial Waterproofing

New Jersey Bell Telephone Bldg., 540 Broad St., Newark, N. J.
Master Printers Building, 460 W. 34th St., New York, N. Y.
Chapel for Seton Hall College, East Orange, N. J.
Essex House, Central Park South, New York, N. Y.
Apartment House, 720 Park Ave., New York, N. Y.
St. Gabriel's Church, New Rochelle, N. Y.
St. John's Church, Newark, N. J.
Church of the Redeemer, Brooklyn, N. Y.
Christodora Settlement House, New York, N. Y.
Apartment House, 322 Central Park West, New York, N. Y.
Apartment House, 230 Riverside Drive, New York, N. Y.
Nelson Tower Building, 34th St. and 7th Ave., New York, N. Y.

BUILDING CHEMICALS CORPORATION

Chemicals for Building Construction
51 East 42nd Street, NEW YORK, N. Y.
REPRESENTATIVES AND DEALERS IN PRINCIPAL CITIES

BUILDING CHEMICALS' PROCESS FOR TRANSPARENT WATERPROOFING

(Process Patented, U. S. Pat. No. 1899391)

What It Does

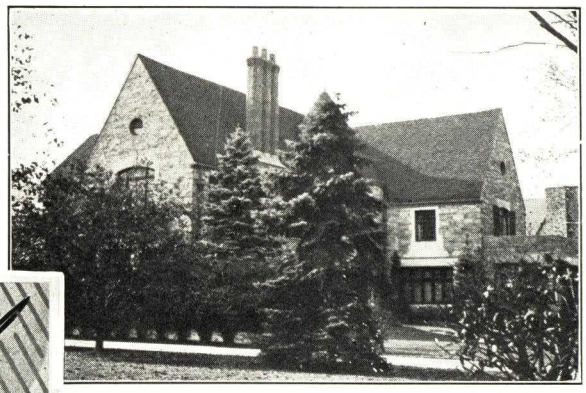
The Building Chemicals' Process is designed to waterproof the exterior of buildings with absolutely no change in their appearance.

The Process waterproofs buildings to resist wind and rain of hurricane force.

The Standard Specifications include:

(1) Repointing with waterproof cement mortar.
(2) Filling all cracks at joints with permanent waterproofing.
(3) Saturating all pores to refusal with waterproofing under separate hurricane air blast.

BUILDING CHEMICALS CORPORATION takes direct responsibility for every job it undertakes.



Erickson Residence, Forest Hills, L. I., N. Y.
Stone preservative by Poncho Process
WM. E. HAUGAARD, Architect

Co-operation

BUILDING CHEMICALS CORPORATION encourages the association of architects and engineers with waterproofing problems. We recommend that a competent architect, or engineer familiar with the structural conditions, be put in charge of all work where possible.

Poncho Contracts

These contracts are performed by the BUILDING CHEMICALS CORPORATION. The Poncho Contract Specifications protects walls against leakages and corrects faults disclosed by thorough examination.

Permanent results are guaranteed both by bond and company guarantee.

Proficiency

Proficiency is assured by a staff of trained craftsmen, in our employ. These men use the most modern equipment and safety devices, constructed for this particular field.

Experience

During the course of 29 years in the waterproofing field, we have encountered almost every type of leakage. It is due to this experience that our craftsmen can deal with any individual problem that may arise; this is a material aid in the solution of your specific case.

Methods

By the use of an exclusive patented method of application, we assure permanent waterproofing results; and our system of operation guarantees perfect workmanship. We build resistance into the surface (penetration as much as ¾in.)

Tests

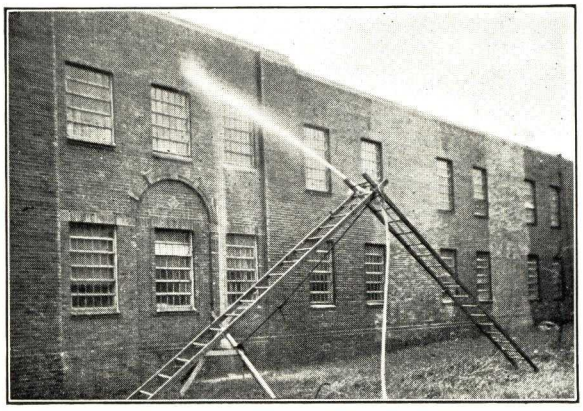
In jobs tested under actual working conditions by the National Bureau of Standards, New York State Department of Public Works, and by private research laboratories, we have received highest ratings and best comparative results.

Materials

Poncho contract products, tried by years of experience, and subject to rigid inspection under almost impossible weather conditions, perfectly perform the function of preservation and waterproofing.

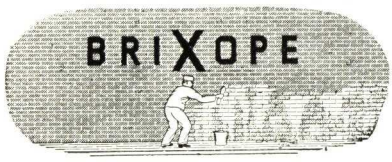
Appearance

Our finished work is so colorless and inconspicuous as to be invisible to the eye. This means that we exercise the greatest care and study to preserve architectural characteristics, maintain proper appearance and protect all existing work.



Marcy State Hospital, New York
Fourteen thousand gallons on one spot 4 continuous hours

OTHER B.C.C. PRODUCTS



B.C.C. Oil Waterproofing—Waterproofs mortar and positively prevents the action of efflorescence or climbing salts through the mortar joint. Acts as a plasticizer for mortar and concrete. Test by the National Bureau of Standards and Department of Agriculture furnished upon request.

BriXope Concentrated—A combination of stainless oils for removing efflorescence on brickwork. Prevents further leeching out of efflorescence and acts as a damp-proofing and brick preservative. All work is performed in one hanging of the scaffold.

B.C.C. Crystal Hardener—A cement floor after-treatment which, when dissolved in water, forms a solution that reacts on the free calcium in the cement topping to form calcium fluoride, providing a hard, flintlike surface which wears smooth and glossy under foot.

Hard-n-tyte Surface Hardener—This cement floor hardener, manufactured by the General Chemical Company, can be supplied from our stock.

B.C.C. Liquid Integral Waterproofing—A chemical solution for waterproofing concrete and masonry—concrete below grade, cement finish and brick mortar. An all-season waterproofing—indispensable for winter work. Increases plasticity and saves labor.

B.C.C. Ammonium Stearate Paste (20%)—This material is a 20% solution of ammonium stearate in paste form; is pure and unadulterated and is prepared for use as an integral waterproofing in either concrete or mortars. Higher strengths can be made on specification.

SAMUEL CABOT, INC.

Clear Brick and Cement Waterproofings for External Application

141 Milk Street, BOSTON, MASS.

For Branch Offices and Agents, see our pages on Stains and Collopakes

For Cabot's Shingles, Stains, Insulating "Quilt," Collopakes (for every paint use), Wood Preservatives, see File Index

PRODUCTS DESIGNED TO WATERPROOF BRICK, STUCCO, CEMENT, STONE, AND ALL TYPES OF MASONRY ABOVE GROUND LEVEL

CABOT'S CLEAR BRICK WATERPROOFING

For All Red Brickwork, Sandstone, and Similar Dark Surfaces

This material has a record of forty years of satisfactory service all over the country. It is based on a natural water-repellent, a wax created and employed by nature for waterproofing purposes, dissolved in a penetrating solvent that carries the wax deep into the pores of brick or stone and seals them. It gives much better protection than linseed oil—one coat is equivalent to three of the oil—and it goes further and lasts many times as long.

Prevention of Efflorescence—The white efflorescence on brickwork is due to the fact that the bricks absorb rain water. This water dissolves the salts within the brick, and when it dries out, the salts are carried to the surface, where they leave unsightly white stains.

Our Clear Brick Waterproofing stops any moisture from getting into the bricks and therefore prevents efflorescence.

CABOT'S CLEAR CEMENT WATERPROOFING

For Stucco, Cast Stone, Concrete, and Other Light Surfaces

This waterproofing is composed of ingredients isolated from naturally waterproof materials, dissolved in a penetrating organic liquid. It is transparent, and will not darken light surfaces.

Clear Cement Waterproofing fills and seals all the voids and pores in cement and stucco walls. Even on the roughest surfaces, it blocks up every hole, and since it is not an integral waterproofing, but is applied after the wall is finished, it seals all cracks and joints as well.

More than twenty years of actual trial in the field have thoroughly proved the worth of this Waterproofing.

South Shore Hotel, South Shore Drive, Chicago, Ill.
Waterproofed with Cabot's Clear Brick Waterproofing

Cabot's

Clear Brick and Cement

Waterproofings

Samuel Cabot Inc

ARCHITECT'S SPECIFICATIONS FOR APPLICATION OF CABOT'S WATERPROOFINGS

Cabot's Clear Brick Waterproofing

All exterior red or dark brick walls, or sandstone, including joints, shall be waterproofed with Cabot's Clear Brick Waterproofing. Apply only to structurally sound, clean, dry surfaces with a brush, like paint, or with a spray gun. Two coats are usually sufficient but not more should be applied than the brick and joints will absorb, and no coating should remain on the surface.

Covering Capacity—One gallon will cover from 200 to 300 sq. ft., two coats, on common brick of average quality, and from 300 to 400 sq. ft. on face brick.

Prevention of Efflorescence

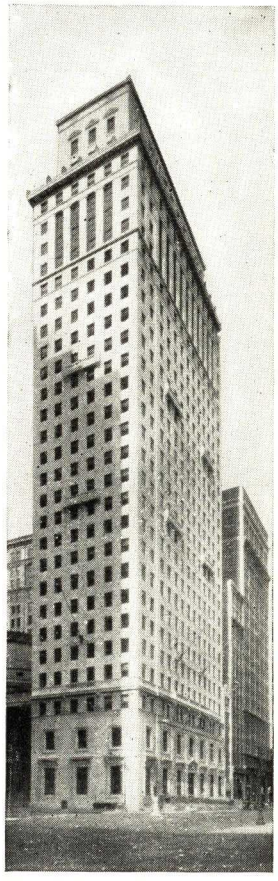
All brick walls, on which efflorescence of salts or mortar stains have appeared, shall be washed with a weak muriatic solution, following which the surface shall be rinsed with clean water and allowed to dry. Cabot's Clear Brick Waterproofing shall then be applied with a brush like paint, or with a spray gun. Only as much waterproofing shall be applied as is necessary to fill all the pores and no coating should remain on the surface.

Cabot's Clear Cement Waterproofing

All exterior (concrete) (caststone) (stucco) (limestone) (light colored brick) surfaces, including joints, shall be waterproofed with Cabot's Clear Cement Waterproofing. Apply only to structurally sound, clean, dry surfaces with a brush, like paint, or with a spray gun.

Only as much waterproofing shall be applied as is necessary to fill all pores, and no more; but, if the surface is not uniform and some parts are more porous than others, care should be taken to apply sufficient waterproofing to fill all places. No coating should remain on the surface.

Covering Capacity—One gallon will cover from 200 to 300 sq. ft., two coats, on smooth concrete, brick or stone, and from 100 to 200 sq. ft., two coats, on stucco or rough cast, depending upon character and condition of the surface.



Girard Trust Company Building, Philadelphia, Pa.
McKim, Mead & White, Architects
Cabot's Clear Cement Waterproofing used on all ornamental cast-stone parapet embellishments

CERESIT WATERPROOFING CORPORATION

Manufacturers of Waterproofings, Dampproofings, Concrete Floor Hardeners and Other Protective Products

GENERAL OFFICES AND FACTORY
512 South Canal Street, CHICAGO, ILL.
SALES REPRESENTATIVES AND WAREHOUSE STOCKS IN ALL PRINCIPAL CITIES

CERESIT WATERPROOFING COMPOUND

The use of integral waterproofing provides a practical, economical, and thoroughly successful method of securing positive waterproofness in portland cement mixtures, such as concrete, mortar, and stucco.

Ceresit Waterproofing Compound is the original waterproofing paste. It was developed by German chemists and brought to the United States in 1909. It is still made from the original German formula, modified, refined and concentrated.

The introduction of a waterproofing in paste form at the time of mixing insures uniform and complete distribution of the waterproofing agent throughout the mass.

Ceresit Waterproofing Compound waterproofs, densifies, and lubricates concrete and other portland cement mixtures. It performs these important functions:

(1) Insures positive and permanent waterproofness.

(2) Produces a "fatty" mix, thus increasing workability to a marked degree. It makes concrete flow more easily through chutes and forms and around reinforcing.

(3) Permits a noticeable reduction in the water content which adds to the strength and increases the density.

(4) Has no chemical reaction with the cement. It mixes easily with the water, which makes its use a simple operation without adding to labor costs.

(5) It is a time tested product, having been in successful use for more than a quarter century.

Ceresit Waterproofing Compound is a plastic paste used in proportions as indicated on the following page.

Condensed Specification—All mass concrete shall be waterproofed integrally with Ceresit Waterproofing Compound to be used in accordance with the instructions of the manufacturer, CERESIT WATERPROOFING CORPORATION.

CERESIT METALLIC WATERPROOFING

In the construction of new buildings, basement waterproofing is invariably included in the specifications. Authorities differ as to the method used. Many architects and engineers lean to the integral type, while others prefer a surface application, using metallic waterproofing, referred to generally as the "Iron Method." This method, being a surface application, can be used after construction is completed. It is of equal value in waterproofing basements of existing buildings.

Ceresit Metallic Waterproofing is a pulverized iron compound in powder form with which is combined during the process of manufacture, certain oxidizing chemicals. It conforms to U. S. Government specifications and has been used on many large government projects.

When applied by qualified mechanics, its use insures permanent waterproofness, even when hydrostatic pressure is present.

Condensed Specification—All surfaces as indicated in the plans shall be waterproofed with Ceresit Metallic Waterproofing to be applied in accordance with the instructions of the manufacturer, CERESIT WATERPROOFING CORPORATION.

CERESIT
TRADE MARK REGISTERED

The prestige of more than a quarter century of successful use stands behind Ceresit products. Through engineering research and actual application in construction and maintenance problems each Ceresit product has been developed to the highest degree of efficiency. Ceresit products are being used in all parts of the United States, Canada, Mexico and many other countries.

CERESIT METALLIC HARDENER

The use of a metallic hardener in concrete floor construction insures a floor which will stand the stress of heavy service.

The metallic hardener method of concrete floor finishing is universally recognized as the surest way to produce a floor which will be wear resistant to the greatest degree.

Ceresit Metallic Hardener is incorporated in the finish when the concrete floor topping is placed. It not only resists excessive wear, but provides a floor surface which will not dust and which is waterproof and oilproof.

Ceresit Metallic Hardener is ground from pure iron and contains no other metals or substances other than iron. It is properly graded from coarse to fine, and processed during manufacture to remove all oil and grease.

It meets the rigid U. S. Government specifications and has been used in many representative Government buildings as well as in every type of industrial plant and other important structures.

The amount of Ceresit Metallic Hardener to be used per 100 sq. ft. of surface is indicated on the following page. Shipped in 100-lb. waterproof bags.

Ceresit Metallic Hardener is supplied in standard Gray, also in Red, Brown, Battleship Gray, and Green.

Condensed Specification—All concrete floors, as indicated in the plans, shall be hardened with Ceresit Metallic Hardener (insert color if desired), to be used in accordance with the instructions of the manufacturer, CERESIT WATERPROOFING CORPORATION.

CERETONE COLORING PIGMENT

Ceretone is concentrated color in semi-paste form combined during the process of manufacture with a hardening agent. Only chemically pure colors are used in Ceretone. It produces a concrete floor surface of perfectly uniform and permanent color which is wear resistant, dustproof and waterproof.

Ceretone is mixed with the gauging water or placed directly in the mixer where it is uniformly dispersed.

The use of Ceretone produces better and more lasting color effects and a more wear resistant floor surface. It is also a factor in saving labor costs as the simplicity of use renders that possible.

A Ceretone floor is attractive, economical, wear resistant, dustproof and waterproof.

Condensed Specification—All concrete floors, as indicated in the plans, shall be colored and hardened with (state color required) Ceretone Coloring Pigment, to be used in accordance with the directions of the manufacturer, CERESIT WATERPROOFING CORPORATION.

CERESIT PROTECTIVE PRODUCTS

WATERPROOFINGS AND DAMPPROOFINGS—INTEGRAL AND SURFACE APPLICATION

Ceresit Waterproofing Compound

A waterproofing paste, introduced from Germany in 1909. The oldest and best known waterproofing of the integral type, Ceresit has been used internationally for over a quarter century.

Quantity Required—6-8 lbs. per cu. yd. of concrete. 6-8 lbs. per 100 sq. ft. of cement mortar or cement floor finish, 1 in. thick. Proportionate amounts for inch fractions. 1 pt. weighs about 1 lb.

Ceresit Waterproofing Powder

Performs same waterproofing functions as the paste. Made in powder form to meet the preference of many architects, and for certain classes of work.

Quantity Required—2 lbs. per sack of portland cement.

Ceresit Waterproofing Liquid

Contains the same basic waterproofing elements as the paste. Made to meet the demand of many customers for the liquid type of integral waterproofing.

Quantity Required—1 gal. per cu. yd. of concrete. 1 gal. per 100 sq. ft. of 1-in. cement mortar.

Ceresit Metallic Waterproofing

Universally used where waterproofing is accomplished by surface application. For new construction, also for waterproofing basements, pits, etc., of existing buildings.

Quantity Required—25 lbs. per 100 sq. ft. for walls. 20 lbs. per 100 sq. ft. for floors before cement topping is applied.

Cresolac Transparent Waterproofing

A waterproofing and stormproofing liquid for exteriors of stucco, brick, stone and similar materials. Waterproofs effectively without any discoloration. Applied with brush or spray.

Quantity Required—100-150 sq. ft. per gal. Amount required depends upon porosity of surface.

Ceresit Foundation Dampproofing

A black asphaltic paint for waterproofing exterior foundation walls below grade.

Quantity Required—70-80 sq. ft. per gal., 1 coat. 40-50 sq. ft. per gal., 2 coats.

Ceresit Plaster Bond

A black, tacky asphaltic dampproofing and bonding paint applied to walls before plastering.

Quantity Required—Same coverage as Dampproofing.

PRODUCTS FOR BUILDING MAINTENANCE AND PRESERVATION

Overnight Craxement

A metallic patching cement for repairing concrete floors, trucking lanes and similar work. Floors repaired in late afternoon are ready for heavy duty the next morning. Particularly adapted to concrete floors which must be repaired in the shortest possible time. Will resist lactic and similar acids. Shipped ready for use.

Quantity Required—8-10 lbs. per sq. ft., 1-in. thickness.

Colored Craxement

Overnight Craxement can be supplied in red, brown, and battleship gray colors.

Quantity Required—Same as regular Craxement.

Feather Edging Craxement

For patching industrial floors of concrete, mastic or wood. No chipping required. Sets in 30-48 hours.

Quantity Required—12 lbs. per sq. ft., 1 in. thick. Proportionate amounts for inch fractions.

Ceresit Metallic Grout

A specialized metallic compound to be combined with portland cement and aggregate for grouting under heavy machinery and similar work where a solid, permanent and vibration-proof base is essential. Such a grout will not shrink. It is quick setting, waterproof and oilproof, and attains a final strength far greater than ordinary concrete. Specifications for use sent on request.

REPRESENTATIVE INSTALLATIONS OF CERESIT PRODUCTS

American Can Company.....Chicago, Ill.
Chrysler Corporation.....Detroit, Mich.
Dept. of Street Rys....City of Detroit, Mich.
Ford Motor Company.....Dearborn, Mich.
General Motors Building.....Mexico, D. F.
International Harvester Co....Ft. Wayne, Ind.
Kroger Baking Company.....Chicago, Ill.
Miami Biltmore Hotel.....Coral Gables, Fla.
Municipal Reservoir.....Wayland, N. Y.
Municipal Swimming Pools.Farmville,N. C.,
.....Platteville, Wis., Tarboro, N. C.
National City Bank.....Mexico, D. F.
Ogden Ave. Improvement, City of Chicago, Ill.
Proviso Township High School..Maywood, Ill.
Sears, Roebuck & Co.....Lake Charles, La.
State Highway Building.....Austin, Tex.
University of Michigan.....Ann Arbor, Mich.
U. S. Courthouse.....St. Louis, Mo.
U. S. Federal Bldg.....El Paso, Tex.
U. S. Naval Academy.....Annapolis, Md.
U. S. Post Offices.....Monroe, La.,
.....Portland, Ore., St. Paul, Minn.
War Memorial Building.....Holyoke, Mass.
Water Purification Plant.....Owosso, Mich.

CERESIT
TRADE MARK REGISTERED

CONCRETE FLOOR HARDENERS AND COLORED FLOOR FINISHES

Ceresit Metallic Hardener

For new concrete floor toppings. Made from pure iron, properly graded, and entirely free from oil, grease and all non-ferrous metals. Provides an iron hard, non-dusting surface for heavy duty concrete floors. Meets U. S. Government specifications.

Quantity Required—30 lbs. per 100 sq. ft. medium duty. 40 lbs. per 100 sq. ft. heavy duty. 50 lbs. per 100 sq. ft. extra heavy duty.

Colored Ceresit Metallic Hardener

Regular hardener combined with color, and machine mixed. Standard colors are red, brown, battleship gray and green.

Quantity Required—Same as regular Metallic Hardener.

Metalsium

A combination of regular hardener with Silium and other elements to produce a material with puzzolanic properties and having greater resistance to acids and alkalis, as well as added plasticity and workability. Also furnished in colors.

Quantity Required—Same as regular Metallic Hardener.

Crescrete Integral Hardener

A chemical solution for integral use in new cement floor toppings. Gives a wear resisting, non-dusting and waterproof surface. Accelerates the set and increases workability.

Quantity Required—1 qt. in gauging water per sack of cement. Use double quantity for floors subject to lactic or similar acid.

Ceretone

A semi-liquid integral hardener and coloring material. Gives a floor of lasting color with a wear resisting, dustproof and waterproof surface. Made in red, buff, brown, black and green.

Quantity Required—¾ gal. in gauging water per sack of cement.

Indurite Liquid Hardener

A chemical solution for surface application to new or old concrete floors. Hardens and dustproofs the surface by chemical reaction. An approved method, in successful use for many years.

Quantity Required—1 gal. covers 100 sq. ft.

Indurite Crystals

These crystals dissolved in water produce the liquid hardener described above.

Quantity Required—2½ lbs. per gal. of water, then 1 gal. of solution per 100 sq. ft.

Ceresit Metalbond

A metallic binder to assist in bonding new concrete floor toppings, and to provide a waterproof membrane between slab and topping.

Quantity Required—15-20 lbs. per 100 sq. ft.

CALBAR PAINT & VARNISH COMPANY

Manufacturers of Technical Paints, Caulking and Glazing Compounds

FACTORY AND EXECUTIVE OFFICE
2612-26 North Martha Street
PHILADELPHIA, PA.

Products

CALBAR "CAULK-O-SEAL" (Reg. U. S. Pat. Off.), NON-STAINING CAULKING, POINTING and GLAZING COMPOUND.

Also Calbar Industrial and Technical Coatings and Finishes.

Calbar Caulk-O-Seal Non-staining Caulking, Glazing and Pointing Compound

The necessity for a material having an elastic nature for sealing cracks, waterproofing and glazing, prompted us some years ago to devote a large amount of time, money and effort to produce a product that would fill every requirement for varying conditions. After several years of constant experiments and gradual improvements we developed a compound which was considered the acme of perfection. Time has proven that our product is just right. Each feature has been carefully tested and we offer those, who are interested in a caulking compound of exceptional merits, Calbar Caulk-O-Seal Plastic Compound.

The saving of fuel from air leakage is an economic necessity. Heating, ventilating and air conditioning of buildings can not be controlled while there are cracks around doors and windows and other openings where air in unregulated amounts can enter. Of course, there are other things to consider also. Such openings allow dirt, dampness and deterioration to get in their work. It is well recognized at the present time that all buildings, from the modest two-story home to the highest skyscraper, require caulking. The cost is low and the benefit is great.

Caulk-O-Seal—Permanently Plastic Compound

Caulk-O-Seal is a permanently plastic compound that is impervious to heat, cold, moisture and fumes. It dries with a tough surface hide which can be painted over without bleeding through. Beneath the surface it remains plastic and pliable for years, taking up expansion or contraction of adjoining surfaces. Vibration does not harm it. It is strictly a waterproof product. It adheres firmly and tenaciously to any surface, whether glass, marble, tile, brick, concrete, wood, steel, limestone, etc.

Caulk-O-Seal—Non-staining Compound

Caulk-O-Seal is a truly *non-staining* compound. This feature is of extreme importance and we suggest that it be considered carefully. It will not stain the surrounding surface adjacent to the place applied. This is a distinctive feature of our product and worthy of consideration. Many beautiful buildings, of limestone and marble construction principally, have been marred by the use of a compound which exudes liquid. The liquid is required as it is the life of the compound. If it bleeds out, its life is lessened. It will be a revelation to you to make a few simple tests with Caulk-O-Seal. Samples will be furnished to demonstrate its *non-staining* quality.

Method of Application

The method of application advocated by us is by the use of a hand caulking gun. We furnish a light, powerful gun, easily operated and capable of developing a high pressure. Caulk-O-Seal is the proper consistency and is easily forced to the required depth in an opening. A canvass of caulking contractors proves conclusively that the use of a hand gun saves labor costs and does the work properly, making a smooth, even, exterior finish.

Caulk-O-Seal—Gun Grade or Knife Grade

Caulk-O-Seal is supplied in Gun Grade (for use with caulking gun) and in Knife Grade (for use with a putty knife or caulking tool). Made in white, gray, limestone, buff, natural, green, red, maroon and black. Special colors made to order in any quantity. Packed in all sized convenient containers. One gallon of Gun Grade will caulk about 150 lineal feet of an opening, ¼ in. wide and ½ in. deep. Seventeen lbs. of Knife Grade is equivalent to one gallon of Gun Grade.

Caulking Around Window and Door Frames

In new construction, it is recommended that the compound be applied between the frame proper and the masonry. When spaces are deeper than ½ in., they should be packed within ½ in. of the surface with oakum and the remaining space completely filled with Caulk-O-Seal. The staff bead is then put in place.

Pointing Stonework, Terra Cotta, Copings, etc.

All joints should be raked back to a depth of ½ in. and filled in with Caulk-O-Seal.

Glazing

For embedding and glazing glass in wood or metal sash or skylights, use the same as putty. The elasticity of Caulk-O-Seal prevents glass from breaking due to vibration or contraction and expansion.

Guarantee

Caulk-O-Seal when applied as directed under usual conditions will give exceptionally satisfactory service and last for a number of years. Many installations are still in perfect condition after ten years.

References

Many important buildings have been caulked with Caulk-O-Seal, including schools, hospitals, apartment houses, churches, public buildings, hotels, United States Government buildings, and industrial plants.

Contractors approved by us are available in principal cities of the United States.

THE ELATERITE PAINT & MANUFACTURING CO.

Waterproofing and Bonding Materials

DES MOINES, IOWA

DISTRIBUTORS

EASTERN OFFICE: Geo. J. Benziger, 33 E. 20th St., New York, N. Y.—Algonquin 4-9084

CHICAGO, ILL., Charles L. Brown, 1719 Fisher Bldg.
KANSAS CITY, MO., Stewart Sand & Material Co., 304 City Bank Bldg.—Victor 5920
LOS ANGELES, CALIF., California Stucco Co., 1840 E. 25th St.
MILWAUKEE, WIS., Spray-O-Bond Co., 2225 No. Humboldt Ave.—Locust 4660
OAKLAND, CALIF., R. M. Johnson, 1716 Filbert St.
ST. LOUIS, MO., F. A. Cammann Builders Service Co., 927-28 Century Bldg.—Chestnut 0866
SEATTLE, WASH., F. T. Crowe Corp., 216 Walker Bldg.
WASHINGTON, D. C., Robley E. Dickerson, 1924 Kearney St., N. E.

TORONTO, ONT., CANADA, W. L. Anderson, Terminal Warehouse, 207 Queens Quay

Products

No. 60, DES MOINES ELATERITE for WATERPROOFING and BONDING; No. 65, DES MOINES ELATERITE for STONE BACKING.

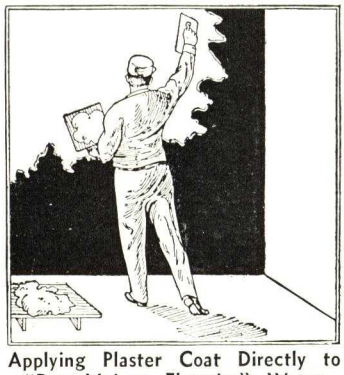
Also manufacturers of Preservative Paints for all classes of surfaces, including Acid and Heat Resisting Paint, Metal Protective Paint, and Waterproofing Gum.

DES MOINES ELATERITE

TRADE-MARK

No. 60, Waterproofing and Bonding

No. 60, Des Moines Elaterite, is both a waterproofing (either membrane or integral) and a bonding material. Its base is elaterite, an intensely adhesive, extremely elastic, non-porous, acid-resisting, absolutely waterproof hydrocarbon, called "mineral rubbers" by geologists. It is mined from true fissure veins extending to great depths and the only deposits of commercial size are located in western United States. Elaterite is entirely distinct from either natural or cut-back asphalts, common to waterproofing materials, and vastly superior.



Applying Plaster Coat Directly to "Des Moines Elaterite" Waterproofing and Bonding Coat

Because of the individual characteristics of this pigment No. 60, Des Moines Elaterite, seals the pores of concrete, cement, brick, tile or stone with an elastic, permanently pliable, rubbery envelope, destroys capillary attraction by its insulating properties and provides a continuous, protecting film which completely shuts out dampness. In addition, its intensely adhesive quality (determined as 295 lbs. by Bureau of Standards of New York City) makes No. 60 an ideal bonding material, permitting direct application over it of plaster or stucco coats and bonding them firmly and permanently.

Advantages—Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room and saving in labor and material costs. It meets every waterproofing requirement, thus there is no need to specify a different material for outside foundations, inside walls, bonding or integral waterproofing.

Application—Applied cold, it spreads easily with broad flat brushes or may be applied with air gun. No hot swabbing or layers of felt required and any workman can apply it.

Covering Capacity—100 to 150 sq. ft. (one coat) per gal.; 80 to 100 sq. ft. (two coats) on cement, brick or stone, depending on porosity; 250 to 300 sq. ft. on wood or metal.

Specifications—***(a) For Waterproofing Substructures***—The waterproofing contractor shall apply a waterproof membrane of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING CO., Des Moines, Iowa, to the outside of all foundation walls to a point 6 in. above grade, including piers, and to be carried over all footings and properly joined to waterproofing course on outside walls. Membrane shall consist of 2 coats properly applied so there shall be no pinholes or uncovered spaces. At least 24 hours must elapse after the application of first coat before applying a heavy second coat, allowing it to dry thoroughly before covering. Walls shall be cleaned thoroughly to remove all loose particles, must be dry and, if of concrete, thoroughly set before applying No. 60, Waterproofing and Bonding, Des Moines Elaterite.

(b) For Dampproofing Interior Walls Which Are to Be Plastered, or for Waterproofing Exterior Walls Which Are to Be Stuccoed—The contractor shall apply 2 coats of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING CO., Des Moines, Iowa, over the inside surface of all exterior walls which are to be plastered, and outside surface of all walls which are to be stuccoed. The walls shall be clean and dry and the application so made that there shall be no pinholes or uncovered spaces. At least 24 hours must elapse between the application of the first and second coat, which shall be a heavy coat.

Plaster shall be applied directly over the coating of No. 60, Des Moines Elaterite, after the second coat is "set" but while it is still "tacky," though not sooner than 3 hours after the second application, nor longer thereafter than 10 days. Stucco shall be applied directly over the coating of No. 60, Des Moines Elaterite, while it is "tacky," but not sooner than 3 hours after application of the second coat nor longer thereafter than 10 hours.

(c) For Integral Waterproofing Use—All plaster or stucco (or mortar for laying up brick, or cement floor or roof toppings or concrete) to be made waterproof must have No. 60, Waterproofing and Bonding, Des Moines Elaterite, as manufactured by THE ELATERITE PAINT & MANUFACTURING CO., Des Moines, Iowa, incorporated integrally, proportioned either with the water used for tempering or with the quantity of portland cement used in the batch in the following manner:

If proportioned with the water used for tempering it shall be 1 to 8—1 part No. 60, Des Moines Elaterite, to 8 parts water.

If proportioned with the portland cement it shall be 1 gal. No. 60, Des Moines Elaterite, to each 1⅔ bags of portland cement used.

The No. 60, Des Moines Elaterite, shall be added to the mixture in the foregoing proportions after the water has been put in for tempering, and the mixing shall then be continued until there is complete and thorough distribution throughout the mixture. It must not be added to the water before the latter has been put in for tempering the mixture.

For integral mixture in waterproofing concrete which is subject to heavy water pressure the proportion shall be changed to 1 part No. 60, Des Moines Elaterite, to 4 parts water used—1 gal. No. 60 to each 4 gal. of water. The No. 60 to be added after the water has been stirred into the mixture and the stirring continued until there is complete distribution.

No. 65 Stone Backing

Specification — All stone shall be coated, before setting, on the five unexposed sides; also entire inner surface, including joints, shall be coated after the stone is set with No. 65, Stone Backing Des Moines Elaterite, as manufactured by THE ELATERITE PAINT & MANUFACTURING CO. of Des Moines, Iowa.

Protecting Stone Facing from Discoloration with "Des Moines Elaterite"

Prices and References

Sent on request.

EVER-PLASTICS CORPORATION

Makers of Ever-Plastic Compounds
Graybar Building, 420 Lexington Avenue
NEW YORK, N. Y.

TELEPHONE
MOhawk 4-0436

REPRESENTATIVES IN PRINCIPAL CITIES

EVER-PLASTICS FOR CAULKING, GLAZING, TILE AND FIXTURE SETTING

EVER-PLASTICS CORPORATION has developed a series of ever-plastic compounds for the express purpose of eliminating the difficulties and shortcomings of ordinary plastic materials.

These compounds are based upon a plastic carrier in combination with an adhesive, and asbestos and mineral fillers. Certain variations and adjustments in formulation fit each compound to a specific use. For special purposes a larger user can obtain a compound especially adapted to his requirements.

CAULKTEX

A Superior Caulking Compound for Every Purpose Contains no Oil—Is Non-staining

Caulktex is an ideal caulking compound suitable for every kind of land or marine construction. It will not harden, dry, rot, nor stain. It is unaffected by climatic changes—no matter how extreme.

Caulktex is an asbestos composition filler which is absolutely gas-proof, fume-proof, watertight, stain-proof—containing neither oil nor asphaltum. It will adhere to a damp surface. It forms an elastic film on the surface after setting which may readily be painted in any desired color.

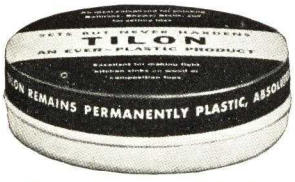
Caulktex is always ready for use; no mixing or preparation is required. Spreads rapidly in a layer as thin as $\frac{1}{16}$ in. and still gives full protection. Caulktex goes 100% further than any ordinary compound. It may be applied with either knife or gun.

Recommended Uses—Around wood or metal door and window frames, for joining tin or galvanized iron roofs to walls, insetting copings on parapet walls, in joints between stone and wood and all other stone or terra cotta work, for sealing flashings and chimneys and for joints in air conditioning ducts.

How Furnished—Caulktex is furnished in 5-lb. cans and 50-lb. drums.

TILON

For Pointing Bathtubs, Shower Stalls and for Setting Glass Brick and Mirrors



Tilon is a *new* plastic setting compound with exceptional adhesive power. It is a composition filler which sets firmly, but remains plastic regardless of weather changes of extremes. It is elastic, yet tough, and can withstand building vibrations and extremely hard usage. Tilon will not stain, nor is it affected by the strongest soaps or salt water.

When applied Tilon is light cream in color. It develops a smooth surface upon setting that readily takes paint of any shade. No mixing or preparation is necessary. Only a thin layer of Tilon is required to make a tight and permanent joint. Can be spread as thin as $\frac{1}{32}$ in. and still retain its plastic qualities.

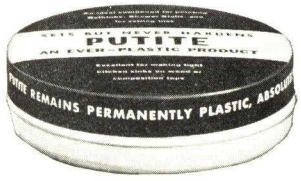
Recommended Uses—Tilon was originally developed for setting tile and for pointing bathtubs and shower stalls. It proved to be excellent for making tight joints of kitchen sinks on wood or composition tops, for performing similar services with laundry and lavatory fixtures, in setting plate glass, glass bricks, glass, ceramic or composition tile, for setting mirrors *(does not affect the silvering)* and expansion joints of practically every kind.

For Cementing Linoleum to Damp Surfaces—Tilon is an ideal adhesive for cementing linoleum to wood, concrete and metal floors. No amount of dampness, either on the surface or below the floor, will effect it. It permanently prevents curling and warping of the linoleum.

How Furnished—Tilon is furnished in 4-oz. and 5-lb. cans and 50-lb. drums.

PUTITE

A "Crack-Proof Putty" for Glazing or Making Tight and Permanent Joints of all Kinds



Putite is a *new* plastic putty. It assures a tight and lasting, repair-free job because it remains permanently elastic. It never deteriorates.

It is unaffected by climatic changes, no matter how extreme. Will not dry out, harden, become brittle, check, crack, rot or crumble. Putite is always waterproof, watertight, does not stain. It sets firmly and acquires a tough skin that takes any color paint. It is ready for constant and immediate use; no mixing, kneading or preparation of any kind is required. It is easy to use, can be spread rapidly in a layer as thin as $\frac{1}{32}$ in.—and still give protection.

Recommended Uses—Putite is recommended for all types of glazing—hothouses, residences, whether metal or wood frames—for all types of marine caulking. It is unusually effective in pointing bathtubs, kitchen sinks, etc. It has proved to be ideal as a permanent or temporary adhesive in applying wood, metal, glass, or composition letters to hard surfaces.

How Furnished—Putite is furnished in 4-oz. and 5-lb. cans and 50-lb. drums.

SANI-SETT

For Making Tight and Permanent Joints in Setting Closet Bowls, Urinals and Traps

Sanitary engineers and architects have long contended that the only material that could make a permanently tight and sanitary joint would be a *permanently plastic* material. Sani-Sett will not harden, dry or rot. It never deteriorates, it is absolutely gas-proof, fume-proof and waterproof. It contains no oil and cannot cause stains.

Sani-Sett is economical because there is no waste; ½ lb. is sufficient for a setting. And Sani-Sett is always ready for use; no mixing or preparation is needed.

Recommended Uses—Sani-Sett has proved invaluable for installation of plumbing fixtures, especially where there is continuous vibration. Sani-Sett is the only product of its kind that can withstand constant vibration without repairs or attention of any kind.

Specified by United States Government—The United States Government, one of the largest users of Sani-Sett, first specified it in the following manner: "An asbestos composition filler which is a germicide, absolutely gas- and fume-proof, watertight, stain-proof, containing neither oil nor asphaltum, and which will not rot, harden or dry under any extreme of climatic change."—*and then issued a specification known as Federal Specification HH-C-536 to cover Sani-Sett.*

How Furnished—Sani-Sett is furnished in ½, 1 and 5-lb. cans and 50-lb. drums.

Samples of Ever-Plastic Products on Request—Please apply on your letter head

THE HYDROLITHIC WATERPROOFING CO., INC.

ASSOCIATE CONTRACTORS

THE HYDROLITHIC WATERPROOFING CO., INC.
6415 Hamilton Avenue
PITTSBURGH, PA.

TAYLOR-HYDROLITHIC CO., INC.
95 Liberty Street
NEW YORK, N. Y.

Service

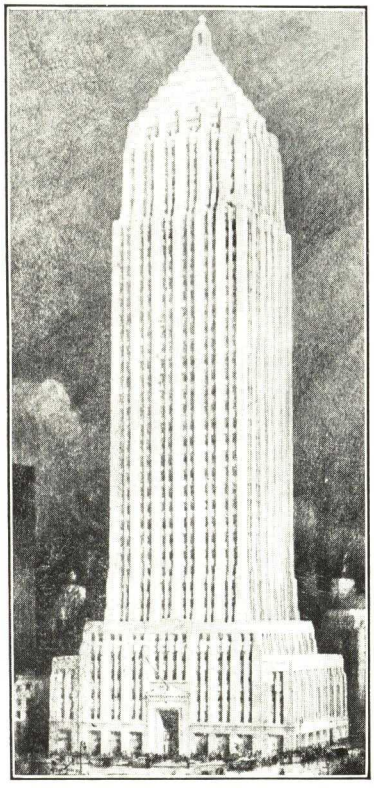
We specialize in the waterproofing of basements, pits, pools, shafts, tanks, tunnels, etc., in both *New* and *Old* structures, and do not undertake work for which we cannot give a positive guarantee against the penetration of water, mineral oils, gases and certain acids. We operate throughout the country and all applications are made by experienced mechanics trained in our service. To procure satisfactory results a thorough knowledge of both material and application is very essential, and for this reason we offer no material for sale.

Product

Hydrolithic is a waterproof cement, applied as a coating, 5/8 in. thick to the inside surfaces of exterior walls, and 1 in. thick over the top of the floor slab; producing a sanitary wall finish, smooth and even, and a long-wearing floor surface of pleasing light gray color.

Our coatings are perfectly bonded and become not only a permanent part of the structure to which they are applied, but lend strength and durability as well. A pioneer in the field of cement waterproofing, Hydrolithic has a long and successful record, and that record will continue, as we rigidly maintain our high standard for both material and workmanship.

TRADE-MARK
HYDROLITHIC
30 YEARS OF DISTINCTIVE SERVICE



Office Building Gulf Refining Co., Pittsburgh, Pa.
TROWBRIDGE & LIVINGSTON, Architect
E. P. MELLON, Associate Architect

Advantages

Waterproofing the inside surfaces of structures has many advantages over the outside method as it requires less excavating, eliminates supporting walls, furring and plaster, and takes the place of the usual floor finish. In case of fracture, due to damage or settlement, repairs can be quickly and economically made, as our waterproofing is exposed to view and is readily accessible. Another advantage is that it can be applied to wet or dry surfaces, even under heavy water pressure. Lastly, our coatings do not deteriorate, but become stronger and harder with age.

Specifications

The interior surfaces of all exterior walls to a height of.....feet, and the interior columns to a height of..... feet above the finished basement (sub-basement) floor, and over the entire basement floor, including the sides and bottoms of all pits, trenches or other depressions, and any walls against earth between floor levels, shall be waterproofed with Hydrolithic Cement Coatings, applied by THE HYDROLITHIC WATERPROOFING CO., INC., Pittsburgh, Pa., or Taylor-Hydrolithic Co., Inc., New York, N. Y.

Prior to the application of the waterproofing, all the surfaces shall be thoroughly roughened, and washed clean.

Wall coating shall be applied in two coats, making a total thickness of not less than 5/8 in.; finished by float, or steel trowel, to a smooth and even surface.

Floor coating shall be 1 in. thick, applied in one coat, floated and troweled to a smooth and even surface, and this coating shall serve as the finished wearing surface, as well as the waterproofing medium.

Guarantee

The waterproofing contractor shall furnish a written guarantee covering his work, for a period of 5 years.

During this time he shall, at his own expense, promptly repair any leaks which may develop, provided such leaks are not due to structural changes in the building, or to external damage to the waterproofing, for which he is not responsible.

REPRESENTATIVE INSTALLATIONS

BUILDINGS AND LOCATIONS	ARCHITECTS
Cathedral of St. John the Divine, N. Y.	Cram and Ferguson
The Hangar Club, New York, N. Y.	Cross and Cross
Mrs. Fredk. E. Guest Res., Roslyn, N. Y.	Grosvenor Atterbury
Yale & Towne Mfg. Co., Stamford, Conn.	James Gamble Rogers
B. F. Goodrich Co., Akron, Ohio	Purdy and Henderson
H. T. Parson Res., Long Branch, N. J.	Horace Trumbauer
Federal Reserve Bank, Pittsburgh, Pa.	Walker & Weeks
Horne Dept. Store, Pittsburgh, Pa.	Janssen & Crocker
Mellon National Bank, Pittsburgh, Pa	Trowbridge & Livingston
H. J. Heinz Auditorium, Pittsburgh, Pa.	Albert Kahn
Standard Sanitary Co., Various Cities	Hunting, Davis & Dunnells
Bell Telephone Buildings, Various Cities	Various Architects

5
14

ESTABLISHED 1897

A. C. HORN COMPANY

Products for Preservation and Decoration

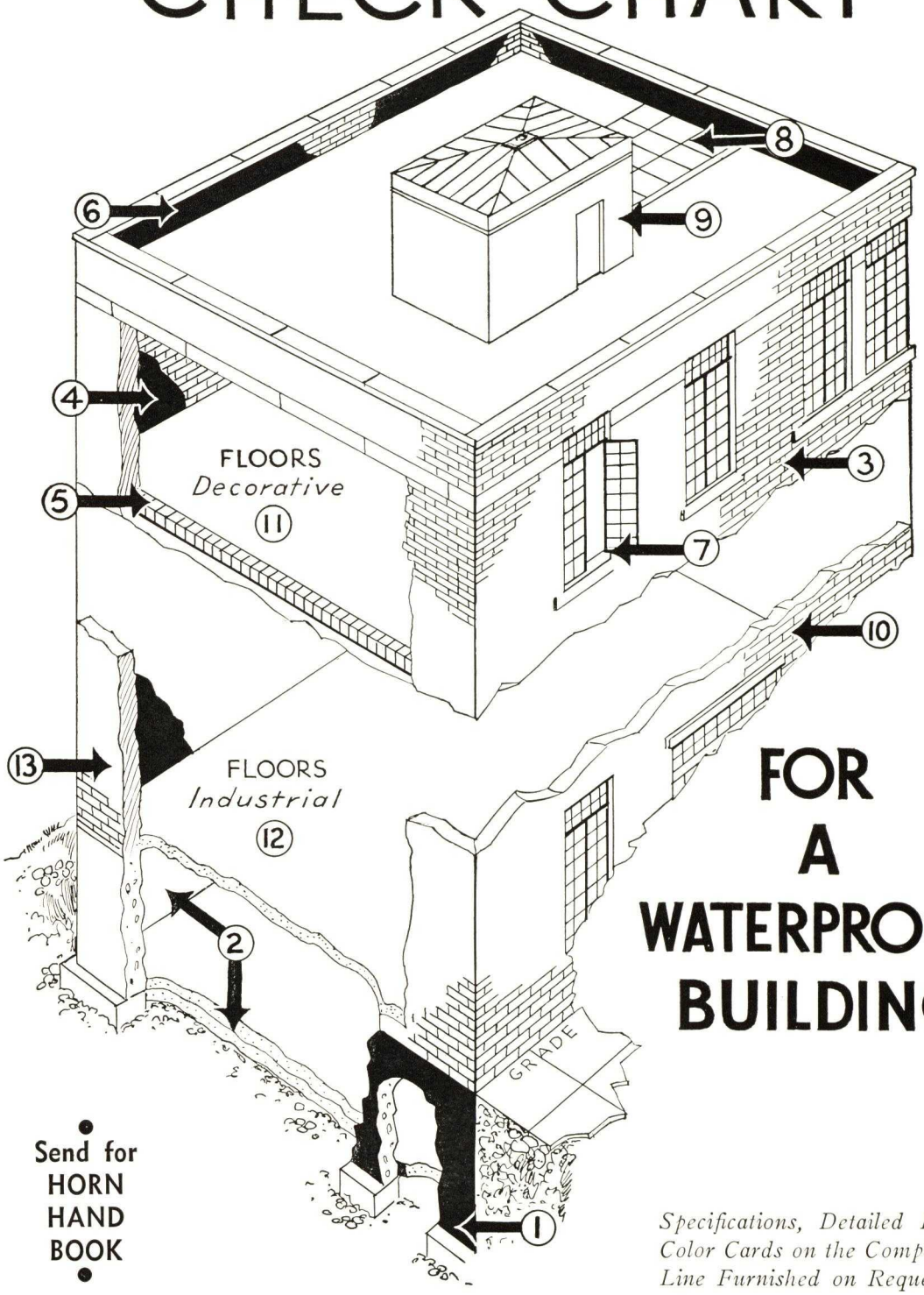
Horn Building, LONG ISLAND CITY, N. Y.

BRANCHES AND WAREHOUSES IN PRINCIPAL CITIES

A HORN PRODUCT FOR EVERY CONDITION AND METHOD

HORN PRODUCT

CHECK CHART



FOR A WATERPROOF BUILDING

Send for HORN HAND BOOK

Specifications, Detailed Data and Color Cards on the Complete Horn Line Furnished on Request.

WATERPROOFINGS—DAMPPROOFINGS—FLOOR TREATMENTS

To Set a Proper Standard in Your Specifications — Specify "Horn or Equal"

1 FOUNDATION WATERPROOFING (Against Surface Drainage)

Coat exterior of foundation walls below grade with *Dehydratine No. 4 foundation coating.* Waterproof all concrete below grade with *Hydratite,* 2 lbs. per bag of cement. Fill joint between floor and wall with *Horn Expansion Joint Cement.*

2 FOUNDATION WATERPROOFING (Against Hydrostatic Head)

Specify *Metalon* metallic waterproofing on top of rough floor slab and inside of walls to grade level. Specify *Hydratite* integral waterproofing, 2 lbs. per bag of cement for all concrete below grade. Specify "Horn detail joint" between floor and wall.

3 BRICK MORTAR

Specify 1 part cement, 1 part lime, 6 parts sand with 2 qts. *Hydratite* integral waterproofing for each bag of cement and lime, for watertight "pre-shrunk" mortar joints, and minimum efflorescence.

4 DAMPPROOFING EXTERIOR WALLS

A.—Brick—For walls well pointed up where no openings are to be bridged, use *Dehydratine* No. 1 under furring. For walls not solidly built, use *Dehydratine* No. 10 *Semi-Mastic.* For finest jobs specify *Dehydratine* No. 10 *Mastic.*

B.—Concrete Walls—Do not attempt to bond lime or gypsum plaster to concrete. Either fur the walls after applying *Dehydratine* No. 1 or roughen the surface and apply Portland cement plaster, waterproofed with *Hydratite.*

5 SPANDREL BEAM WATERPROOFING

Specify *Horn Spandrel Beam Method* using *Triple-Flex Fabric.*

6 PARAPET WATERPROOFING

A.—Parapet Joints—Prime with shellac or lacquer and fill with *Vulcatex Caulking Compound* installed by "Vulcatex Thriftube Pressure Method."

B.—Parapet Backs—Prime with *Dehydratine* No. 1. Trowel on $\frac{1}{16}$-in. thickness of *Dehydratine* No. 10 *Mastic* from coping line to flashing of roof line.

7 WINDOW CAULKING

Avoid narrow joints. Specify minimum width ½ in. Pack with oakum to within ½ in. of surface. Prime joints with shellac or lacquer. Caulk with *Vulcatex* using Vulcatex Thriftube Pressure Method.

Specify same for door openings.

8 TILED ROOF DECKS (Joints)

Specify *Hornex* Rubber Expansion Joint for priming and filling 1-in. joints between roof deck and parapet. Install *Hornex* joints at 10-ft. intervals throughout roof area.

9 PENTHOUSE or STUCCO WALLS

Specify one coat of *Symentrex Suction Stop;* two coats of *Symentrex,* of color to be selected. All cracks or openings must be filled or pointed first.

10 POROUS MASONRY

A—To seal porosity, and slightly deepen the color thereby developing texture, apply two coats *Dehydratine* No. 2.

B—To seal the porosity and not change color use two coats *Dehydratine* No. 2A transparent waterproofing.

11 CEMENT FLOORS (Decorative)

A—Specify *Colorundum* "in accordance with manufacturers directions" for cement floors that are equivalent to tile in beauty and durability. Standard colors—red, green, brown, black, French grey (all priced the same).

B—For floors already installed use *Holzon.* Can be used below grade—or Koncrex.

12 FLOORS (Industrial)

A—Heavy duty concrete: Specify 40 lbs. per 100 sq. ft. *Ferro-Fax* metallic hardener.

B—Average factory floor: Specify 30 lbs. per 100 sq. ft. *Ferro-Fax* metallic hardener. (In colors also.)

13 LEAKY BUILDINGS

Horn maintains a nation-wide service of waterproofing engineers to render expert reports and recommendations on remedial waterproofing of all types of existing structures.

These Products Are Time-Tested, Meet Rigid Specifications and Are Unexcelled for Quality, Efficiency and Economy

ESTABLISHED 1889

H. B. FRED KUHLS

OFFICE AND FACTORY
6411-6423 Third Avenue, BROOKLYN, N. Y.

REPRESENTATIVES

CHARLESTON, S. C., Wm. M. Bird & Co.
CHICAGO, ILL., Fred J. Barker, 9 So. Clinton St.
CLEVELAND, OHIO, Upson Walton Co., 1310 W. 11th St.
DALLAS, TEX., Macatee, Inc., P. O. Box 245
PITTSBURGH, PA., Fort Pitt Mfg. & Supply Co., 116 Seventh St.
PORTLAND, ORE., E. E. Gilmer, 316 S. E. Madison St.
SEATTLE, WASH., McCune Merifield Co., 303 Washington Mutual Bldg.
and Tourtellotte-Bradley, Inc., 4th Floor, Whit Bldg.
SAN FRANCISCO, CAL., McCune Merifield Co., 231 Sansome St.

For Kuhls' Elastic Glazing and Caulking Compositions, see File Index

KUHLS' ELASTIC WATERPROOFING COMPOSITIONS AND COATINGS

Products of 49 Years' Experience

H. B. Fred Kuhls has specialized in the manufacture of non-staining elastic waterproofing compositions since 1889. During these 48 years of experience we were in a position to test many compositions for various purposes. Our tests have proven that one composition cannot satisfactorily be used for caulking around windows, pointing-up stone, expansion joints in promenade tile roofs, etc., and we have, therefore, developed the following products each designed to meet the specific requirements of the service for which it is intended.

Manufacturers Since 1889

Kuhls' Elastic Pointing Up Composition

Uses—Recommended for pointing joints in copings, cornices, cap stones, water tables, brick walls, domes, joining tin roofs to walls, and all projecting courses in all types of stone or terra cotta work.

Description—This is a *non-staining* elastic composition made in any color to harmonize with that of the adjoining material. When set, a smooth tough skin forms on the surface which remains elastic at all times. It makes a permanent watertight bond to wood, stone, steel, glass or any other material. Heat, cold or any extreme atmospheric conditions do not affect it. Vibration will not loosen its bond. Acid fumes have no effect on it. Furnished in two consistencies:

Knife Grade: Shipped in 1, 2 and 5-lb. cans; 12½ and 25-lb. pails; 50 and 100-lb. drums. *(100 lbs. will fill approximately 1 cu. ft. of joint.)*

Gun Grade: Shipped in 1, 2 and 5-gal. containers; 30 and 55-gal. drums. *(7 gals. will fill approximately 1 cu. ft. of joint.)*

Specifications for Pointing Joints in Stone, Terra Cotta, etc.—Joints shall be raked out and thoroughly cleaned for a depth of at least ¾ in. Sides of the joints shall then be thoroughly painted with Kuhls' Elastic Joint Paint (manufactured by H. B. Fred Kuhls, Third Avenue and 65th Street, Brooklyn, N. Y.) in one or two coats or until the surface shows a gloss. *(See Elastic Joint Paint.)* Joints shall then be filled with Elastic Pointing Up Composition thoroughly worked and pressed into the joint, to fill the entire joint and shall be neatly finished flush with adjoining surface. Color of Kuhls' Elastic Pointing Up Composition shall be the color as selected by the architect.

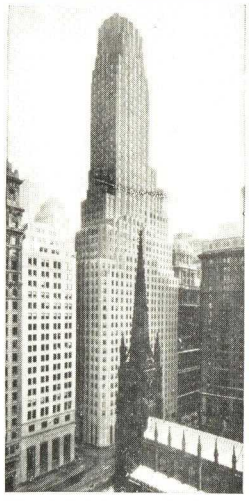
Kuhls' Elastic Expansion Joint Composition

Uses—Used for over 40 years for expansion joints in promenade roofing tile, swimming pools, sidewalks, sidewalk lights, etc. It is also used for filling seams in wood floors.

Description—Kuhl's Elastic Expansion Joint Composition is manufactured in any color. It has been used successfully on the terraces of the Capitol at Washington; Army Base in Brooklyn; Brooklyn State Hospital, and many other prominent buildings, hospitals, bridges, railroad stations, etc. Exposure to sudden and extreme changes of temperature, as well as movement and vibration do not affect it. It will not soften under the heat of the sun, therefore it will not crack. It will make an elastic watertight joint for many years. This composition is manufactured in *knife consistency* only. Shipped in 1, 2 and 5-lb. cans; 12½ and 25-lb. pails; 50 and 100-lb. drums. *(100 lbs. will fill approximately 1 cu. ft. of joint.)*

Note: The joint must always be painted with Kuhls' Elastic Joint Paint before applying the Elastic Expansion Joint Composition, in order to secure the best results.

Specifications—Expansion joints shall be provided in promenade tile roofing where noted on drawings. All expansion joints shall be cleaned out down to the waterproofing course. After this Kuhls' Elastic Joint Paint shall be applied in one or two coats or until the surface of the joint shows a gloss. The joint shall then be pointed up with Kuhls' Elastic Expansion Composition, thoroughly working the material into the joint to fill the space. Finish shall be left crowned above the adjoining surfaces.



No. 1 Wall Street, Irving Trust Building
Voorhees, Gmelin & Walker, Architects
Marc Eidlitz, General Contractor
23,000 lbs. of Elastic Pointing Up Composition used to waterproof and dampproof back-joints of limestone facing throughout the building

Brooklyn State Hospital
Expansion Joint Composition used for expansion joints in all promenade tile roofs and concrete walks

Kuhls' Elastic Tile Bedding Composition

An elastic waterproofing composition in semi-paste form. On tile or slate roofs it is used as an elastic waterproof bedding beneath the slate and tile. Specifications and complete information furnished on request.

Kuhls' Elastic Waterproof Coating

An elastic fibrous composition for application with a heavy brush or trowel. Used as a foundation dampproofing and waterproofing. Specifications on request.

Kuhls' Elastic Transparent Waterproofing

A colorless, non-staining liquid for waterproofing brick walls, stucco, stone or concrete. Before this waterproofing is applied to the surface it should be examined carefully for cracks which should be cut away and properly pointed up with Kuhls' Elastic Point Up Composition. Windows should be inspected and where necessary, thoroughly caulked before applying the Elastic Transparent Waterproofing.

Kuhls' Liquid Integral Waterproofing

Kuhls' Liquid Integral Waterproofing will waterproof, harden and densify portland cement concrete, floor finish, plaster and mortar. Kuhls' Integral Waterproofing mixed with cement will prevent freezing at 18° F. It will make high early strength withstanding heavy loads twelve hours after laying. Further information and specifications sent on request.

Kuhls' Elastic Joint Paint

Especially recommended for use with Kuhls' Elastic Compositions. This paint is applied with a brush to the sides of the joint where it forms an alkali-resisting, transparent coating. Elastic Joint Paint prevents suction by porous stone. Alkali or lime content in stone in time reduces the life of the elastic composition used to fill the joint if it is not first painted with Elastic Joint Paint.

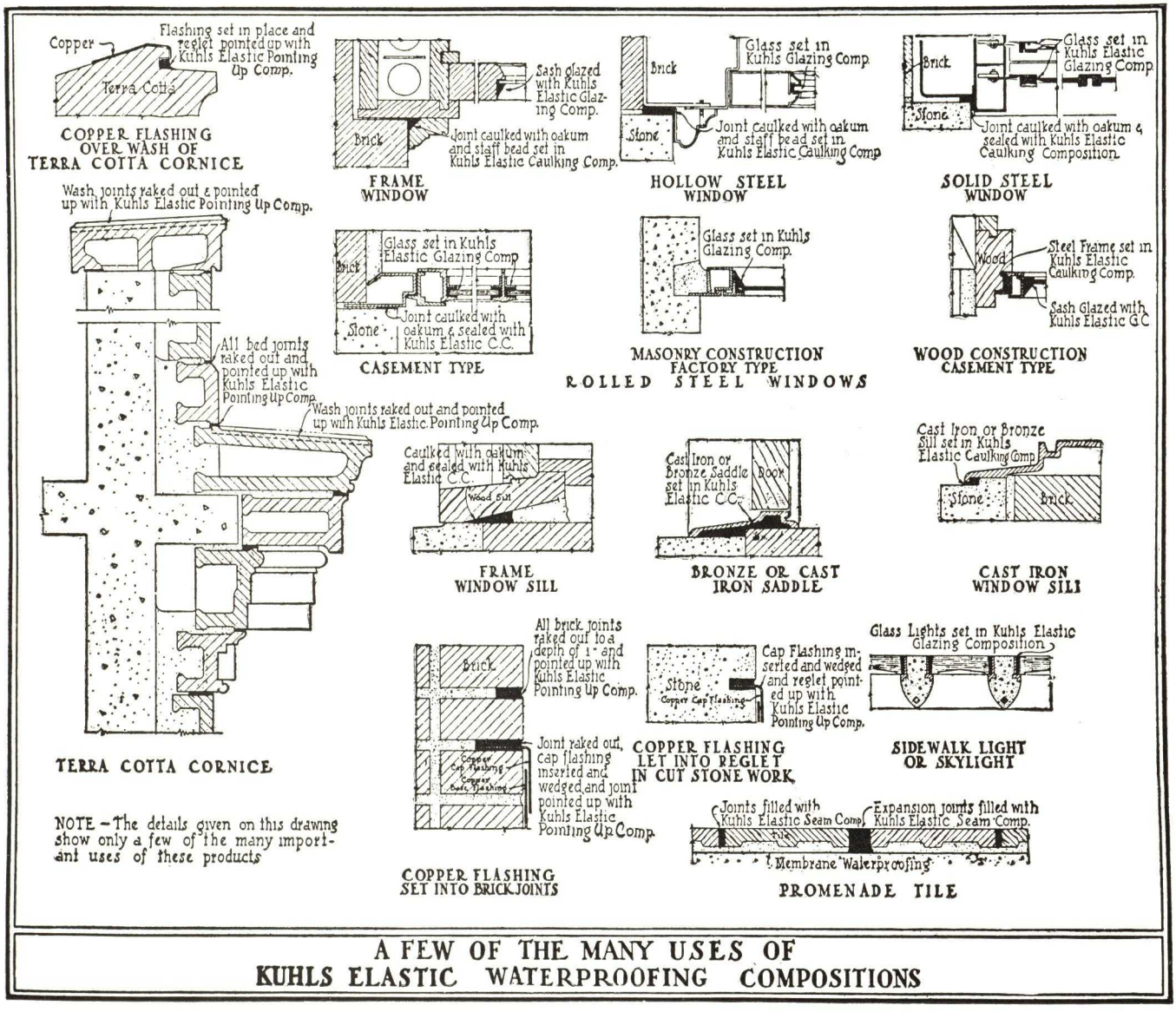
The application of this paint does not delay other work as it dries in ten minutes. Shipped in ½-pt., ½ and 1 gal. cans. *(½ gal. is required for approximately every cu. ft. of joint.)*

A Few Buildings on Which Kuhls' Elastic Waterproofings Have Been Used

Northern Swimming Pool, Madison, Conn.
Seamen's Institute, Newport, R. I.
Boston & Albany Railroad, Worcester, Mass.
Baker Library, Harvard University, Boston, Mass.
Arlington Memorial Bridge, Washington, D. C.
Army Supply Base, Brooklyn, N. Y.
Rhinelander Building, New York, N. Y.
Williamsburg Savings Bank, Brooklyn, N. Y.
Biltmore Hotel, Los Angeles, Calif.
Pader Pelton Building, Los Angeles, Calif.
Plaza Hotel, New York, N. Y.
B'nai B'rith Temple, Los Angeles, Calif.
Western Union Building, New York, N. Y.
Woolworth Building, New York, N. Y.
Pennsylvania Terminal, New York, N. Y.
New York Central Railroad, New York, N. Y.
No. 1 Wall Street Building, New York, N. Y.
Chrysler Building, New York, N. Y.

Some Architects Who Have Specified Kuhls' Elastic Waterproofings

J. C. Austin, Los Angeles, Calif.
Allied Architects, Los Angeles, Calif.
Charles P. Baldwin, New York, N. Y.
Claude Beelman, Los Angeles, Calif.
Carrère & Hastings, New York, N. Y.
Cass Gilbert, New York, N. Y.
Halsey, McCormack & Helmer, Inc., New York, N. Y.
Koch & Wagner, Brooklyn, N. Y.
Lee & Hewitt, New York, N. Y.
Meyer & Hunt, Los Angeles, Calif.
McKim, Mead & White, New York, N. Y.
George B. Post & Sons, New York, N. Y.
Palmer & Hornbostel, New York, N. Y.
Charles A. Platt, New York, N. Y.
Sugarman & Berger, New York, N. Y.
Warren & Wetmore, New York, N. Y.
Isaac A. Allen, Jr., Hartford, Conn.
Voorhees, Gmelin & Walker, New York, N. Y.



A FEW OF THE MANY USES OF KUHLS ELASTIC WATERPROOFING COMPOSITIONS

W. H. LOOMIS TALC CORPORATION

Manufacturers of "LOOMITE" for Improving Concrete

GOUVERNEUR, N. Y.

LOOMITE FOR CONCRETE—MORTAR—PLASTER—STUCCO

"Loomite" is a finely subdivided aggregate containing about 10% calcium silicate having a hardness of 4.5-5, specific gravity 2.85-3, and a melting point of 2650° F., is chemically inert, and not acted upon by ordinary acids or alkalis.

In concrete and mortar, its function is mechanical, as is that of sand, but owing to its extreme fineness and slip, it makes a very fat or plastic paste with cement and sand and may properly be regarded as another aggregate.

In the preparation of "Loomite" it is ground to such a degree of fineness that 98% passes the 325-mesh sieve. It is air floated to insure uniformity. Some of the high early strength cements approach this degree of fineness but the average particle size of "Loomite" being less than that of cement itself, insures a better bond with the coarser aggregates and a more impervious concrete.

There is also an increase in the volume of finished concrete of 2 to 5%.

THE EFFECT OF "LOOMITE" ON CONCRETE

Workability

In Loomconcrete (concrete with "Loomite" added) the coarse aggregates are held in suspension. It will flow in place at a flatter angle for longer distances than plain concrete without excess water or segregation, and a greater yardage can be handled in the same time at less cost per yard.

The greater flowability of Loomconcrete permits an increased upward flow of the mass that insures a better contact on the underside of structural steel than is usual with plain concrete.

Mortar—Plaster—Stucco

Mortar mixed in proportions—one part of cement, one part of "Loomite" by volume—and sand in proportion desired for mortar, plaster or stucco will give a plasticity, bond and acid-resistant mortar of increased strength over the standard mortar mix. There is no efflorescence from Loommortar.

Waterproofing

By mixing a proper amount of "Loomite" with the other aggregates used in concrete or mortar, a very dense cement paste is formed which resists the free passage of water.

"Loomite" is not an organic substance nor does it depend on chemical action or solubility for its waterproofing and fattening effect.

Setting

Loomite lowers the temperature of the mix, slightly increasing the time of set, a favorable feature in mass concrete where unequal setting would cause cracking.

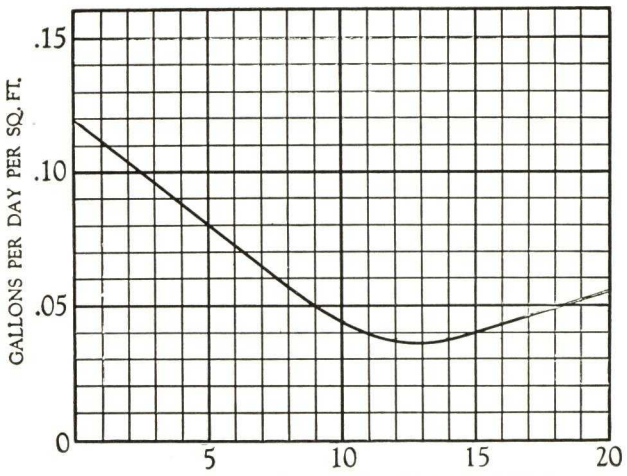


Chart Showing How "Loomite" Affects Permeability of Concrete

Increases Acid and Fire Resistance

The addition of "Loomite" to the fine aggregates results in a dense, hard finished concrete. Because of the chemical inertness of the "Loomite" itself, it greatly increases the resistance to acids and alkalis (sea water) and because of its heat-resisting qualities, tends to eliminate spalling of concrete due to exposure to intense heat, thereby protecting metal reinforcing, steel posts and girders.

Compressive Strength

It has been determined by careful study and experiment over a period of years that the use of "Loomite" as an additional aggregate in concrete increases workability, prevents segregation, waterproofs, improves fire resistance and retards the corrosive action of acids and alkalis, and does not impair the strength of concretes or mortars in which it is incorporated. Actually there is an increase in strength over plain portland cement concrete and mortar which is incidental to the denser structure and closer bond of the aggregates.

When "Loomite" is used with portland cement the compressive strength is inversely proportional to the ratio $W \div (C+L)$ rather than the direct ratio $W \div C$. In the case of stiff mixes, it is necessary to allow for the absorption of "Loomite" (about 40% by weight of the "Loomite") but in the case of soupy mixes no extra water is needed. In fact, the water may be reduced and still produce a more workable concrete.

RESULTS OF COMPRESSIVE TESTS USING AS AN ADDITIONAL AGGREGATE 50 LBS. "LOOMITE" PER YARD CONCRETE

Mix	Pounds "Loomite" per bag	Compressive Strength					
		7 days	28 days	90 days	1 yr.	3 yrs.	5 yrs.
1:5	None	1323	2184	2738	2528	3527	4301
	9.5	1532	2204	2845	3634	3950	4561
1:6	None	1211	2221	2326	3054	3360	3482
	11.3	1405	2377	2373	2881	3284	3665

Note: The upper figure is for plain concrete. The lower figure is for Loomconcrete.

Increases Density

The curve at the left shows that the density of Loomconcrete, in pounds per cu. ft., increases in proportion to the amount of Loomite used up to 10 lbs. per bag of cement. This increased density is important in highways, garage floors, etc. The sand grains are held in place by the "Loomite" and have to be worn down instead of being dislodged in traffic. This density resists penetration of motor oils.

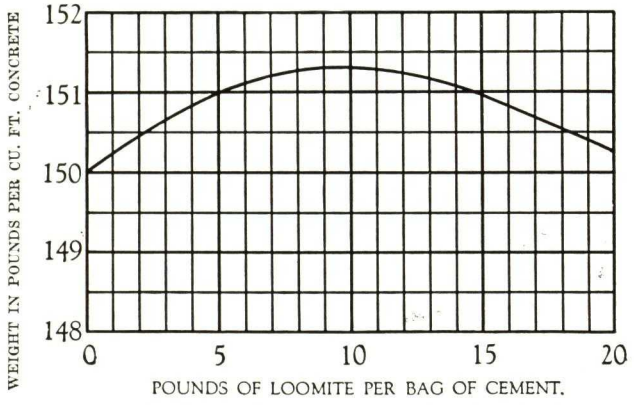
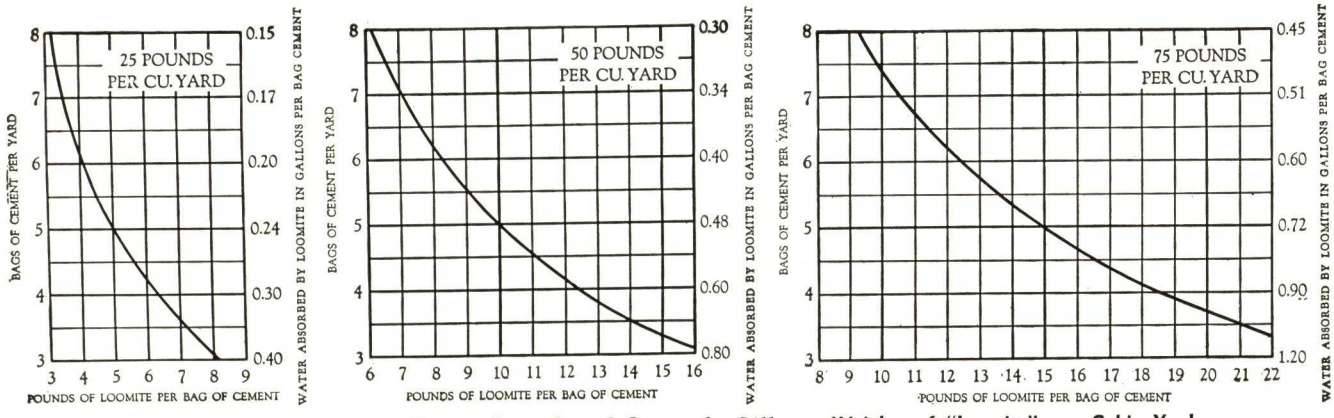


Chart Showing Increase of Density of Concrete by Use of "Loomite"

DIRECTIONS FOR THE USE OF "LOOMITE" IN CONCRETE

"Loomite" is another aggregate and should be introduced into the mix either before or with the cement. There need be no greater attention given to it than is given to any of the other aggregates. Because of its chemical inertness, it is absolutely harmless to those who handle it.

From 5 to 15 lbs. of "Loomite" per bag of cement depending on the grading of the aggregates and the use for which it is intended is all that is required to produce the desired results. The volume of "Loomite" also is somewhat dependent upon the richness of the mix.



Curves Showing Amount of "Loomite" per Bag of Cement for Different Weights of "Loomite" per Cubic Yard

Also shows amount of mixing water absorbed by "Loomite."

Shipment and Cost

"Loomite" is usually shipped in 50-lb. double walled paper sacks, 100-lb. or 200-lb. burlap bags, if preferred, at the same price f.o.b. mills, Emeryville, N. Y.

Where "Loomite" Has Successfully Been Used

In railroad tunnel linings, mine shafts, seawalls, mine walls, freight terminals, highways, garages, warehouses, hospitals, office buildings, churches, hydroelectric projects, reservoir walls, spillways, bridges, retaining walls, etc.

Laboratory

The results from our testing laboratory for Loomconcrete and Loommortar will be mailed at your request, and our laboratory facilities are available for your special problems.

MINWAX COMPANY, INC.

A Complete Service for Waterproofing and Dampproofing

11 West 42nd Street, NEW YORK, N. Y.

BRANCH OFFICE: CHICAGO, ILL. FACTORY: DELAWANNA, N. J.

Products

There is a Minwax product for every condition for which Waterproofing, Dampproofing, Caulking, or Surface Protection may be required. This group of products, some thirty individual materials, has been gradually evolved during the thirty years this Company has specialized in this field. The more important are listed in the following paragraphs.

For our pages on Wood Finishes and Brick and Cement Coating, see File Index or Paint section.

Engineering Service

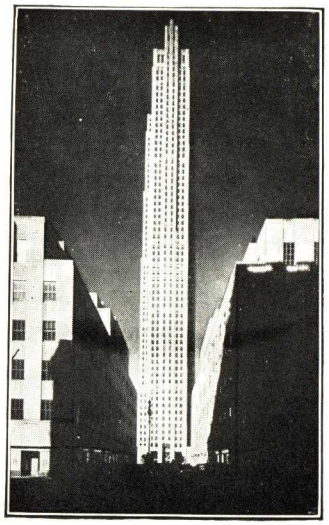
Our experience equips us with a special engineering knowledge on the application of our products which we offer without reservations, to those seeking satisfactory results. We are in a position to recommend experienced, responsible organizations who specialize in the application of Minwax products. We have representatives in the principal cities; for address consult your local telephone directory.

Minwax Membrane Waterproofing

Description—Consists of alternate layers Minwax Waterproofing Asphalt and Minwax Saturated Cotton Fabric, forming a built-up blanket or mat constructed to envelop or cover the portion of the structure to be waterproofed. In placing, the asphalt is heated until it is fluid, mopped on the surface and the fabric placed in the hot mopping. Repeat to the required number of plies. This creates a tough, stretchable elastic membrane that gives maximum protection against leakage due to cracking, temperature or vibration movement.

Uses—*Open or Above Grade Work*—In this class may be included: terraces or bridge decks under paving, tracks or fill; roofs under tile or masonry wearing course; sidewalks over basements; floors in factories; hotels or clubs where dampness may occur; shower stalls, bathrooms; swimming pools; tanks, reservoirs, etc. See details on opposite page.

Foundation or Sub-structure Work—In this class may be included not only basements, but also tunnels, subways, and underground structures generally. A careful study of the design is warranted to provide "proper conditions for application". Our experience is at your disposal.



Rockefeller Center
REINHARD & HOFMEISTER
CORBETT, HARRISON & MACMURRAY
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Minwax Caulking Compound

Note: For dampproofing foundations see Minwax Asphaltic Dampproofings.

Specifications—Membrane shall generally consist of primer, 3-ply fabric and 4 moppings asphalt laid on dry, smooth, solid surface and protected by 1 in. cement mortar. Where minimum quantities are desired, use 2-ply and 3 moppings.

Waterproofing for Walls Above Grade

For new buildings we recommend centralizing responsibility by specifying under one heading all work necessary to assure weatherproof walls. Minwax materials cover all requirements in such a plan: (a) Waterproof cut-offs under copings or parapets, over window heads and at spandrels; (b) dampproofing inside of outside wall surfaces under plaster; (c) elastic caulking around windows, in copings, cornice, water-table and similar masonry joints; (d) transparent waterproofing for severe exposure, stone protection, etc. Recommendations on specific projects gladly furnished.

Minwax Asphaltic Dampproofings

Minwax Dampproofing—For concrete, solid brick or tile masonry above or below ground.

A full-bodied, black liquid coating based on Minwax Asphalts, which is combined with special chemically inert solvent to make a material that forms a tacky, plastic, lasting dampproof coating which never hardens, to which plaster will adhere perfectly and which will give maximum protection below ground.

Minwax Spray Coat Dampproofing—*For protection against "built-in" moisture, and for normal exposures*—is the above material in a consistency suitable for spray application or for applying with brush. Use 1 gal. per 100 sq. ft. per coat.

Minwax Fibrous Brush Coat (Brush Mastic)—*For additional protection against more severe exposures.* This is the same material with the addition of asbestos fibre as a filler and reinforcing agent. It works well under the brush and insures a heavier and more complete film. Use 1 gal. per 70 sq. ft. per coat.

Minwax Trowel Coat Dampproofing—*For perfect, complete film and maximum protection.* This is again the same material but with the proportion of asbestos fibre increased to bring the material to mastic consistency and insure absolutely complete and continuous film under all conditions. Use 1 gal. for each 12 sq. ft. for $\frac{3}{32}$ to $\frac{1}{8}$ in. coat.

Specifications—(For Spray Coat and Fibrous Brush Coat) Apply two thorough heavy coatings using (state quantity). (For Trowel Coat) Apply one heavy coat with trowel using (state quantity).

For Dampproofing Under Plaster—Scope of work: inside of all exterior walls from floor to and returning 12 in. on ceiling and partitions.

For Dampproofing Foundations—Scope of work: outside of all exterior foundation walls from footing to grade.

Specify Under Masonry—All mortar joints on wall surfaces which have to receive dampproofing shall be solidly filled and struck.

Note: Not recommended for concrete ceilings, or conditions where weight of plaster is largely suspended from coating, or under cement plaster.

Minwax Spandrel Waterproofing

A method of building into masonry walls, over spandrel beams, lintels, etc., a tough pliable course of waterproofing which will prevent transmission of moisture with minimum reduction in the bond strength of the wall.

There are two methods of spandrel construction using Minwax materials, as follows:

Built-in-Place Spandrel—*Specification*—The Contractor shall apply two trowel coats of Minwax Trowel Dampproofing reinforced with one continuous layer of Minwax Cotton Cord Cloth extending from within 1 in. of wall face through the wall and to provide 3 in. for turn up. See details on opposite page.

Full-Seal Fabric Spandrel—*Specification*—(This method should be specified where utmost speed is required in placing.) The Contractor shall apply one layer of Minwax Full-Seal Fabric bonded to masonry and at laps with Minwax Trowel Mastic, and coated with this same material and extending from within 1 in. of wall face through the wall and to provide 3 ins. for turn up, see details below.

Minwax Caulking Materials

Designed for sealing joints around window or door frames to prevent the penetration of moisture or air; also for an elastic weatherproof seal for any masonry joints, particularly in extending members such as capstones, copings, cornices, belt courses, water-tables, etc. May be applied with either a hand tool, hand gun or power gun, either on new work or old. They are unaffected by conditions of heat, cold, smoke or fumes, etc. They bond perfectly to wood, stone, steel, glass or other building materials and will remain plastic almost indefinitely.

There are two types of material:

Minwax Caulking Compound—In three standard colors: Cream white, Limestone Gray and Buff; special colors extra. It is recommended for all locations where an elastic caulking of light color or one to take paint is desired. In two consistencies: No. 1 (soft) for gun application only; No. 2 (heavy) for knife, hand tool or gun application.

Minwax Asphalt Caulking Compound—Made in black only and is recommended for industrial work or for surfaces where dark color is satisfactory. It cannot be painted over. It is non-staining and can be used against limestone and similar surfaces. Made in one consistency suitable for hand or gun application.

Minwax Caulking Guns—We can furnish efficient powerful caulking guns which assure rapid, economical application of our materials.

Specifications—This contractor shall caulk all exterior door and window frames throughout, both wood and metal. All joints between the wood or metal and the masonry at the jambs, heads and sills, shall be packed with oakum and filled solidly from the outside with Minwax Caulking Compound to a depth of not less than ¾ in. The sills shall be caulked from the inside also. The caulking shall be done before staff beads are set.

Pointing Stone, Terra Cotta, etc.—All joints in stone and terra cotta on the top of copings, cornices, belt courses, washes and sills shall be raked out to a depth of ¾ in., and filled solid with Minwax Caulking Compound, color as selected.

Minwax Transparent Waterproofings

There are two distinct types designed to waterproof exposed masonry—brick, stucco, stone or concrete—without materially changing their color or texture. They will seal the surface but will not seal or fill visible holes or cracks, therefore on brick walls and similar surfaces the importance of proper repointing, recaulking, etc.—to provide a surface to make waterproof—cannot be overemphasized.

Minwax Clear Waterproofing—Recommended for red brick and darker colored porous surfaces. It is a light amber colored liquid which penetrates deeply—depositing a very large volume of solid mineral gums, actually filling pores and seams. These gums do, however, bring out the underlying colors of the surface in the same way as when the surface is wet with water. No work with this material should be done at temperatures below 55°F.

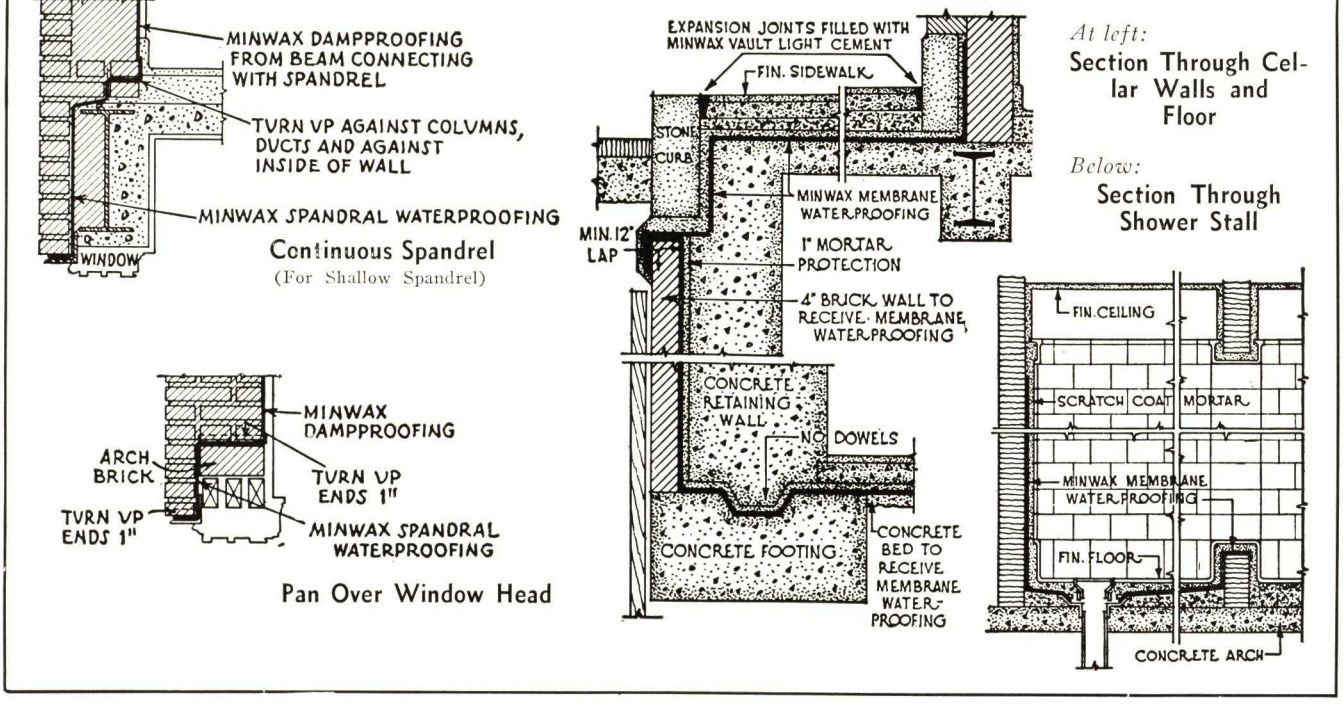
Minwax Colorless Waterproofing — Recommended for limestone and light colored, close textured surfaces. It can be used on the lightest colored surfaces without appreciable change in their color. No work should be done with this material at temperatures below 40°F.

Specifications—Cut out and replace with lime cement mortar all loose and unsound joints. Apply only on clean dry surfaces at temperatures mentioned above. Apply two coats, thoroughly saturate surface with each coat. After first coat, point up incidental holes and cracks with Minwax Caulking Compound, rubbing it in so that no excess remains on the surface. Waterproof from roof flashing to grade.

Minwax Brick and Cement Coatings

For waterproofing and decorating exposed surfaces of cast concrete, brick and stucco. A pigment coating developed from Minwax Clear Waterproofing produced in a series of flat color tones. This coating penetrates, becomes part of the concrete. May be applied with brush or spray. For further information, see File Index or Paint Section.

DETAILS FOR SPANDREL AND MEMBRANE WATERPROOFING



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FOR WORKABLE LOW WATER RATIO CONCRETE	POZZOLITH	Eliminates up to 20% of mixing water, yet improves placability, increases density.	6 and 7
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OMICRON

"THE VITAL INGREDIENT FOR PERMANENCE IN CONCRETE"

OMICRON, discovered in 1927 by Master Builders Research Laboratories, performs the unique function of *reducing the volume of water needed to provide an ideal placeability* in *all* concrete or mortar mixes. The importance of this development cannot be overlooked, for it marks a new and radical advance in the effort materially to increase the practical life of concrete structures. This sharp reduction in the volume of water in concrete or mortar mixes results in greatly increased *density*, reduced *shrinkage*, a sharp increase in *strength*, a stubborn resistance to the disintegrative attack of *freezing and thawing* and *corrosion*.

Density . . . .

Ultimate goal of all concrete or mortar designers, is best achieved through a reduction in the volume of water. *Omicron* products provide the architect and the engineer with greater control of the density and water-tightness of the concrete or mortar used in the construction of their jobs.

Strength . . . .

This reduction in the volume of water needed to obtain ideal placeability results in a natural increase in strength; field and laboratory tests show for concrete and mortar made with *Omicron* products a much greater strength than plain mixes.

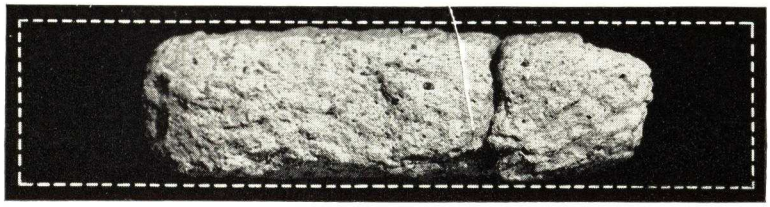
Pozzolanic Activity . . . .

Important to many projects is the added resistance *Omicron* products build into concrete and mortar . . . resistance against corrosion and attack by natural alkalies and acids present in the soil and air. *Omicron* preserves the increased density imparted to concrete and mortar by Master Builders products.

Increased Placeability . . . .

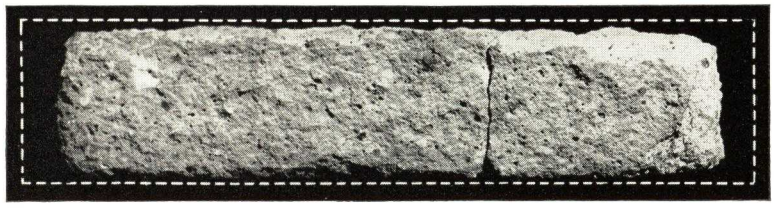
With much less water! From scores of engineers, architects and contractors have come unsolicited substantiation of the claims made for *Omicron* products. Of major importance is the fact that under actual job conditions *Omicron* products have enabled engineers to create from unusually dry mixes concrete and mortar of exceptional placeability.

THE EFFECTS OF 150 CYCLES OF FREEZING AND THAWING ON MORTAR



Untreated

Here are pictured the results of 150 cycles of freezing and thawing on 1:5 mixes tested by Loring O. Hanson, registered professional engineer, University of Wisconsin. The specimen below was fortified with Pozzolith, an *Omicron* product. Note the comparative rate of disintegration; break tests for strength showed the Pozzolith specimens 75 per cent stronger than the plain specimens.



With Pozzolith

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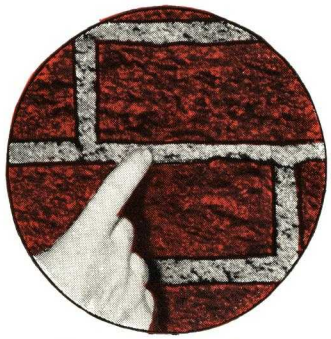
OMICRON MORTARPROOFING

Mortar Shrinkage Means Leaky Walls

"I check mortar shrinkage"

The Rockefeller Apartments, New York City. Archts.—Wallace K. Harrison and J. Andre Fouilhoux. Gen. Contrs.—Barr, Irons & Lane, Inc. Masonry Contr. —Micuiel Co., New York City.



Above: *Actual photo of ordinary mortar joints. Note shrunken, cracked mortar, permitting rapid water seepage and destruction.*

Right: *Actual photo shows how Omicron Mortarproofing preserves the bond —makes possible weatherproof brick walls.*

AUTHORITIES agree that cracks between the mortar and brick are the major cause of leakage. *All* mortars shrink, whether patented masonry cements, standard cement or lime or combinations of cement and lime, waterproofed or otherwise. Shrinkage is inevitable, because more than twice as much water is required for workability than is needed to hydrate the cement. *By a reduction in water volume without the loss of workability shrinkage can be checked.*

Omicron Mortarproofing produces an ideally workable mortar *with much less water—and reduces shrinkage beyond the critical point at which the bond breaks.*

- **Increases Plasticity**

The gelatinous properties of Mortarproofing so increase the plasticity that the mason must automatically reduce water or add sand—or both—to obtain proper consistency.

- **Checks Efflorescence**

The puzzolanic action of the Omicron ingredient in Mortarproofing reduces the soluble salts which cause efflorescence originating from the mortar.

- **Reduces Water Absorption**

The stearate ingredient of Mortarproofing assists bond, checks capillarity, and renders pores water-repellent.

- **Improves Adhesion**

The plasticizing effect of Mortarproofing increases the extent of bond.

- **Increases Strength**

Reduced water-cement ratio increases the bond, shear and compressive strengths of the mortar.

SPECIFICATION (NON-COLORED) . . .

Mortar for all masonry shall be composed of 1 part cement, 1 part lime, 6 parts sand; (or 1:2:9; or an approved masonry cement, or other mix as designated) to which shall be added Master Builders Omicron Mortarproofing in the proportions of 1 qt. per each sack of cement and 1 qt. per each cu. ft. of lime, in exact accordance with the directions of the manufacturer, The Master Builders Co.

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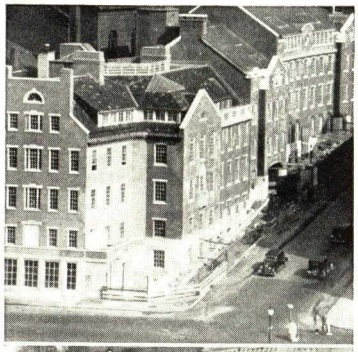
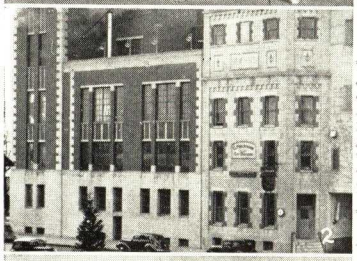
AN UNEQUALLED RECORD IN PERFORMANCE!

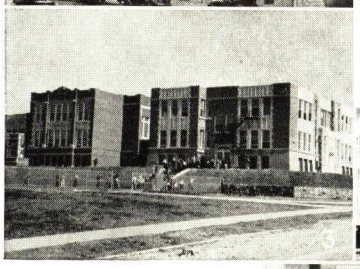


1. Rhode Island School of Design —Providence, R. I.
   Archts.—Jackson, Robertson & Adams, Providence, R. I.
   Contrs.—James C. Stewart Co., New York City.

2. Heilemann Brewery Stock House—La Crosse, Wisc.
   Archt.—R. Griesser, Chicago, Ill.
   Contrs.—Peter Nelson & Son, La Crosse, Wis.

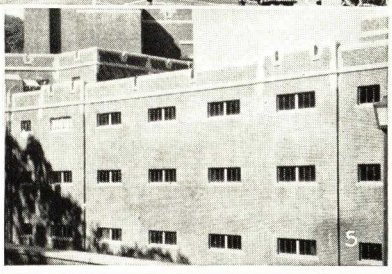
3. Alameda County Court House—Oakland, Calif.
   Archt.—Wm. E. Schirmer, Oakland, Calif.
   Contr.—K. E. Parker Co., San Francisco, Calif.





4. Circle Park School, Fort Worth, Texas.
   Archt.—H. H. Crane, Fort Worth, Texas.
   Contrs.—Quisle & Andrews, Fort Worth, Texas.

5. Gymnasium—U. S. Military Academy — West Point, N. Y.
   Private Plans — Capt. Edward V. Dunstan, Construction Quartermaster.
   Contrs.—C. T. Wills, Inc., New York City



Reduces Shrinkage

FROM COLUMBIA UNIVERSITY TEST Nos. 2356-57

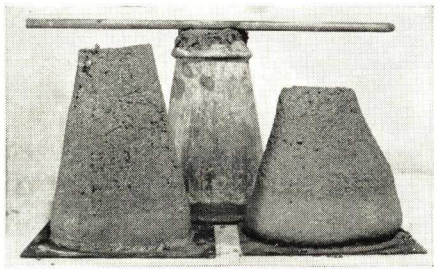
Mix	Shrinkage in Inches 2″ x 4″ Specimens			Bond Strength*	Comp. Strength*
	24 hrs.	7 days	28 days	28 days	28 days
1:1:6	.027	.030	.030	66.8	704
1:1:6 with M.	**.017**	**.019**	**.020**	**72.7**	**740**
1:2:9	.022	.024	.023	73.0	490
1:2:9 with M.	**.018**	**.014**	**.015**	**90.8**	**569**
1:2:11 with M.	**.010**	**.014**	**.015**	**74.9**	**462**

Average of three specimens. *Pounds per sq. inch.

Reduces Absorption

Mix—1:3	Percent absorption by weight				Decreased absorption
	1 hr.	2 hrs.	1 day	Totally immersed	
Untreated	1.4	1.8	2.5	3.4	....
Mortarproofing	**0.7**	**0.9**	**1.1**	**1.8**	47%
Average—4 standard Stearate Pastes	0.65	0.875	1.3	1.85	47%

Triples Slump with Lower Water Ratio



MIX—1 Cement: 1 Lime: 6 Sand
A B
6 gal.—WATER—5¾ gal.
0—MORTARPROOFING—¼ gal.
2⅛″—SLUMP—4¾″

Mortarproofing Checks Cracking in Stucco

As every architect knows, the troublesome shrinkage in mortars occurs *during the first 24 hours.* This early shrinkage results in minute, often invisible cracks that later widen and deepen under the attack of weathering and contribute greatly to the untimely disintegration of stucco walls.

Omicron Mortarproofing reduces early shrinkage by 50% . . . *or beyond the critical point where cracks occur!*

COLORED MORTARPROOFING

IN COLORS — Through exhaustive analysis of the mortar color problem a special process for producing colors ground to a colloidal fineness was developed which eliminated the objections to old style colors, namely: fading, weakening of joints and increased shrinkage.

Colored Omicron Mortarproofing joints *do not fade,* actually increase compressive strength over plain mortar and greatly *reduce shrinkage.*

(Send for color card, with detailed instructions.)

Specification

Mortar for brick, (stone, tile, terra cotta) shall be proportioned 1 part cement, 1 part lime, 6 parts sand (or other mix as designated), to which shall be added Master Builders (insert the name of the color) Omicron Mortarproofing, in exact accordance with the directions of the manufacturers, The Master Builders Company.

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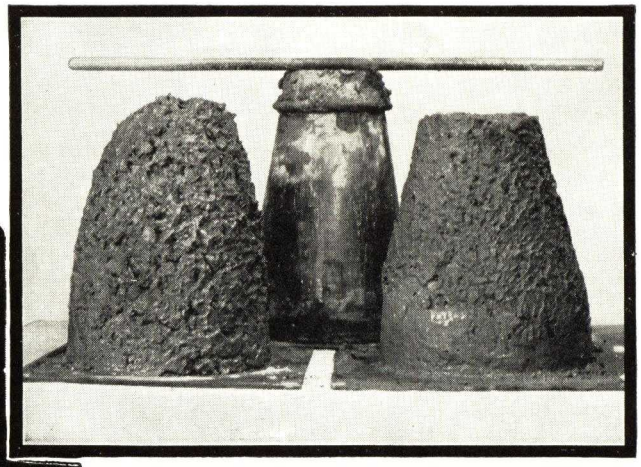
FOR MORE DENSE, MORE DURABLE CONCRETE . . .

POZZOLITH



LESS WATER *more* PLACEABILITY IN *ALL* CONCRETE MIXES

PLAIN MIX		POZZOLITH MIX
2¼ gals.	Water	1⅞ gals.*
1¾ in.	Slump	2½ in.
3180 lbs.	Comp. Strength...(7 days)	**5150 lbs.**

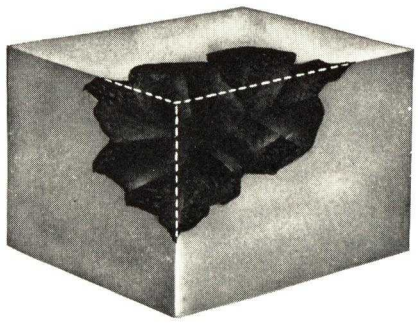
**16½% less water!*

SINCE the introduction of the water-cement ratio law governing the strength and durability of concrete, the necessity for using comparatively dry mixes has been generally recognized. Of great importance, however, has been the need for some means of obtaining low water-cement ratio mixes that could be easily and economically placed. POZZOLITH, *and much less water*, produces concrete of exceptional placeability—a dense, durable concrete highly resistant to the disintegrating attack of freezing and thawing and corrosion. POZZOLITH, added to any practical mix, "automatically" forces a reduction in the amount of gauging water—for if the gauging water is not reduced the mix will be too "wet" for practical purposes. To any mix, even a very dry mix, POZZOLITH imparts a plasticity and cohesiveness that makes for speedy, economical placing, for freedom from the dangers of excessive honeycombing and segregation. On a growing list of the nation's important projects POZZOLITH is daily demonstrating its ability to build better, more placeable concrete *with much less water*. An added feature of extreme importance to many jobs is the early effective puzzuolanic activity of POZZOLITH which adds a stubborn resistance to attack by corrosion.

Specification

Master Builders Pozzolith shall be added in the proportions of 1 Gal. of Pozzolith per cu. yd. of concrete to all mixes using up to 5½ sacks of cement per cubic yard. For each sack of cement per cubic yard in excess of 5½ sacks, one additional quart of Pozzolith shall be added to the mix. (For example, in 6½ sack mixes use 5 qts. of Pozzolith; in 7 sack mixes use 5½ qts., etc.)

The volume of clear water shall in all cases be reduced by not less than the volume of Pozzolith added to the mix.



• *WHY LESS WATER?*

In a cubic yard of concrete, about 2½ gals. of water per sack of cement are required for complete hydration. Water in excess of that amount is simply "placing" water. Thus, in a 6-bag, 6.5 gal. per bag mix, only 15 gals. are needed for hydration, 24 gals. will be "placing" water, occupying approximately 3.2 cubic feet of space which will be voids and shrinkage cracks in finished concrete. If this excess water were concentrated at one point, it would leave space illustrated by the shaded area in block above—over 10% of the original volume.

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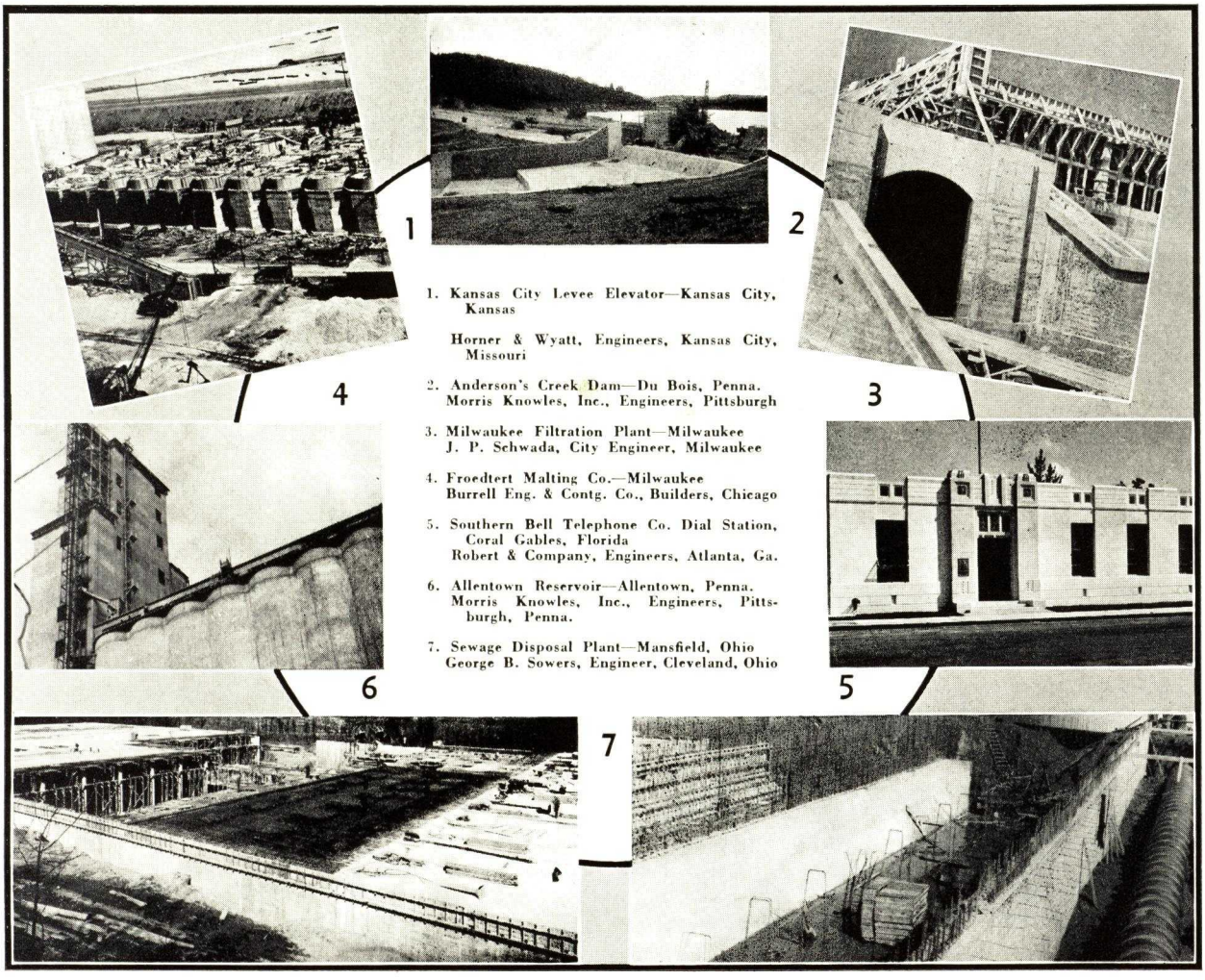

1. Kansas City Levee Elevator—Kansas City, Kansas
   Horner & Wyatt, Engineers, Kansas City, Missouri
2. Anderson's Creek Dam—Du Bois, Penna.
   Morris Knowles, Inc., Engineers, Pittsburgh
3. Milwaukee Filtration Plant—Milwaukee
   J. P. Schwada, City Engineer, Milwaukee
4. Froedtert Malting Co.—Milwaukee
   Burrell Eng. & Contg. Co., Builders, Chicago
5. Southern Bell Telephone Co. Dial Station, Coral Gables, Florida
   Robert & Company, Engineers, Atlanta, Ga.
6. Allentown Reservoir—Allentown, Penna.
   Morris Knowles, Inc., Engineers, Pittsburgh, Penna.
7. Sewage Disposal Plant—Mansfield, Ohio
   George B. Sowers, Engineer, Cleveland, Ohio

"We have used Pozzolith in the concrete on several projects and find that it is possible to materially decrease the volume of water required to produce a placeable concrete."

Morris-Knowles, Inc.,
Pittsburgh, Pa.

"I have not seen a finer piece of concrete work than the contractor produced on the Mansfield Sewage Disposal Plant with Pozzolith. Not one area of honeycombed concrete showed on the surface and no excessive amount of puddling was required.

George B. Sowers,
Consulting Engineer,
Cleveland, Ohio

"On the St. Charles filtration plant job Pozzolith enabled us to make a substantial reduction in water while maintaining full strength and increasing the plasticity and workability of the mix."

Russell & Axon,
St. Louis, Mo.

"There is no question in our minds regarding our ability to produce better concrete with the same materials and less water by adding Pozzolith."

John B. Pike & Sons, Inc.,
Contractors,
Rochester, N. Y.

Independent Laboratory Tests

Ohio State University—April 20, 1936

Mix	W/C	Admixture	Slump, in.	Strength 28 days, lbs. per sq. in.
Many different mixes ranging from 1:4½ to 1:6½	Varying	None	1.16	4,870
	Varying	Pozzolith	1.75	5,804

(Tests of mixes of identical character, slump increased markedly as well as the compressive strength.)

Robert W. Hunt Co.—July 31, 1936

Mix	W/C	Admixture	Slump, in.	Strength 28 days, lbs. per sq. in.
1:1¾:2¼	6.8	3 lbs. Diat. earth	3	3029
1:2:3	6.35	Pozzolith	2¾	3334

(This test shows that with 18% more aggregate and slump approximately maintained, that the strength is increased 10% in the Pozzolith versus the richer diatomaceous earth mix.)

Donald Hunt, Ltd., Toronto—October 26, 1935

Mix	Admixture	Slump, in.	Strength, 7 days, lbs. per sq. in.	Strength, 28 days, lbs. per sq. in.
1:2:3	None	3½	2578	3371
1:2:3	Pozzolith	4¾	2852	3755
1:2:3	None	4¼	....	3428
1:2:3	Pozzolith	6	....	3835

MASTERBUILT CONCRETE

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INTEGRAL LIQUID COLORED HARDENER

COLORMIX

COLORMIX is the original colored integral floor hardener using the gauging water dye principle. Its notable performance has made Colormix the "standard of comparison" for over 15 years.

The efficiency of the product, combined with Master Builders technique, with which leading floor finishing contractors are today well-acquainted, make it possible for the architect to specify Colormix with full confidence in the finished result.

Inexpensive—Permanently colors and hardens floors for less than the cost of two paintings.

Characteristics

Colormix is *supplied in liquid form* to be added to the gauging water or directly into the mixer. Thorough dispersion is thus obtained, assuring uniformity of color and hardness.

Colormix contains Omicron (see page 3) which *reduces shrinkage* through its unique function of substantially increasing plasticity with water-cement ratio reduced up to 12½%.

Strength—Colormix increases strength from 20% to 35% over plain concrete.

Colormix *contains no calcium chloride.*

Colorwax

Colormix Floors, when cured, should be polished with Colorwax, which comes in corresponding colors.

The wax develops and preserves the full beauty, making cleaning easier and protects surface from staining.

Colors

Please refer to color chart, page 9.

Short Specification

The concrete floor finish as indicated shall be colored and hardened with (insert name of color from chart, page 9) Colormix, 1 gallon to each sack of cement, exactly in accordance with the directions of the Master Builders Company. Floors shall be cured and protected by the use of non-staining waterproof paper. When ready for use surface shall be cleaned and shall be given a finish treatment of Colorwax applied in accordance with directions of the manufacturer, The Master Builders Company.

COLORING AND HARDENING FLOORS IN PLACE

DYCROME

DYCROME provides an unusual technique for permanently coloring and hardening existing *plain* concrete floors. Finish provided is permanent because colors are etched into the surface. Colors include Flemish Oak, Weathered Bronze, Cordovan Brown, Palmetto Green, Nile Green and Jade. Hardens the surface—resists wear and dusting. Cost over period of even few years only a fraction of cost of repeated paintings which wear rapidly. Also much less costly and much more artistic than laying linoleum or installing wood or special flooring.

Specification

Existing Floors—The concrete floor finish shall be colored and hardened with the Master Builders' Dycrome in accordance with the directions of the manufacturer, The Master Builders Company.

Installing New Floors—Mortar for floors to be Dycromed shall be proportioned (mix desired), to which shall be added two pounds of hydrated lime for each bag of cement in the mix.

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HARDENING AND COLORING FLOORS BY LOW COST—DUST-COAT METHOD

COLORED METALICRON

COLORED METALICRON is a dry compound of superfine colors, Omicron and tough, wear-resisting aggregate. It produces an integrally colored wearing surface that is non-absorbent and highly wear resistant.

Colored Metalicron type of finish has been standard for over 20 years. Thousands of these floors from 5 to 20 years old are in service today. The method of installation is well known to experienced floor finishers and therefore can be specified with full confidence.

Initial cost less than that of two coats of paint—year by year cost incomparably lower.

Characteristics

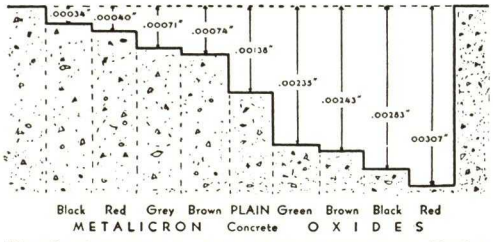
1. Two or three times more wear resistant than plain cement finish.

2. Omicron ingredient protects colors from clouding and efflorescence.

3. Omicron ingredient resists attacks of alkali solutions and corrosive agents.

Strength

Abrasion tests show that Colored Metalicron floors are two to three times more wear-resistant than plain cement finish. Twenty-eight-day concrete slabs subjected to abrasion show the relative strength of—(a) plain concrete, (b) concrete colored with high grade commercial oxides, and (c) concrete colored and hardened with Colored Metalicron.



Tested and Reported by James H. Herron Company, Testing Engineers and Chemists, Cleveland, Ohio

Uses

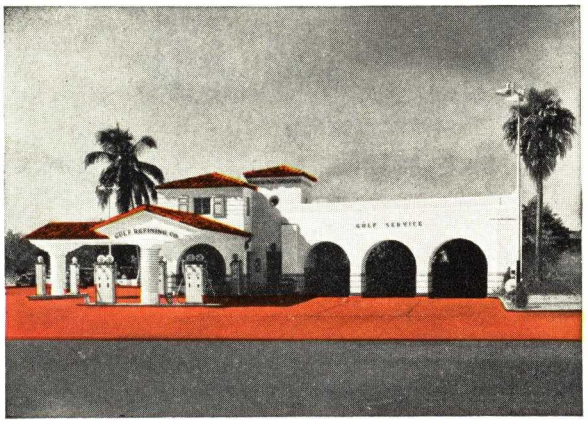
Recommended for use either in separate top finish or where topping is omitted and base is finished off as a wearing surface ("monolithic").

For

Office Buildings	Garages	Service Stations
Loft Buildings	Basements	Salesrooms
		Sidewalks

Non-Slip

A special formula of Colored Metalicron with non-slip aggregate is manufactured for use in finishing colored ramps, corridors, stairs, wet areas where slip-proof surface is desirable.



Red Metalicron Floor in service station of Gulf Refining Company, Miami. Waterproof, hardened and colorfast. Protected from stain and corrosive action of oil and grease drippings by Omicron ingredient.

COLORMIX & METALICRON COLORS

Color shades shown subject to slight variation with different brands of cement and aggregates.

Also available in Black and White.

Short Specification

The concrete floors shall be colored and hardened with Master Builders* Colored Metalicron using no less than 30 lbs. of Colored Metalicron and 22 lbs. of cement for each 100 square feet of surface, applied in accordance with the directions of The Master Builders Company.

**If non-slip feature is desired, insert words "non-slip."*

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CEMENT PAINT FOR MASONRY SURFACES

MASTERTEX

PAINTS or coatings containing oils, glues, caseins or volatiles will not adhere to wet masonry surfaces. If applied to dry walls that later become wet they saponify and come off.

Mastertex waterproof cement paint, specially designed for exterior and interior coating of concrete, brick, tile, stucco, stone and other masonry, is applied directly to the wet surface, forms a permanent bond, becomes a part of the wall. It will not blister, peel or flake and its hardness increases with age and with successive wetting. It can be washed or brushed clean repeatedly without being injured.

Not designed for use on floors or on vitrified, enameled, magnesite, gypsum, or lime surfaces.

Standard Colors: *Cream, Ivory, Green, Blue, Light Grey, French Grey, Dark Grey.*

Specification

All surfaces as indicated on plans shall be given two coats of Master Builders (insert color) Mastertex, waterproof cement coating, following the directions of the manufacturers, The Master Builders Company.

Only type of coating that adheres firmly to damp basement walls, swimming pools, garden pools, tanks, tunnels, and other masonry subject to constant moisture. Recommended for inside white on all masonry surfaces, particularly in dairies, laundries and other plants subject to steam, fumes and humidity.

COLORLESS SURFACE WATERPROOFING

MASTERSEAL . . .

MASTERSEAL waterproofs brick, tile, stucco and concrete without changing the appearance of the surface. It retards disintegration, resists the corrosive action of smoke and fumes and prevents sanding, staining and efflorescence. Two types of Masterseal are available—*All-Weather Masterseal* for use on wet or dry surfaces and Masterseal No. 1 and No. 2 for use on dry surfaces only and in temperatures above 50 degrees F.

All-Weather Masterseal may be applied to wet or dry brick surfaces in temperatures down to freezing. It speeds up completion of the job, lowers labor costs, has 2½ times the covering capacity of conventional colorless waterproofings; designed for use on brick surfaces only. For stone, stucco, etc., use Masterseal No. 1 or 2. The latter must be applied in temperatures above 50 degrees F. No. 1 darkens light colored surfaces slightly; No. 2 wholly invisible.

Specification—Wet or Dry Walls

All brick surfaces as indicated on plans shall be treated with Master Builders All-Weather Masterseal, surface waterproofing, following the directions of the manufacturers, The Master Builders Co.

Short Specification—On Dry Surfaces Only

All surfaces of brick, tile, stucco, stone and concrete as indicated on plans shall be treated with Masters Builders (Insert Masterseal No. 1 or No. 2) colorless surface waterproofing following the directions of the manufacturers, The Master Builders Co.

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WATERPROOFING PASTE for MASS CONCRETE and MORTAR

STEAROX "30"

STEAROX "30" is a pure stearate waterproofing paste containing 30% stearic acid.

Stearox "30" has been made possible by the discovery of a new process of introducing straight concentrated stearic acid into concrete without the aid of useless adulterants.

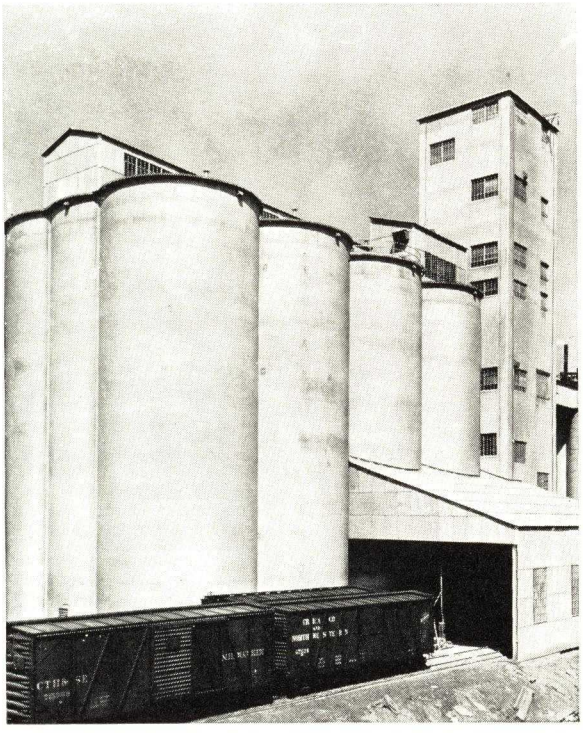
An Authority States

"The stearate or stearic acid ingredient is the most effective constituent and the value of commercial waterproofing pastes and powders seem to depend largely upon their stearate content.

"Analyses of commercial waterproofing pastes show great variations in their stearate content. It has been the practice to add substances such as alkalies and ammonia to waterproofing pastes. *A pure stearic acid, if it can be made easily soluble in the mixing water, would be the most desirable.*"

F. O. Anderegg, Ph.D.,
Consulting Specialist on Building Materials.

Stearox "30" is ***pure, unadulterated, and quickly distributed in the mix.***



Penik & Ford's Grain Elevator—Cedar Rapids
Stearox "30" used throughout

Advantages

Since authorities agree that stearate content controls waterproofing value, Stearox "30"—which contains 30%—has indisputable advantages when compared with other preparations. One of the most widely used of these contains only 16% stearic acid—another only 3%.

Water absorption of concrete is reduced 60% when Stearox "30" is applied. Tests show not only the lowest total absorption but the lowest rate of absorption, which is equally important.

	1 Hr.	1 Day	Decreased absorption
Plain 1:3 mortar	.9%	1.5%	....
Stearox "30" (.6 lbs. per sack cement)	.3%	.6%	60%
6 brands paste Avge. (1½ lbs. per sack cement)	.53%	.617%	59%
6 brands powder Avge. (2 lbs. per sack cement)	.7%	1.1%	26%

Economies

Only 3.6 lbs. of Stearox "30" are required to provide standard waterproofing value. This compares with 9 to 36 lbs. of other types.

Handling and transportation charges are lower, because Stearox is more compact than other waterproofing preparations.

Protection

It is difficult to determine the relative waterproofing value of different brands because there is no convenient way of determining stearate content. (Recent analyses have shown an extreme variation of stearic acid contents and indicate that builders have received not bargains, but only what they paid for or less.)

Stearox "30" has a positive standard of value. The builder knows he is getting a preparation with 30% stearic acid—the purest, strongest and most for the money.

To insure receipt of full value, the following specification is advisable: "The waterproofing shall be free of non-stearic ingredients, and not less than .6 lbs. of 30% Stearic Acid Paste (or corresponding increased proportion of paste of lesser stearic acid content) shall be used per sack of cement."

Specification

All mass concrete shall be waterproofed integrally by the use of not less than 3.6 lbs. of Master Builders Stearox "30" waterproofing paste per cubic yard of concrete used exactly in accordance with the directions of the manufacturers, The Master Builders Co.

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THE 'DEEP-METALLED' CONCRETE FLOOR FOR HEAVY INDUSTRY --

MASTERPLATE

●

The MASTERPLATE floor is a dense, low-water ratio concrete finish with up to 120 lbs. of tough wear-resisting metallic aggregate per 100 sq. ft. This is 2 to 4 times more metal than it has been possible to use by the best previous methods. Masterplate is the 'Super Concrete Finish' that heavy industry has long sought.

This increased amount of metal is made possible by an exclusive new water-reducing plasticizer which makes it easy and practical to incorporate 120 lbs. of Masterplate in the surface of a 'dry mix.'

The operation is further facilitated and results made sure by Master Builders perfected mechanical technique which automatically secures the proper results; much of the costly, variable manual work is eliminated.

Where 30 to 50 pounds of regular Metallic Hardener have been the limit that could be used heretofore (attempts to use more have led to use of an excessive amount of water, which cuts strength and density), you can now have 80, 100 or 120 lbs. of Masterplate—many times more wearing service!

Masterplate is a combination of Master Builders *pure* water absorbent, carefully graded Metallic Hardener with *Omicron* to give resistance to corrosive agents, *and* with the new patented water-reducing agent which make practical and easy the use of 120 lbs. of metal per 100 sq. ft.

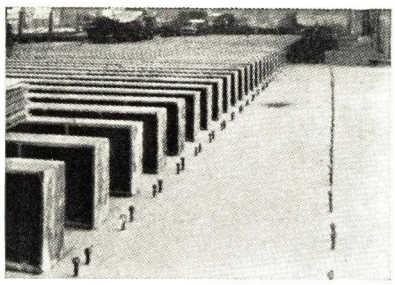
MAGNIFIED cross section shows great increase in metallic finish over best previous method

Specification

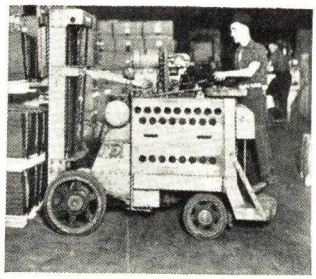
The concrete floor finish shall be hardened with Master Builders Masterplate using not less than (here insert 80 lbs. to 120 lbs. for heavy duty floors) of Masterplate to each 100 square feet of surface. The Masterplate shall be applied and the floor finished and protected in accordance with directions of THE MASTER BUILDERS CO.

●

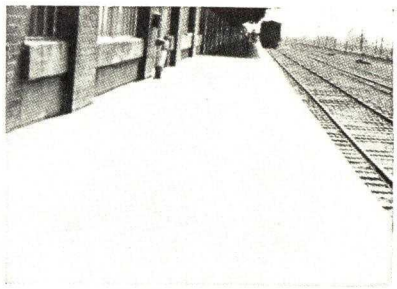
As always, Master Builders service is available to help builders get exactly the kind of floor today's heavy industries require. Steel mills, paper mills, factories and industries of all descriptions are now installing this long-lived low-maintenance floor that will outwear any concrete floor you have ever seen. Further information on request.



Masterplate floor in service at the Wheeling Steel Co. plant, Steubenville, Ohio



Masterplate floor in service at Follansbee Bros. Steel Mill, Follansbee, W. Va.



Masterplate floor on the shipping platform of the Welch Grape Juice Company, Westfield, N. Y.

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THE MASTER BUILDERS CO.
CLEVELAND OHIO

FOR AVERAGE INDUSTRIAL TRAFFIC . . . IT'S

METALICRON

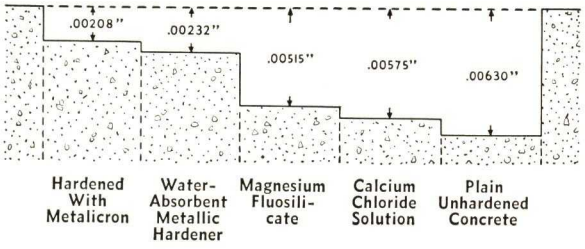
Wear resistance "teams up" with corrosion resistance in Metalicron hardened concrete floors to create long-lived, economical concrete floors for average industrial use. More than twenty-five years of experience have established the superiority of Metalicron floors, for not only does Metalicron provide a hard, long-wearing "iron" surface but it also provides through its Omicron ingredient a surface impervious to the destructive action of cutting oils and alkalies common in practically every industry. Metalicron is easy to apply, easy to finish and free from dusting and crazing. The list of Metalicron users reads like a "Who's Who" of American industry. Sent on request.

Non-Slip Metalicron

The standard formula is changed to include non-slip aggregate. Specify "Non-Slip Metalicron" for use on ramps, stairs and other areas where non-slip finish is desired.

ABRASION CHECKED

Concrete specimens subjected to abrasion tests show following relative wear resistance:



Specification

The concrete floor finish shall be hardened with Master Builders Metalicron, using not less than [here specify 30, 40, 50 or 60 (maximum) lbs. per 100 sq. ft. according to weight of traffic to be carried] of Metalicron to each 100 square feet of surface. The Metalicron shall be applied and the floor finished and protected in accordance with directions of the Master Builders Co. (If the non-slip finish is desired, insert the words "Non-Slip" before the word "Metalicron".)

COMMERCIAL and LIGHT DUTY INDUSTRIAL FLOORS

MASTER MIX

MASTER MIX has been the standard integral liquid floor hardener and waterproofer for commercial and light industrial concrete floor finish since 1915.

Ideal for office building, laundries, auditoriums, lofts, schools, garages, and similar areas subject to heavy foot traffic or light trucking.

Important Characteristics

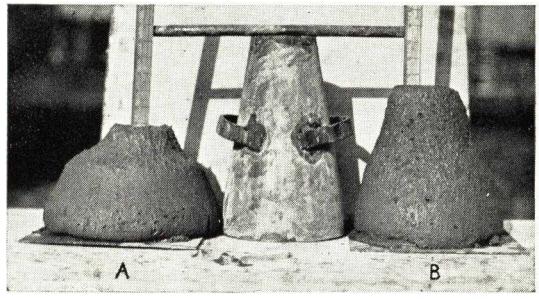
1. By virtue of its Omicron content, it *reduces* shrinkage while *increasing* plasticity with *reduced* water-cement ratio. The proven result is a dense hard and non-dusting floor.

2. Master Mix Floors not affected by mild corrosives because Omicron combines with a substantial portion of free lime *throughout* topping.

Colored Master Mix

Identical in all respects to Master Mix—plus colors. It colors and hardens entire thickness of topping and is ideal for low cost color treatment of large areas. Colored Master Mix floors receive a supplementary treatment of Glazecoat, which imparts a permanent finish. For large areas the results produced by the Colored Master Mix-Glazecoat method cannot be duplicated by any other means for less than several times its small cost. Red—Brown—Tan—Gray—Black.

HOW MASTER MIX IMPROVES WORKABILITY



"A" with MASTER MIX—"B" without MASTER MIX

1 part cement to 2 parts sand. 4¼ gal. water plus 1 quart of Master Mix. SLUMP, 6½".

1 part cement to 2 parts sand. 4½ gal. of water. SLUMP, 3".

Specification

All concrete floor finish as designated shall consist of one part standard Portland cement and two parts clean sharp sand and shall be hardened with Master Builders Master Mix used in the proportion of one quart of Master Mix to every bag of cement mixed. Colored Master Mix, use one gallon per bag of cement. For industrial light duty areas the concrete floor finish shall consist of one part Portland cement and 1½ parts clean, sharp sand and 1½ parts hard pea gravel or crushed stone graded up to ⅜ inch. For floors subject to corrosive agents use two quarts of Master Mix to every bag of cement mix. Not over 5 gallons of liquid, including Master Mix, shall be used per sack of cement. Place, finish and protect in accordance with directions of the Master Builders Co.

IN CANADA
THE MASTER BUILDERS CO., LTD.
TORONTO
MONTREAL

THE MASTER BUILDERS CO.
CLEVELAND OHIO

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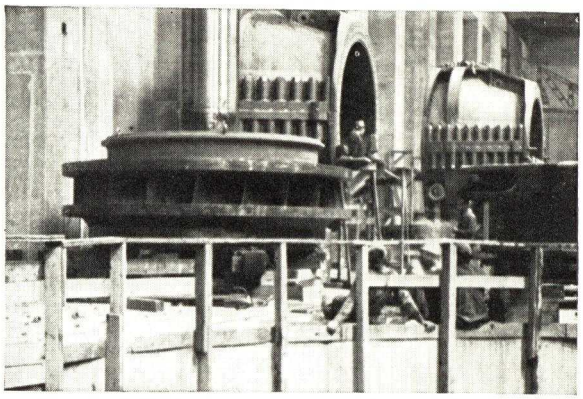
18

REINTEGRATION — GROUTING — REPAIR BY THE

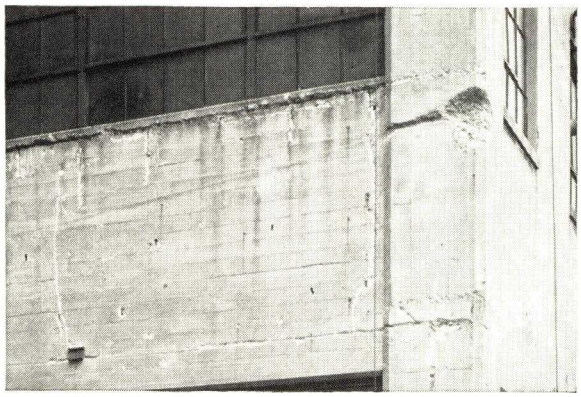
NON-SHRINK EMBECO METHOD

EMBECO is a metallic aggregate which wholly *eliminates shrinkage in concrete.* Since its development fifteen years ago, Embeco has become the standard specification for grouting, repairing and reintegration in the nation's major industries. An increase of 50% in strength results from the use of Embeco and shrinkage cracks do not appear in mortars whether placed by hand or pressure gun equipment. To the architect or engineer faced with the problem of restoring concrete structures, Embeco offers a safe, simple method of obtaining excellent results.



Massive generating equipment being placed before grouting with non-shrink Embeco . . . at Boulder Dam.

CONCRETE BUILDING RESTORATION



Preparatory work completed, ready for restoration with non-shrink Embeco, Continental Can Company plant, Baltimore, Md.

The non-shrink Embeco method of concrete building restoration has proved successful in many cases where other products and methods have failed. So completely does Embeco eliminate shrinkage that patches and repairs made with it create a perfect bond and a completely sealed base for finishing mortars. Among the hundreds of jobs on which Embeco was used are found the names of many of the nation's leading industries. Time tried, proven, it has steadily grown in favor and acceptance among architects and engineers until today it enjoys leadership in its field.

Elimination of Shrinkage Means Perfect Bonding, Perfect Repairs

The unique ability of non-shrink Embeco to completely eliminate shrinkage in concrete has enabled maintenance engineers in the nation's major industries to create really permanent restoration of concrete walls, floors, buildings, grouts, etc. Because non-shrink Embeco does eliminate shrinkage, it forms a perfect bond with the old concrete to which it is applied, building tremendous strength and durability into the original structure. Easy, economical to use, non-shrink Embeco has become a standard specification in the repair and maintenance work of many great industries, railroads and public utilities.

Complete Pictorial Specifications for All Types of Work

To simplify the task of the maintenance crew, Master Builders have produced a book of pictorial specifications, showing the step-by-step procedure in the correct use of non-shrink Embeco. So complete and effectively illustrated is this book that we have been forced to re-issue it a number of times to meet the demand of those who wish to know more about this exceptional product. A copy is yours for the asking.

GROUTING — Machinery, columns, floor grids, etc.

REPAIRS — Heavy duty floors, ramps, platforms.

REINTEGRATION — Buildings, bridges, dams, etc., by hand-placed or gunned methods.

IN CANADA
THE MASTER BUILDERS CO., LTD.
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OTHER MASTER BUILDERS PRODUCTS

Detailed descriptions, technical data and specifications on any of these products sent upon request

METALLIC WATERPROOFING

Master Builders Metallic Waterproofing is applied to either inside or outside wall surfaces, usually the inside surface. It permanently seals all pores and cracks, and provides a water-tight metal-cement sheath that defies time and elements. Applied as successive brush coats or as a plaster coat, or both, as conditions require.

Metallic Waterproofing is used widely instead of the more expensive and difficult membrane method. One great advantage is the ease with which structural cracks or leaks are located and cheaply repaired. Metallic Waterproofing is a permanent seal for repairing and reintegrating masonry and concrete structures.

BONDING IRON

For Bonding Separate Top Finish to Hardened Concrete Slab

Bonding to a set slab is largely a matter of workmanship, but results are surer when Master Builders Bonding Iron, specially designed for this purpose, is used. Bonding Iron is applied in a one-coat treatment to the base slab after the surface has been roughened and thoroughly cleaned and saturated with water. The coat oxidizes, providing a waterproof sheath that prevents the dry base from drawing moisture from the topping and provides an additional mechanical key. Approximately 15 pounds per 100 square feet required.

Specification

Where a cement finish is to be applied to a set slab, the slab shall be thoroughly roughened with picks and broom cleaned; slab shall then be saturated with water, and a grout of Master Builders Bonding Iron shall be applied exactly in accordance with directions of the manufacturers. The Master Builders Co.

CAULKING COMPOUND

In nine colors and natural. Applied by knife or gun.

SANISEAL

For Floors Already Installed

Master Builders Saniseal is a powerful chemical hardener, which when mixed with water and brushed into the floor surface, deposits in the pores a hard, wear-resisting crystal. This arrests dusting and hardens the surface.

Saniseal is designed as a maintenance or corrective treatment for floors already installed. Not less than 2 lbs. of Saniseal should be used per 100 sq. ft.

CONCRETE PRESERVATIVE

Protects concrete from the attack of reagents which ordinarily cause rapid deterioration, such as solutions of alkalies, acids and salts. It is a moderately viscous amber liquid of a non-volatile synthetic base, which, when applied on any dry concrete surface, penetrates and fills the pores with a waterproof corrosion resistant. An excellent alkali-resisting priming coat for oil paints to be used on concrete or masonry, as it waterproofs, forming a strong bond between paint and concrete, preventing blistering and peeling. Concrete Preservative is recommended for application to all concrete exposed to severe corrosive conditions, such as floors in food manufacturing plants, bakeries, laundries, concrete tanks and vats, sewers, silos, bottling plants.

PLASTER BOND

A black bituminous-base adhesive paint for excluding dampness from the inside of exterior walls that are to receive a plaster finish.

FOUNDATION COATING

A black elastic hydrocarbon waterproofing applied cold to exterior surface of masonry below grade.

THE MASTER BUILDERS CO.
CLEVELAND OHIO

REPRESENTATIVES

(For Street Address and Phone Number, Consult Directory)

(Continued from Page 2)

MONTGOMERY, ALA.
T. M. Gorrie
MONTREAL, QUE.
Webster & Sons, Ltd.
NEW ORLEANS, LA.
Clifford A. King, Jr.
NIAGARA FALLS, N. Y.
Empire Bldrs. Sup. Co.
OKLAHOMA CITY, OKLA.
Bissell Bldrs. Sup. Co.
OMAHA, NEB.
Earl S. Lewis & Co.
OTTAWA, ONT.
Webster & Sons, Ltd.
PEORIA, ILL.
Peoria Fuel Co.
PHOENIX, ARIZ.
Walter Dubree
PITTSBURGH, PA.
McCrady-Rodgers Co.
PLATTSBURG, N. Y.
Dock & Coal Co., Inc.
PORT ARTHUR, ONT.
Ernest A. Cuff
PORTLAND, ORE.
McCraken-Ripley Co.
PROVIDENCE, R. I.
H. R. Horton & Co.
QUEBEC CITY, QUE.
Webster & Sons, Ltd.
ROCHESTER, N. Y.
Geo. A. McNerney
ST. LOUIS, MO.
Heinecke Coal & Mat'ls Co.
SALT LAKE CITY, UTAH
Williams & Richardson
SAN ANTONIO, TEX.
Rufus A. Walker
SEATTLE, WASH.
Tourtellotte-Bradley Co., Inc.
SHREVEPORT, LA.
Builders Supply Co.
SYRACUSE, N. Y.
F. J. Ludwick
TAMPA, FLA.
J. E. Wood
TOLEDO, OHIO
Kuhlman Builders Supply Co.
TRENTON, N. J.
Tattersall Company
UTICA, N. Y.
American Hardwall Plaster
VANCOUVER, B. C.
The O'Neil Co., Ltd.
WALKERVILLE, ONT.
Kenneth E. Shaw
WASHINGTON, D. C.
A. P. Woodson Co.
WICHITA, KAN.
Spencer Allen Fuel Co.
WILSON, N. C.
J. L. Lawshe
WINNIPEG, MAN.
Walker's Limited
YOUNGSTOWN, OHIO
Youngstown Ice Co.

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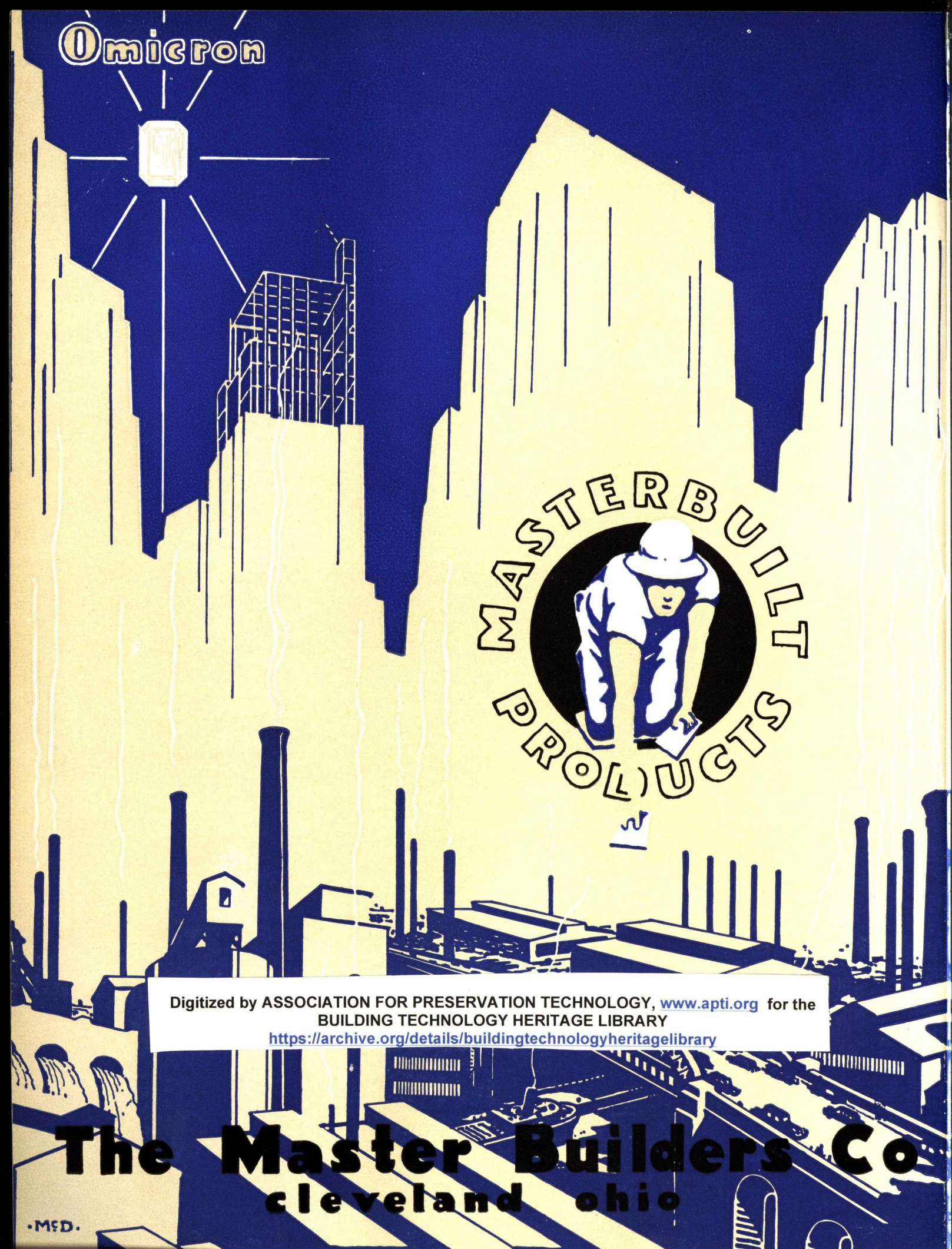

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THE OBELISK WATERPROOFING COMPANY

The Heat Method

1819 Broadway
NEW YORK, N. Y.

TELEPHONE
CIrcle 6-2360-1

Services

Exterior Surfaces of Stone, Brick and Stucco Buildings, above grade, TREATED with the CAFFALL PROCESS, the Heat Method.

Business, Residential and Monumental Buildings and Churches Restored, Dampproofed and Preserved; Exteriors of Delicate Marble Preserved from Weather Disintegration; Monuments Restored and Preserved.

Guarantee

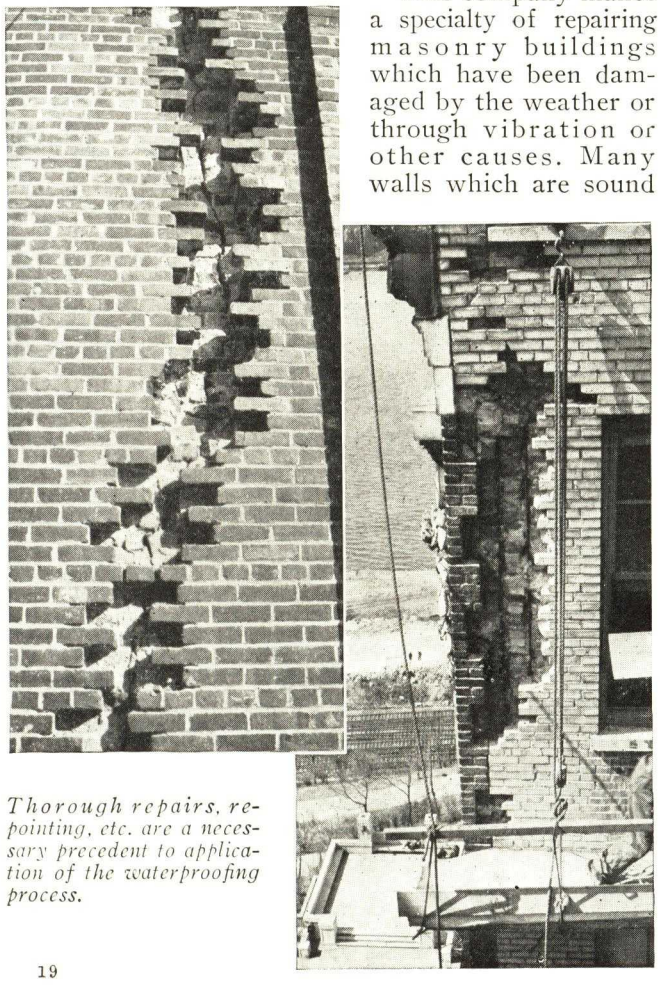
Work done under contract with a 10-year guarantee, or a cost-plus-percentage basis without guarantee.

Process

New Structures—The surface is tested and structural defects, if any, are made good. The wall is then impregnated to considerable depth with a melted wax compound forced in by heat.

Old Structures—Where masonry walls leaks but material disintegration has not occurred all joints are tested and made sound where necessary, and the entire surface, including joints, treated as above.

This company makes a specialty of repairing masonry buildings which have been damaged by the weather or through vibration or other causes. Many walls which are sound upon casual inspection prove to have been seriously affected. Where the surface has disintegrated from weather attack, it is restored to sound condition, joints are repointed, and the entire surface treated as above. The treatment leaves the appearance unchanged, and one treatment will last for the life of the building.



Thorough repairs, repointing, etc. are a necessary precedent to application of the waterproofing process.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat dries out the surface and forces penetration of preservative material. On cooling, the wax congeals and becomes an integral part of the material at and below the surface.

Durability

The principal components cannot be easily oxidized and are insoluble in water, acidulated or alkaline solution, or gases. This process has preserved and waterproofed buildings — successfully — for 68 years. Buildings treated since 1869 are still dry.

Cost

Cost can be ascertained on application to the company. It is determined by the following elements:

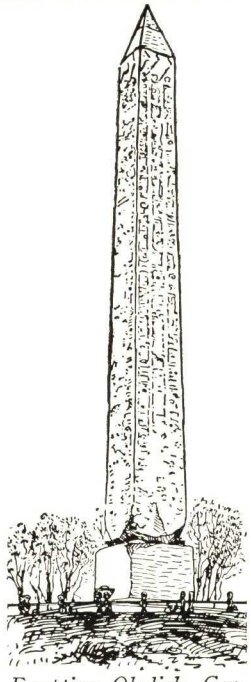
Character of material to be treated.

Area requiring treatment.

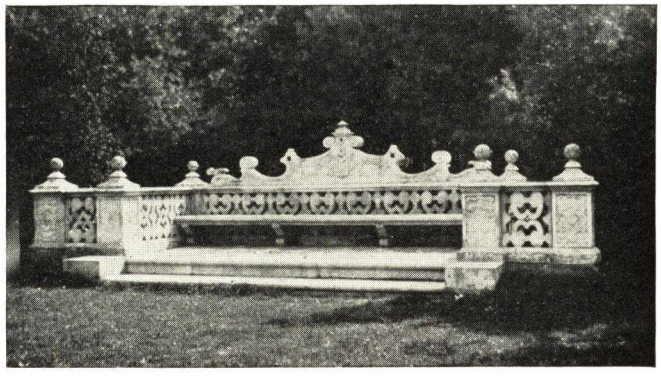
Character of surface, whether plain or ornamental.

Condition, whether newly erected, old or requiring renovation.

Location of building or monument.



Egyptian Obelisk, Central Park, preserved in 1885. No erosion or scaling since that time.



Sixteenth century garden seat, dedicated by Queen Elizabeth. Removed to America, and preserved against local climatic changes.

THE ROCKTITE COMPANY

Manufacturers of Heavy Duty Waterproofing Processes

EAST BOSTON, MASS.

Products

Rocktite Crack and Floorline Sealer; Rocktite Water Plug; Rocktite Waterproof Bond Coating; Rocktite Waterproof Compound; Rocktite Waterproof Color Coating.

Approximate Coverages

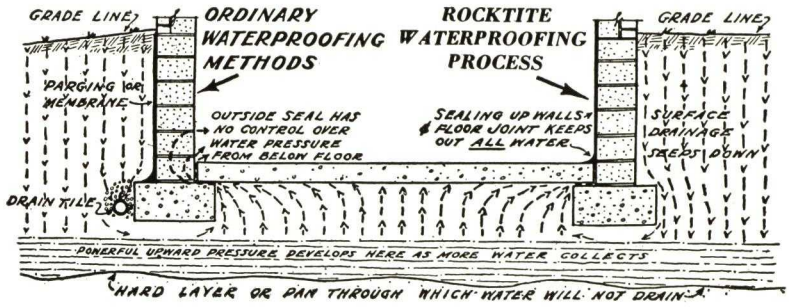
Rocktite Waterproof Bond Coating — One pound covers approximately 12 sq. ft., one coat.

Rocktite Crack and Floorline Sealer — One pound seals approximately 10 lin. ft. of floor line.

Rocktite Water Plug — One pound fills approximately 12 cu. in.

Rocktite Waterproof Compound — Four pounds per bag of cement.

Rocktite Waterproof Color Coating — One pound covers approximately 8 sq. ft., two coats.



Preparation of Surfaces

Walls—Wall surfaces must be clean and free from any form of paint, dust, plaster, lime or other finish. All loose mortar joints must be raked out and the wall pointed up with Rocktite Water Plug. All surfaces and cracks must be thoroughly wetted before the material is applied.

Cracks—Before using Rocktite Crack and Floorline Sealer, be certain that the *wall* and *floor line crack* is clear of dirt, paint, lime, or loose cement.

Settlement cracks must be cut or raked out; cleaned of loose material; wetted thoroughly with clean water; pointed or filled with Rocktite Water Plug flush with wall surface, and smoothed over by brushing with a wet brush to seal the edges.

Hairline cracks or small shrinkage cracks in mortar will be filled satisfactorily by the Rocktite Waterproof Bond Coat.

Rocktite Crack and Floorline Sealer

Use—A special waterproofing sealer applied over wall cracks and into the floor line cracks to seal these openings with an impervious material which will maintain a waterproof seal and expand and contract with normal wall and floor movement.

Mixing—Mix in a 2-qt., clean metal pan. Fill pan one-fifth full of dry powder. Add clean water slowly, stirring material rapidly to heavy cream free from lumps. Apply immediately and generously.

Application—Wet all cracks and floor line with clean water. Apply Rocktite Crack and Floorline Sealer rapidly and generously, using 3-in. paint brush, flowing it freely into cracks. Spread Crack and Floorline Sealer up on wall about 6 to 8 in. above floor line crack and out onto floor about 2 in. from wall. Be sure floor line crack and all pin holes are filled with this material. Remember that this material must withstand expansion and contraction and must be applied liberally to effect a perfect seal.

Rocktite Water Plug

Use—This is a special material and will be used to plug or fill holes and cracks after they have been first cleaned and wetted, and brushed with Rocktite Crack and Floorline Sealer. It may be used to plug openings when water is flowing from them under pressure.

Mixing—Use a clean 2-qt. metal pan for mixing. Fill pan one-fifth full of dry powder. Add clean water. Mix thoroughly and rapidly into a smooth putty. Apply immediately because this hardens very quickly.

Application—Plug holes and open wall cracks with a pointing trowel, filling the cavities flush with wall and smooth over by brushing with wet brush.

Pressure Application—Where water is running under pressure from an opening, allow water plug to become slightly stiff on trowel. Then jam the wad of material into opening, pressing trowel firmly and steadily behind material and holding it a full minute and one-half, to allow material to set. This will shut off the water.

To speed up the setting for pressure work, warm water may be used during mixing.

Be certain to wash pan, trowel, etc., after each mix.

Rocktite Waterproof Bond Coating

Use—A general waterproofing bond coating applied to masonry walls in one coat. *Be certain* that all pinholes in the wall are completely filled and sealed off with this coating.

Mixing—*Prepare not more than* 1 *gal. at a time.* Using a 2½ gal. metal pail, fill it, approximately half full of dry powder. Add clean water and stir into a thick paste, being certain that all lumps are worked out. Add more water until bond coat is reduced to a thick cream. Do not strain.

Application—*Wet the walls thoroughly with clean water first and keep them wet* in advance of the bond coating being applied. Apply coating with a wide, stiff-fibre whitewash brush over the wet walls, flowing it generously onto the walls, being sure to fill all pores and pinholes.

Rocktite Plaster Coating

Use—This is a cement plaster made waterproof by adding Rocktite Waterproof Compound to be applied over the Rocktite Waterproof Bond Coating to afford substantial reinforcement and protection. It will produce a uniform cement plaster. Rocktite Waterproof Color Coating may be added for a decorative white finish.

Mixing—Add to each sack of cement 4 lbs. of Rocktite Waterproof Compound. Mix dry with cement. Add ¼ sack of mason's hydrated lime and enough sand to make a 1:2 mix. Add water and mix to make an ordinary cement plaster mortar.

Application—Apply the first *plaster coat* ¼ *to* ⅜ in. in thickness. Use hock and trowel in usual way. Follow with *skim coat* of same material as soon as first coat is firm enough to work over. As soon as this skim coat is in the early *set* stage, seal and smooth the surface with a circular motion, using burlap dipped in clean water. This will close all pores and leave the surface with a level firm sand finish.

Sprinkle the finished plaster coating with clean water several times during drying to prevent checking. Prolonged curing improves the purpose of the work.

SEC MANUFACTURING COMPANY

Compounds for Waterproofing and Building Maintenance

609 North Miami Avenue, MIAMI, FLA.

BRANCH OFFICE: The Victor L. Phillips Co., 16th and Baltimore Streets, KANSAS CITY, MO.

WATERPROOFING COMPOUNDS

SEC No. 1—Integral Waterproofing

An integral waterproofing compound of the highest quality in the form of a semi-liquid paste. We guarantee that SEC No. 1 contains no soap. It will make stucco plaster and concrete absolutely watertight for the life of the building. Prevents leaching out of the free lime; does away with necessity of furring walls. Impervious to action of sea water.

Specific Uses—Sub-grade walls of common brick, stone, cement block, cinder block, concrete; above grade exterior walls of stucco, all can be made permanently waterproof when plastered with mortar in which SEC No. 1 is included.

Cement Mortar—For plastering the inside surface of all sub-grade walls to make the walls absolutely waterproof even under hydrostatic pressure from the outside.

Stucco Mortar—Stucco exteriors can be positively and permanently waterproofed with a stucco mortar in which SEC No. 1 is included. Such surfaces, after being waterproofed in this manner will not hair check or alligate.

Brick and Tile Mortar—Brick and tile mortars containing SEC No. 1 result in positive waterproof joints. Shrinkage and cracking of mortar joints is eliminated.

Directions for Using—*Mass Concrete*—Estimate 1 gal. SEC No. 1 to each cubic yard concrete for above grade work, use 1 qt. to each sack of cement for grade slabs and sub-grade work.

Recommended Mixes—*Cement and Stucco Mortar*—¼-in. scratch coat: 1 part cement, 2 parts sand, ⅛ part lime; ⅜-in. finish coat: 1 part cement, 2½ parts sand, ⅛ part lime.

For *Cement Mortar, Stucco Mortar, Brick Mortar* use 1 qt. SEC No. 1 to each sack of cement. Can be used without lime in the mix.

SEC No. 5—Clear Waterproofing

A transparent waterproofing compound for stucco, stone and brick surfaces. Will not change the appearance of the surface. Evaporates quickly and may be applied with brush or spray. Does not contain any paraffin or wax and therefore leaves no oily film.

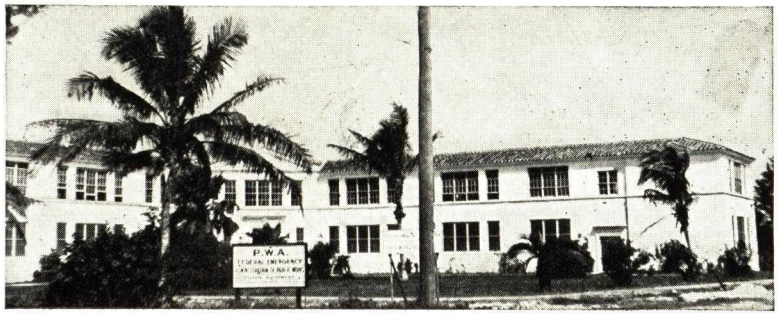
SEC No. 5 successfully seals the exterior pores and prevents the penetration of moisture.

SETTING COMPOUNDS

SEC No. 2

Integral accelerator and hardener. Used in the mix. Controls the setting time of concrete from a few minutes to four hours, depending upon the amount used. Used as an integral, mix with cement for patching concrete floors.

SEC No. 2 stops leaks in walls in one minute. Driveways and floors may be opened to heavy traffic in a few hours after the concrete is laid. Specifications on request.



North Beach Elementary School, Miami Beach, Fla.

SEC No. 3

A super cement setting compound which will give an initial set of ten seconds. Of inestimable value in stopping leaks in concrete where water is coming through in jets or large quantities under pressure.

SEC CEMENT COAT

A hard, dense cold water paint, producing a close grained cementlike waterproof finish for all masonry surfaces. It is especially adapted for use in the tropics where the ultra-violet ray is at its strongest. It is a ready mixed product containing Portland cement and other especially treated pigments which impart easy finishing qualities. It drys hard with a firm grip on whatever surface it is used and has unusual hiding qualities.

SEC Cement Coat forms a decorative as well as waterproofing coating for use on stucco, concrete, and brick surfaces, producing a soft velvetlike finish. It becomes harder and more durable with age.

Colors—Furnished in white and seven beautiful colors: ivory, light cream, cream, buff, mist gray, coral pink and green.

Covering Capacity—For the average surface, 4 lbs. will cover 100 sq. ft. one coat; and 7 lbs. will cover 100 sq. ft. two coats.

SEC WONDER WALL

A permanent, decorative casein paint for interior plaster walls, woodwork, brickwork, masonwork, etc. It comes in a variety of soft pastel tints with wonderful light reflecting values. It may be applied to new or damp walls without sizing and also may be applied over oil painted surfaces. It is odorless, washable and extremely durable. We claim it is the most economical (permanent) wall paint ever produced. It is *not a calcimine.*

SEC Wonder Wall is prepared in white and eight beautiful pastel colors. A 5-lb. package of Wonder Wall makes approximately 1 gal. of paint and will cover from 250 to 500 sq. ft. according to the texture and absorption of the surface to be painted. Tinting can be satisfactorily done by the proper use of good dry colors. Earth pigments, chromium and iron oxides are the most desirable to use.

SEC PERMA BOND

A highly durable maintenance paint with a cement base, for exterior and interior use on new or old concrete, stone, brick, plaster, insulation board, galvanized iron and other metal surfaces. It may also be applied over oil paint.

Applied over asphalt paints, galvanized iron and roofing material of all kinds, Perma Bond in white has high refractive qualities.

Can be applied to masonry surfaces while still damp without interfering with the normal process of drying and curing.

Perma Bond is immune to the usual effects of sun or acid and sulphur fumes. When necessary to repaint, any paint product can be applied over it.

Application—May be applied with either a brush or spray. 6 lbs. of Perma Bond powder will make approximately 1 gal. of paint and will cover 175 to 250 sq. ft.

Colors—Manufactured in white only, tinted on the job with dry limeproof colors. Packed in 5 and 50-lb. bags and 300-lb. barrels.

Passes U. S. Government Specifications for Hydraulic Primer.

We invite architects to submit their problems to us. Write for detailed specifications and recommended mixes on any of our products.

H. N. SANDELL COMPANY

Manufacturers of Through-Wall Flashing, Expansion Joints

38 Chauncy Street, BOSTON, MASS.

SANDELL THROUGH-WALL FLASHING

(U. S. Pat. No. 2,017,106)

Description

Sandell Flashing is composed of two layers of waterproof saturated fabric, between which a galvanized wire mesh is embedded, and the two layers are thoroughly bonded together with a binder of asphalt mastic. The cloth is a strong, tough, closely woven pure cotton fabric, perfectly sealed, and fully saturated and coated with waterproof asphalt.

Uses

Sandell Flashing is adaptable for the prevention of transmission of moisture through outside walls of buildings above grade. This type of damp-proofing in general consists of damp courses built into the wall at the vulnerable points. In particular, these are:

(1) Damp courses over tops of foundation walls to act as cut-offs near the grade line,
(2) Under window sills,
(3) Under exterior door saddles,
(4) Over window heads,
(5) Over exterior door heads,
(6) In skeleton frame construction, protecting the spandrel beams,
(7) In wall-bearing masonry construction, where through-wall flashing is desired at floor and roof lines,
(8) Under copings of parapet walls.
(9) Expansion joints, etc.

(See illustrations on following page.)

Advantages of Use

Many advantages result with the use of Sandell Flashing, some of which are enumerated as follows:

(a) The cost of the material is less and its installation cost less than most metal flashings. *No soldering is required.* It is tough and pliable and hence can be made to form pan-type flashings readily, and can be easily cut and even patched to meet job conditions.

(b) In masonry walls, it does *not* affect the bond or strength. In addition, mechanical bond is obtained by the grid effect of the mesh in all planes as well as the natural adhesive bond of the asphalt.

(c) It will not discolor or stain stonework, other masonry, or stucco.

(d) It can be readily concealed in masonry, and does not require wide mortar joints.

(e) It is not affected by acids in smoke or other atmospheric chemicals. Electrolysis is eliminated.

(f) Expansion and contraction of this flashing are negligible. Hence the material can be used in long sheets when required.

(g) It is self-healing, and hence can be patched over nailings, or joined to wall damp-proofing with mastic.

(h) Structural steel spandrel beams are protected from corrosion and the resulting troubles from such corrosion.

Sizes

Sandell Flashing is made in standard widths of 12, 15, 18, 24 and 30 ins.; and in standard lengths of 10 ft. Special lengths can be obtained if desired.

Recommendation

In order to produce 100 per cent protection against infiltration of moisture through masonry walls in general, where the interior surfaces are to be plastered, it is recommended that the interior of a masonry wall be dampproofed with the standard asphaltic materials.

Samples

Samples and additional information will be furnished upon request. Price lists and cost data are available for those interested.

Partial List of Recent Installations

Building and Location	Architect
Science Building, Wellesley College	C. Z. Klauder, Philadelphia
Library, Mt. Holyoke College	Allen, Collens & Willis, Boston
Aldis Building, Chicago, Ill.	Holabird & Root
R. I. School of Design, Providence, R. I.	Jackson, Robertson & Adams
Barbour Field House, Massachusetts Institute of Technology	Private Plans (Chase & Gilbert Contractors)
Washington Irving School, Boston, Mass.	R. Clipston Sturgis Associates
City Hospital, Worcester, Mass.	Stevens, Curtin & Mason, Boston
State Hospital, Westfield, Mass.	John M. Gray, Boston

SPECIFICATIONS FOR FLASHING FOR MASONRY WALLS

(Under Mason's Work)

Flashings—Build in all flashings as shown and hereinafter specified. All surfaces shall be left sufficiently smooth, with no sharp edges or corners left protruding. All ends of wires, reinforcing, and the like, shall be bent carefully in out of the way.

Through-Wall Flashings—All through-wall flashings, as hereinafter specified, shall be Sandell Flashing, conforming with the manufacturer's standards, and shall be installed in accordance with their recommendations.

All flashings shall be in accordance with the details shown on the drawings, and shall be installed in a workmanlike manner.

Laps—All laps shall be at least 3 in. and shall be sealed between the layers and over the top with mastic. All edges as turned up against inside face of wall shall be turned in a workmanlike manner.

Turn-Up—Where shown connected to damp-proofing treatment on walls under plaster, flashing sheets shall be cut to widths so that they will extend not less than 2 in. beyond inside face of wall. Turn-up connection shall be made tight with damp-proofing material.

Foundations—Damp courses over tops of foundation walls shall be carried to within ½ in. of the exterior surface, through the wall, and shall be turned up on the inside at least 2 in.

Sills—Under all windows sills and exterior door saddles, install flashing as shown, forming a continuous, tight pan to within ½ in. of exterior surface, through wall as detailed, turned up on inside and at ends at least 2 in.

Heads—Over all window heads and exterior door heads install flashing as shown, forming a continuous, tight pan to within ½ in. of exterior surface, through wall as detailed, turned up on inside and at ends at least 2 in.

(For Skeleton Construction)

Spandrels—At all floor and roof spandrel beams install flashing as shown, with the top course to within ½ in. of exterior surface, through wall as detailed, and turned up on inside at least 2 in. Lower course shall start on the spandrel at least 4 in. above bottom and shall extend down and out on to angle forming the window arch to within 1 in. of finished outside face of wall. Space between top and lower courses shall be covered as detailed with waterproof spandrel cloth with the courses thoroughly lapped at least 4 in. and thoroughly sealed with mastic. Where beams are spliced or framed into columns, flashing shall be full height of spandrel, carefully fitted, lapped and sealed with mastic.

(For Wall-Bearing Construction)

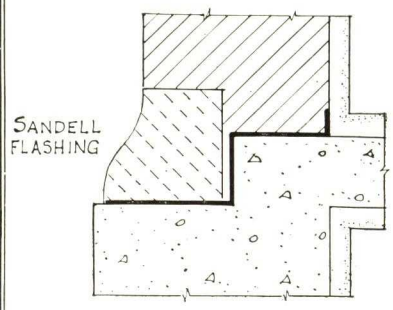
Where floor construction bears on walls, install through-wall flashing as shown, to within ½ in. of exterior surface, through wall as detailed, and turned up on inside at least 2 in.

Under copings of all parapet walls, install flashing as shown, forming a continuous sheet, to within ½ in. of exterior surface, through wall as detailed.

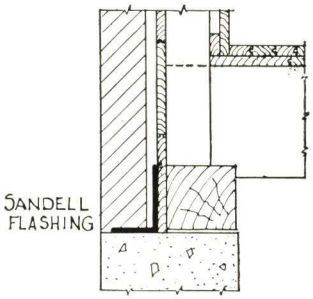
(Under Concrete Work)

Wall Joints at Basement Floor—Install special Sandell Flashing as detailed 6 in. wide at all points where basement floor meets foundation walls. The outer 2 in. at each side shall show the bare mesh to provide bond.

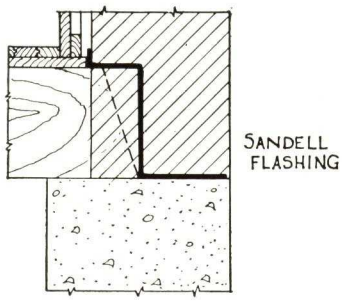
Expansion Joints (Roads, Paving, etc.)—Install special Sandell Flashing 9 in. wide as detailed in all expansion joints noted. The outer 3 in. at each side shall show the bare mesh to provide bond. The upper portion of joint shall be filled with an approved asphalt.



WATERTABLE

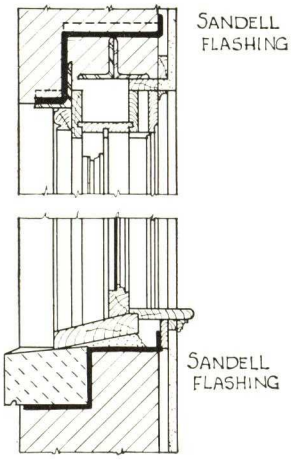


VENEER

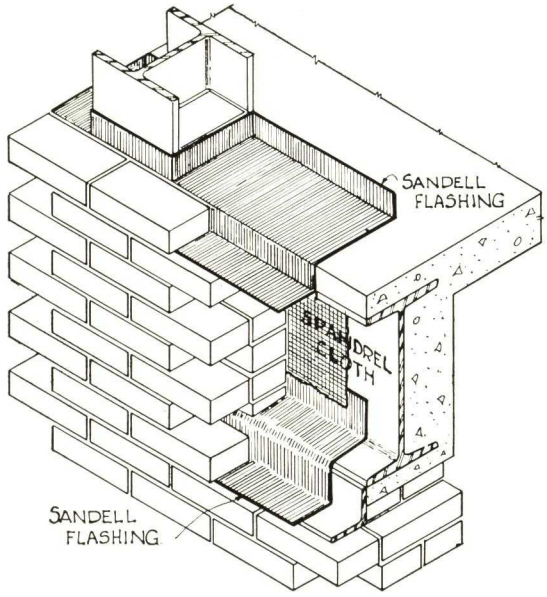


MASONRY

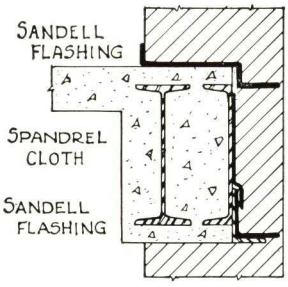
DETAIL AT SILL COURSES



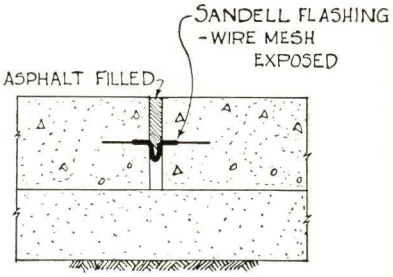
DETAIL AT HEAD AND
SILL OF WINDOW



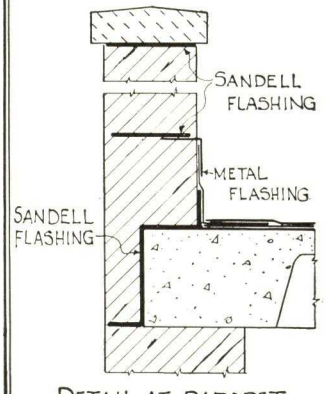
ISOMETRIC DETAIL OF TWO-PIECE
SPANDREL WATERSTOP



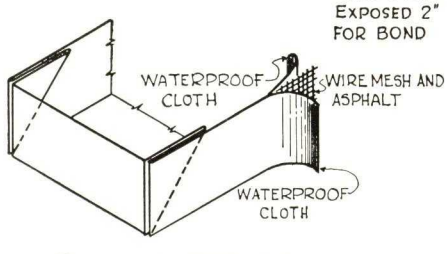
DETAIL AT SPANDREL



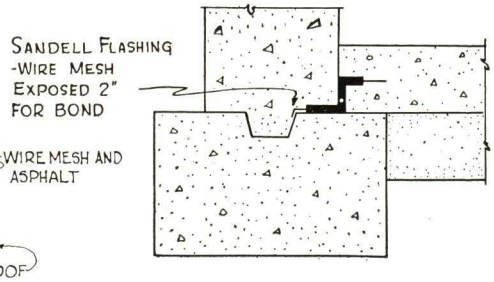
EXPANSION JOINT IN PAVING



DETAIL AT PARAPET



FOLDING DETAILS
CONSTRUCTION OF FLASHING



SUGGESTED DETAIL AT
BASEMENT FLOOR

H. N. SANDELL CO.
BOSTON, MASS.

SANDELL FLASHING DATA

A. I. A.
FILE NO. 12h

SIKA INCORPORATED

Structural Waterproofing Specialists
Sole Proprietors of Sika Products for the United States of America

HEAD OFFICE
330 West 42nd Street, NEW YORK, N. Y.

TESTING WORKS & CHEMICAL LABORATORIES
R. H. Harry Stanger, Assoc. M. Inst. C. E., A.M.I. Mech. E., M. I. Struct. E., F.C.S.
Broadway House, Westminster, S.W.1.

RESULTS OF PERCOLATION TESTS ON THREE SPECIMENS OF MORTAR MADE IN MY LABORATORY

6th December, 1929

Test No.	COMPOSITION
P.6	3 parts Ham River Sand to 1 part of Portland Cement gauged with 11% water.
P.7	3:1 as for "P.6" but with the addition of Road Sika in the proportion of 1 part to 7 parts water.
P.8	3:1 as for "P.6" but with the addition of Sika No. 3 in the proportion of 1 part to 7 parts water.

DIMENSIONS OF SPECIMEN—5 in. diameter (approx.) by 2 in. thick.
AREA UNDER TEST—20 sq. in. Age at time of test, 24 hours.
STORAGE CONDITIONS—Moist cupboard.

Pressure of Water Per Sq. In., Lbs.	Feet Head	Presure maintained for	Quantity of Water Percolating Through Specimen per Hour P.6	P.7	P.8
20	46		c.c.	c.c.	c.c.
30	69		20.5	Nil	Nil
40	92		35.5	Nil	Nil
50	115	One hour	60.0	Nil	Nil
75	172	at	74.0	Nil	Nil
100	230	each pressure	150.0	Nil	Nil
125	287		199.0	Nil	Nil
150	345		261.0	0.125	0.5
			309.5	0.5	2.0

Extract from a Report by Messrs.
RILEY, HARBORD & LAW
16 Victoria Street, Westminster, S.W.
on the effect of various SIKA SOLUTIONS on the COMPRESSIVE strength of CONCRETE.

6-in. cubes made in the proportion of:
4 parts *Ham River Gravel*
2 parts *Ham River Sand*
1 part *Pelican Brand Cement*
Gauged with 7.5 per cent *Liquid*

Results given in pounds per square inch.

Age	Water	Sika 1 : 8	Sika 1 : 10	Sika 1 : 12	Sika 1 : 15
2 days	1,275	1,710	1,900	1,835	1,770
4 days	2,160	2,430	2,520	2,550	2,520
7 days	2,640	3,200	3,580	3,200	3,140
14 days	3,375	4,120	3,670	3,560	3,515
28 days	3,730	4,230	4,040	4,040	3,790

Shakespeare Memorial Theatre, Stratford on Avon, England
Basement and cellars waterproofed with Sika

What Sika Is and What Sika Does

Sika is a *liquid integral waterproofer* for admixture with cement concrete or cement coating. It is not an inert porefiller, but combines with the cement, effecting more complete hydration and insoluble crystallization, thus ensuring complete impermeability. It gives immunity against seawater, acids in groundwater and prevents efflorescence, sweating, fungoid growths and the disintegration by frost. It gives added resistance to chemical solutions used in industrial processes and increases plasticity and adhesion. By means of Sika, *the setting time of ordinary portland cement can be controlled completely from a few seconds up to the normal,* and on this account Sika *can be successfully used against infiltration of water from the slightest beading up to the heaviest of jets.* Sika is also used for the quick setting and rapid hardening of concrete.

" . . . a remarkable saving of time as compared with ordinary road repair work was effected by the use of Road Sika."
" . . . a saving in time of approximately four to five days was achieved thus reducing the time during which traffic was interrupted." *The Surveyor and Municipal and County Engineer.*

"The process makes possible a tremendous saving in time and money. Repairs which took days with the use of other methods have been done in a single night, and a great amount of traffic dislocation has been avoided." *The Daily Telegraph.*

" . . . men were laying wood blocks on what two hours before had been a bed of liquid concrete." *The Evening News.*

Six grades of Sika with different setting properties are manufactured to deal with various kinds of work.

Normal Setting Sika No. 1

Supplied in soluble paste form for dilution with the gauging water. For general use in concrete, cement coating, stucco, roughcast, artificial stone, and all forms of cement work where impermeability and preservation are desired, but quick setting is not necessary. It is used in the proportion of *3 to 100 lbs. of cement* which works out at a solution varying from 1:12 to 1:8 according to the amount of water contained in the aggregate. The Sika solution is added after the other materials are mixed dry. Concrete requires from *1¼ to 1½ gal. of Sika No. 1 per cu. yd.,* and in cement coating 1 in. thick, *1 gal. will waterproof from 10 to 12 sq. yd.*

Quick Setting Sika No. 2

The fastest setting of all the Sikas and is used in *extreme cases of infiltration,* such as where a large quantity of water is concentrated in one jet, Sika No. 2 will produce initial set in an average cement in from 10 to 15 seconds and final set in from 20 to 40 seconds.

Quick Setting Sika No. 3

Used for *sealing leaking joints* in masonry or brickwork, particularly in large scale heavy work, such as railway tunnels, rock faced aqueducts, etc. It is also used for accellerating the setting and hardening of concrete.

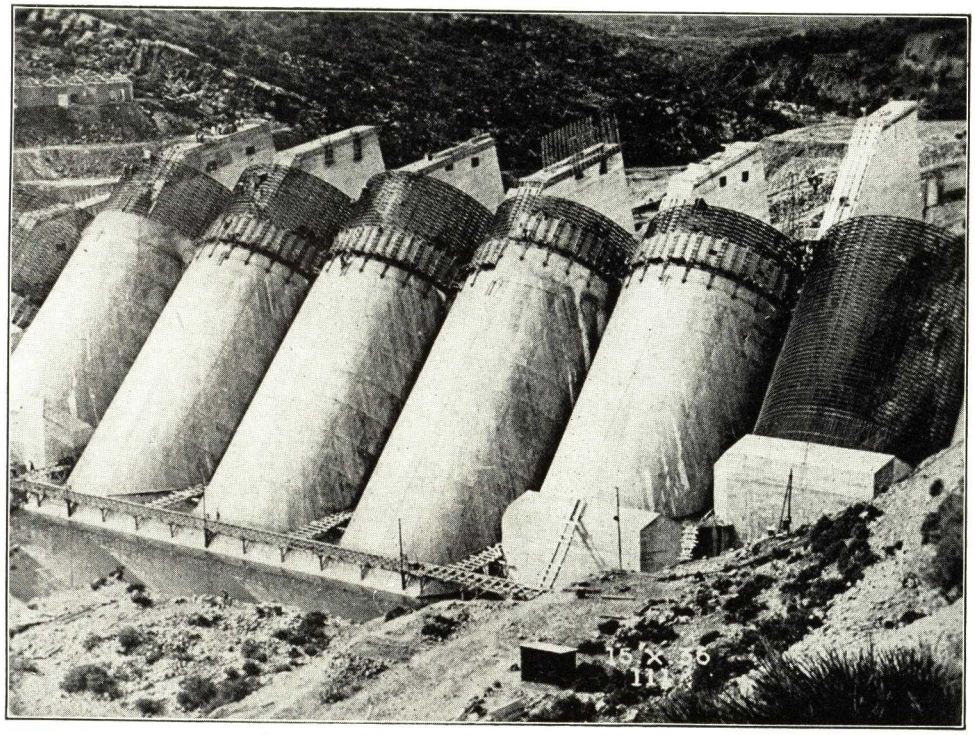
Initial set can be obtained in about 30 seconds, and final set in about one minute, using an average cement. By diluting the Sika, the setting times can be controlled to within narrow limits. Quantities depend upon the dilution required, which vary from 1:10 to neat Sika No. 3.

Quick Setting Sika No. 4

Used in *cement coating against infiltration,* and when exceptional *adhesion* or *resistance against oil* is required. An average cement will show an initial set of 30 to 60 seconds, and a final set of 2 to 4 minutes, using Sika No. 4. It is diluted with water as required.

Quick Setting Sika No. 4A

Used as Sika No. 4 *against infiltration,* but possesses superior properties of resistance against *impurities in water,* and is also used in concrete to accelerate *setting or hardening against seawater, etc.* An average cement with Sika No. 4A will reach its initial set in 30 to 60 seconds, and its final set in 2 to 4 minutes.



Large Multiple-arch Dam Built with Plastiment

PLASTIMENT

The Vitamin of Concrete

Increases—Plasticity, Workability, Impermeability, Homogenity, Adhesion, Durability.

Reduces—Working costs.

Eliminates—Surplus water, Air pores, Water pores, Laitance.

Plastiment is a powder for admixture with concrete in the proportion of *1 lb. to each 100 lbs. of cement.* Its introduction permits *reduction of water content* of a given concrete by *from 10% to 20%*, giving the same plasticity and workability. Concrete so produced has a *compressive strength* of from 30% to 50% more than an ordinary concrete of the same plasticity. There is no surplus water left in the concrete to dry out and leave pores, and the individual cement grains are more closely compacted and more completely crystallized in the form of insoluable material.

This property of Plastiment, in conjunction with the homogenity and compactness obtained by the increase in plasticity, gives a concrete which is impermeable and, in addition, by reducing laitance at horizontal joints and increasing the adhesion between pours, eliminates all porosity at those vulnerable points.

A considerable saving of time is achieved in pouring, by virtue of the perfect workability obtained, and the cost of plastering up honeycombed faces entirely eliminated.

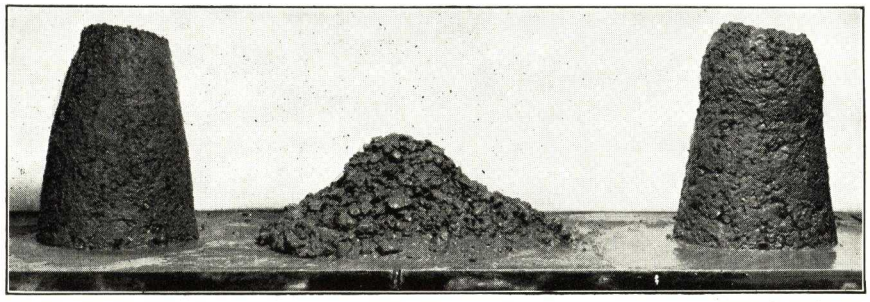
Our illustrated brochure giving full details of this unique product will be sent upon request.

Road Sika

A quick-setting Sika for use diluted with water for the *rapid hardening of concrete* which is required to resist *early wear, or stress at an early age,* as in the case of repairs and renewals in *busy streets and rush work* generally. It is not suitable for cement coating or water stopping, although it adds considerably to the waterproof properties of cement. With a suitable cement it will give an initial set of about 30 seconds, and a final set of about 1 minute if used in an undiluted state. Usually the most effective dilution for the rapid hardening of concrete is from 1:7 to 1:10. The solution is added after the cement, sand and gravel are mixed dry.

Other Products

In addition to the Sikas mentioned above, we are equipped with subsidiary products of the most effective nature, which enable us to deal with any waterproofing or allied problem which may arise, for example Exterior Transparent Impregnation against rain and atmospheric moisture, Elastic and Plastic Jointing and Coating, Floor Hardening, Acid and Oil Proofing, Frost Prevention, etc.



Without Plastiment 7.2% Water Slump 1¼ in.

With Plastiment 7.2% Water Slump 7½ in.

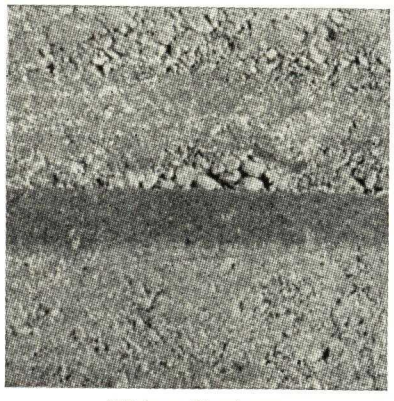
With Plastiment 5.8% Water Slump 1¼ in.

Plasticity and Homogenity

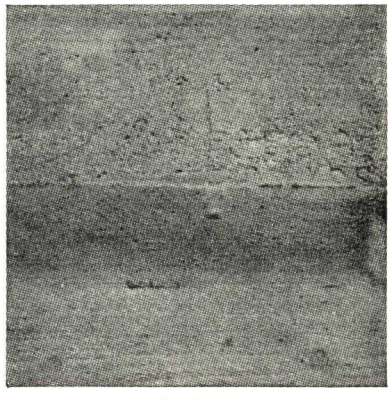
Sika Service

We welcome inquiries on any proofing problem, large or small, and inquirers are requested to let us have the fullest possible particulars in all cases as this materially assists us in giving the best advice and service. General literature will be sent upon request, and instruction sheets covering a wide range of practical problems are available for the executive and workmen on the job. Special Instructions are drafted to deal with individual cases which are not covered by our general instructions.

Our staff of Engineers are available to demonstrate the properties of Sika, inspect and advise upon any work, or estimate for its execution under guarantee. All our products are manufactured in the United States of America.



Without Plastiment



With Plastiment

L. SONNEBORN SONS, INC.

Guaranteed Quality Waterproofing and Dampproofing Products

88 Lexington Avenue, NEW YORK, N. Y.
BRANCH OFFICES IN PRINCIPAL CITIES FACTORIES, NUTLEY, N. J.

For Our Page on Floor Preservatives, Technical Paints and Varnishes, see File Index

Hydrocide Exterior Colorless Waterproofing

Description—A clear, colorless liquid composed of water-repellent colloids incorporated in special solvents which are blended in such a manner as to make the product permanently stable in form; permits the ready penetration of the water-proofer into the surface and eliminates discoloration. It differs from liquids incorporating wax, oil or gum compounds in the important fact that Hydrocide Colorless does not leave a sticky or viscous film to invite the accumulation of dust and dirt, and it remains unaffected by temperature changes.

Application—All surfaces to be waterproofed must be clean and absolutely free from moisture to insure thorough absorption. For that reason it is advisable to allow at least three days to elapse after a heavy rain before making an application. It is important that all mortar joints be inspected and wherever necessary, repointed and allowed to dry and set thoroughly before Hydrocide Colorless is applied.

Specifications—Brush or spray thoroughly on the exterior wall two (2) coats of Hydrocide Colorless (specify formula) as manufactured by L. Sonneborn Sons, Inc., 88 Lexington Avenue, New York, N. Y.

At least 18 hours should elapse between coats. For exceptionally dense surfaces, one (1) heavy saturation coat may prove sufficient. Hydrocide Colorless must be brought to the job in the original sealed containers. Can be applied by brush or spray.

Special Note: For light colored surfaces of low porosity, two coats of Hydrocide Colorless "G" are recommended; for dark colored stucco, dark colored natural stone and dark colored artificial stone and red brick, two coats of Hydrocide Colorless "B" are recommended. For surfaces of high porosity, one coat of Hydrocide Colorless "D" is recommended; in exceptional cases two coats are recommended.

Covering Capacity—For two coats, estimate 1½ gals. for each 100 sq. ft.

Kaukit

Description—An airproof, non-shrinking waterproof, plastic caulking compound. It cures to a tough film on the surface, but remains pliable and elastic underneath. It expands and contracts with alternating temperatures.

Kaukit can be used for caulking around window frames and door jambs, glazing steel sash and skylights; sealing and waterproofing cracks and crevices in concrete, stone and brick; waterproofing flashing around chimneys, cornices and coping walls.

Kaukit is made in two consistencies: knife and gun grade. The knife grade is easily applied with a putty knife or hand tool. The gun grade is lighter in consistency and is applied with a caulking gun.

Kaukit is manufactured in Black, White, Natural, Dark Gray, Light Gray, Maroon, Green, Aluminum.

Covering Capacity—One gallon of gun grade is sufficient for caulking about 350 to 500 lineal feet, depending upon the depth of the joint.

One pound of the Kaukit knife grade will cover about 15 to 25 lineal feet, depending upon the depth of the joint.

Specifications—Caulking material shall be Kaukit as manufactured by L. Sonneborn Sons, Inc., 88 Lexington Avenue, New York, N. Y., and applied in accordance with their specifications.

WATERPROOFING AND DAMPPROOFING ADMIXTURES

For Mass Concrete and Mortar Mixes

Hydrocide Integral Paste, Powder and Liquid

Description—These products contain both water repellent and pozzuolanic ingredients and are recommended for—

(a) Waterproofing concrete structures.
(b) Imparting workability to portland cement mixes and mortars.
(c) Imparting density and decreasing shrinkage.
(d) Increasing strength and durability by reducing free lime in finished concrete.

Specifications—Paste for Portland Cement mixtures about 1 lb. for each bag cement; Paste for cement stucco, plaster and mortar about 1 lb. for each bag of Portland Cement. Where severe conditions prevail, a larger proportion of Paste to each bag of cement may be required.

Powder—About 1 lb. of powder to each bag of Portland Cement.

Liquid—About 1 qt. to each bag of cement.

Detailed specifications furnished upon request.

Installations—Thousands of installations throughout the country.

Trimix

Description—Trimix is a solution of chemicals containing a siliceous admixture of high pozzuolanic activity for increasing the workability of mixes and when used according to the manufacturer's directions, is a suitable admixture for use as an accelerator, integral hardener and waterproofer when used in mortar or concrete construction.

Specifications—Detailed specifications upon request.

Hydrocide Mastic, Semi-Mastic—For Dampproofing and Waterproofing Foundations and Walls Above Grade

Description—These materials are ready for use and require no heating or mixing. They are composed of the finest asphalt reinforced with asbestos fibre and provide a modified membrane system of waterproofing.

Covering Capacity—Hydrocide Mastic, 30 to 40 lbs. for every 100 sq. ft. $\frac{1}{16}$ in. thick. Hydrocide Semi-Mastic, use 1 gal. for every 30 to 40 sq. ft. one heavy coat (two coats recommended). Hydrocide No. 648 Foundation Coating, 1 gal. for every 65 to 100 sq. ft. each coat (two coats recommended).

Specifications—Detailed specifications upon request.

Hydrocide No. 633—A Plasterbond and Dampproofer

Description—A black bituminous compound of highest quality free from coal tar or other adulterants, for application to interior surfaces of exposed exterior walls above grade.

Covering Capacity—1 gal. will cover about 65 to 100 sq. ft., one coat.

Specifications—Furnished on request.

STANDARD WATERPROOFING CORPORATION

Waterproofing and Dampproofing Engineers and Contractors
Manufacturers of Stanwaco Waterproofing Products

TELEPHONE
HArlem 7-3910

1691 Park Avenue,
NEW YORK, N. Y.

BRANCH OFFICES IN PRINCIPAL CITIES

Waterproof Products Nos. 1, 2, 3 Transparent

A transparent waterproofing which stops seepage of water and moisture through brick and stone where ordinary waterproofing materials have failed. Does not wash off, mar, crack nor peel. It penetrates every pore. Stanwaco resists heat, cold, rain, and snow. It has been used to waterproof thousands of buildings permanently, economically, and with absolute satisfaction. Applied with either brush or spray.

Laboratory Test of Stanwaco Transparent—An ordinary brick exposed to rain or immersed in a pail of water for 12 hours, gains 6 ounces in weight. The same test made after Stanwaco Transparent Waterproofing is applied to the brick shows no gain in weight. *Water cannot penetrate Stanwaco.*

Grades—Stanwaco is available in the following grades to suit specific requirements:

No. 1—For light colored brick, concrete, stucco, or light stone.

No. 2—For red or other dark colored brick.

No. 3—For very porous surfaces.

Stanwaco No. 4 Asphalt Waterproofing

An asphalt product for waterproofing interior and exterior walls, cellars; for resurfacing and repairing masonry, roofing, wood or metal. Colors: red, green, gray, buff and black.

Stanwaco No. 7 Caulking

An elastic, non-drying caulking compound which will withstand all kinds of weather. Colors: black, gray, red.

Laboratory Test of Stanwaco Caulking Compound—A pat about 2 in. square, ¼ in. thick on a steel plate is dried in an oven at 250° F. for 7 hours and then placed while hot in a freezing mixture of ice for 17 hours, repeated for 3 successive days. Stanwaco Caulking Compound will remain plastic and show no sign of loosening, cracking, blistering, or any signs of disintegration.

Stanwaco No. 8 Integral

An integral waterproofing to be mixed in cement. Acts as an anti-freeze and a cement hardener. Is added to mixing water with which it combines immediately, without stirring.

Waterproof concrete—1½ gal. for cu. yd. concrete.
Hard dustless floors—1 gal. for 100 sq. ft.
Waterproof mortar—1 gal. for 800 to 1000 bricks.
Waterproof stucco and plaster—1 gal. for 120 sq. ft.

How Furnished

Stanwaco is furnished in 50, 30 and 5-gal. drums.

19AJ

Contract Service

We specialize in waterproofing exterior walls above grade.

During our 33 years of waterproofing, the materials which we have perfected and the experience gained through waterproofing thousands of important buildings have enabled us to succeed even in the most difficult and unsual cases. We do not undertake any work on which we cannot give a positive guarantee against the penetration of water. The mere application of waterproofing materials on a damp or leaky wall is not sufficient. The cause must be determined to avoid continual recurrences.

Although we operate throughout the country, all applications are made by experienced mechanics trained in our service. Quotations for waterproofing work are submitted at reasonably low prices, consistent with our superior workmanship.

Our waterproofing work will stand the following test:

Field Test—In an official test conducted by the Department of Public Works, State of New York, at Brooklyn State Hospital, Creedmor, N. Y., on Building No. 1, the plaster and hollow tiles were removed from a 16-sq. ft. wall, leaving the brick exposed. Then a fire hose was played against the outside of this area. Water appeared in the interior within five minutes. After forty-five minutes the water flowed right through the wall.

We then applied our waterproofing on the same area in accordance with the *Standard Waterproofing Method.* To test our work, a fire hose was placed 15 ft. away from the building and over 50 lbs. of pressure of water was forced against one spot for four hours. *No water or dampness came through.*

National Scope

We accept contracts anywhere in the United States.

"Standard Waterproofing" Is Permanent Insurance—A Written Guarantee with Every Job.

A Few of the Buildings Waterproofed by "Standard" with Stanwaco Waterproofing Products

Eighteen Public Schools, City of New York
East and West End Schools, City of Long Beach, N. Y.
U. S. Government Army Barracks at Fort Slocum, N. Y.
Queens County Savings Bank, Corona, L. I., N. Y.
Ritz Carlton Hotel, Atlantic City, N. J.
Brooklyn State Hospital at Creedmor, L. I., N. Y.
Church of Our Lady of Mount Carmel, Mt. Vernon, N. Y.
New York Furniture Building, New York, N. Y.
Pocono Manor, Pocono, Pa.
Industrial Office Building, Newark, N. J.
And thousands of others.

STRUCTURAL WATERPROOFING, INC.

285 Madison Avenue
NEW YORK, N. Y.

TELEPHONE
AShland 4-1237

JOSEPH ROSE, C. E.
President

WATERPROOFING ENGINEERS AND CONTRACTORS
Experts in the Installation of Waterproofing and Dampproofing Products

DAMPPROOFING
Paints, Mastics, Emulsions and our own "Cemulsion Process" (patented)

SPANDREL WATERPROOFING
Membrane, Prepared Cloth and Metal

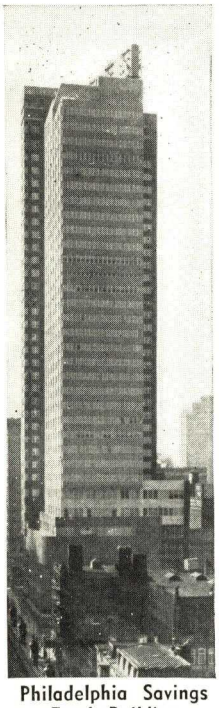
CEMENT WATERPROOFING
For all Masonry below grade

MASONRY POINTING, WATERPROOFING CLEANING AND PRESERVATION
For all types of Structures, Monuments and Statues

STEEL PROTECTION
With Asphaltic Compounds for exterior columns and beams

Asphalt Mastic Floors
Playgrounds
Roofs

Special Concrete and Finish Work



Philadelphia Savings Fund Building
Philadelphia, Pa.
HOWE & LESCAZE, Architects

Hampshire House,
New York, N. Y.
A. ROLLIN CAUGHEY, Architect

New York Central Building,
New York, N. Y.
WARREN & WETMORE, Architects

RCA Bldg., Rockefeller Center
New York, N. Y.
HOOD & FOUILHOUX,
HARRISON & MCMURRAY & CORBETT,
REINHARD & HOFMEISTER,
Architects

"When it rains, we reign."
Trade Mark

Other Installations

Sherry Netherlands Hotel
Heckscher Bldg., New York
General Motors Bldg., New York
Maritime Exchange, New York
Sterling Library at Yale
Roxy Theatre, New York
Radio City Music Hall
Academy of Science, Washington
Architects Bldg., Philadelphia
Western Union Bldg., New York

Photos by Underwood and Underwood

American Radiator Bldg.,
New York, N. Y.
RAYMOND HOOD,
Architect

TOCH BROTHERS INC.

(ESTABLISHED 1848)

386 Fourth Avenue
NEW YORK, N. Y.

2600 Federal Street
CHICAGO, ILL.

DISTRIBUTING AGENCIES IN THE WORLD'S PRINCIPAL CITIES

Products

Manufacturers of Steel Protective Paints; Damp-proofing and Water-proofing Paints and Compounds; Caulking and Pointing Compounds; Masonry Paints; Concrete and Wood Floor Coatings.

R.I.W. REMEMBER IT'S WATERPROOF
Reg. U. S. Pat. Off.
TRADE-MARK

Insulating Paints; Smokestack Acid and Alkali Resisting Paints, Roofing Paint; Enamels; Stone Backing; Wood Floor Preservatives; Mortar Cement and Plaster Colors; Decorative Paints for all purposes.

Purpose or Service	Product	Descriptive Data
Damp-proofings — Plasterbonds: Interior Wall Surfaces Super Structure	"R.I.W." No. 232	A black elastic full bodied, tacky damp-proofing and plasterbond coating for brush or spray application to interior surfaces of masonry walls to which hard plaster is to be applied. Prevents penetration of dampness and renders plastered walls stainproof. Not recommended for use under portland cement mortar (except under special instructions).
	"R.I.W." Semi Mastic	Similar to No. 232, except a heavier bodied material.
	"R.I.W." Plastertox	Mastic damp-proofing and plaster bond for trowel application. Similar in properties to No. 232.
Waterproofing: Foundation Walls — Floors Tunnels — Bridge Floors, etc.	"R.I.W." Marine Cement	A black heavy body damp-proof coating for cold brush application to exterior of foundation walls and footings, concrete base floor slabs, wood sleepers or timber laid in concrete or set inground.
Membrane and Brush Coat Methods	"R.I.W." Self-Healing Bridge Cement	A black elastic viscous non-hardening membrane compound; unaffected by vibration, low or high temperatures. Applied hot with mop or roofing brush.
Integral and Plaster Coat Methods	"R.I.W." Toxement Powder and Liquid "R.I.W." Mortar Toxement For brick and stone mortar	R.I.W. Toxement Compounds give increased workability, flowability with lower water-cement ratio and promote complete and proper hydration of the cement. Toxement compounds minimizes efflorescence and shrinkage.
		Integral waterproofing for all portland cement (concrete-stucco) construction and cement products. 1½ to 2 lbs. Toxement Powder required per bag of cement; 1 Toxement liquid per bag of cement.
	"R.I.W." Concentrated Toxement Paste	A highly concentrated stearate paste integral waterproofing, which readily intermixes, gives increased workability, etc., along with thorough and efficient waterproofing. Required 6/10 lbs. per bag of cement.
	"R.I.W." Tox-Mix Liquid	A semi-liquid for integrally hardening and waterproofing concrete-cement floor finishes etc. Speeds up setting action with a permanent increase in compressive and tensile strengths.
	"R.I.W." Ironized Waterproofing Plaster coat method	Metallic waterproofing system. A specially processed iron compound which when applied in two or three successive brush coats and cement plaster coat renders walls or floors resistant to water pressure.
Stain-proofing and Damp-proofing: Stone and Wood Trim, etc.	"R.I.W." No. 110	A black alkali-acid resisting and waterproof elastic paint for protection of limestone marble and other stone from chemical action and discoloration due to alkalis in cement and moisture. Also used to back paint wood trim etc., in contact with masonry.
Damp-proofing; Exterior: Above Grade Colorless — Transparent-Color	"R.I.W." Toxloxpore	A colorless damp-proofing for application to brick, concrete, stucco, limestone, etc. Thoroughly damp-proofs and prevents developments of efflorescence.
	"R.I.W." Anhydrosol	Transparent damp-proofing similar in properties to Toxloxpore, but heavier bodied.
	"R.I.W." Liquid Konkerit	A waterproof masonry paint in white and colors. For application to stucco, brick and other masonry. Dries with a flat finish, for gloss apply R.I.W. Flex-Sicco Paint.
Pointing and Caulking:	"R.I.W." Elastic Pointing and Caulking Compound	Gray and caenstone shades. Gun and knifing consistencies. An elastic waterproof non-staining compound. For pointing of terra cotta and stone joints etc. and caulking metal or wood windows, doors, etc.
Cement and Wood Floors: Decorative Coatings	"R.I.W." Cement Floor Enamel	A decorative protective floor coating in white and other shades for dry cement or wood floor. This waterproof enamel penetrating the pores, neutralizes lime inherent in cement, hardens the surface; is oil resisting, prevents cement dusting.
Wood Floor Preservative	"R.I.W." Toxbro Preservative Filler	A light straw color composition for application to wood floors or other wood surfaces. Binds wood fibres together, prevents grain of wood from raising. Fills and insures a smooth surface. Prevents silvering, splintering, cracking and checking.
Hardening-Dustproofing	"R.I.W." Cement Filler	A transparent cement floor coating which hardens, dustproofs. Renders floor resistant to water and oil.
	"R.I.W." Flintox	A chemical treatment furnished in crystal and liquid form for surface application to harden and dustproof. Two coatings recommended.
Integral Hardening and Coloring	"R.I.W." Toxmix Colored	An integral paste medium in various shades. An alkaliproof coloring-hardening medium which readily intermixes and possesses great waterproofing properties.
Metallic Floor Hardeners (Dust-on Method)	"R.I.W." Puzzolanic Metallic Hardener	A specially processed and graded metallic hardener. Readily mixes and trowels with cement. Resists abrasion and destructive influences. Furnished in gray and red—other colors can be supplied. Use 30 lbs. per 100 sq. ft.
	"R.I.W." Non-Slip Metallic Hardener	For use in cement or asphalt floors to give safe traction. Gives permanent non-slip metallic surface even under wet conditions. Natural and red shades. For cement floors use 30 lbs. per 100 sq. ft.
Steel and Metal Preservative Paints-Priming and Shop Coats	"R.I.W." Tockolith	A cement basis, anti-corrosive paint. Gray color. For priming iron, steel, metal, etc. Always apply a finishing coat according to desired color and service conditions.
	"R.I.W." No. 708	For priming or finish coat, a gray flexible acid-alkali resisting waterproof paint for steel or wood interior or exterior exposure. Resistant to sulphur fumes, ammonia, gases and electrolytic corrosion.
Finish Coats Interior or Exterior	"R.I.W." No. 1017	Furnished in black, gray, red, brown, dark green, etc. An acid and alkali-resisting waterproof paint for application to steel or wood, tanks, gas holders, bridges, and in chemical plants.
	"R.I.W." No. 137	A high grade red oxide waterproof paint for exterior or interior use on steel structures, tanks, gas holders and where acid fumes prevail.
	"R.I.W." No. 49	A high grade exterior waterproof paint made in black, maroon, olive green. Withstands action of gases, acid fumes and high heat.
Machinery and Pipes	"R.I.W." Machinery and Pipe Enamel	Furnished in various colors. Particularly adapted for use on machinery, transformers, engines, pipes, guard rails, etc.
Enamels and Wall Coatings	"R.I.W." Plaster Primer	A semi-opaque liquid plaster wall primer. It overcomes alkalinity in plaster and gives exceptional base for succeeding coats of flat wall paint or enamels.
	"R.I.W." Hospital and Laboratory Enamel	A waterproof white hard usage enamel. Resistant to acid fumes, gases, etc. Retains its whiteness. Ideal for hospitals, laboratories, kitchens, bathrooms, etc.

Specialties and Service Department

Our Technical Service Department can be of assistance to our clients where special materials are required or where unusual conditions are to be contended with.

Correspondence and personal inquiry are invited on technical paint and damp-proofing and waterproofing problems.

Specification Data Sheets and Color Cards Forwarded on Request

THE TREMCO MANUFACTURING CO.

Caulking, Pointing, Glazing Mastics; Mastic Flooring; Waterproofings and Paints

393 East 131st Street
CLEVELAND, OHIO

REPRESENTATIVES IN THE PRINCIPAL CITIES

CANADA: The Tremco Manufacturing Co. (Canada), Limited, LEASIDE, ONTARIO

TREMCO CAULKING AND POINTING COMPOUND

TREMCO

All caulking and pointing compounds look good when they are new.

Tremco Caulking and Pointing Compound continues to absorb expansion, exclude moisture and relieve strains and stresses many years after it has been applied. It is non-sagging in the deepest vertical joint, non-bleeding on porous stone. Tremco Compounds not only remain plastic, but they are highly adhesive and cling eternally. Complete, detailed specifications are available for architects on request.

Note: Tremco Caulking and Pointing Compound is made in consistencies for hand gun, pressure gun, or pointing tool application. Colors are stone, gray, aluminum, red, green, chocolate brown, or black. Special shades will be furnished when specified.

Tremco Approved Caulking Contractors are located in the principal cities of the United States and Canada.

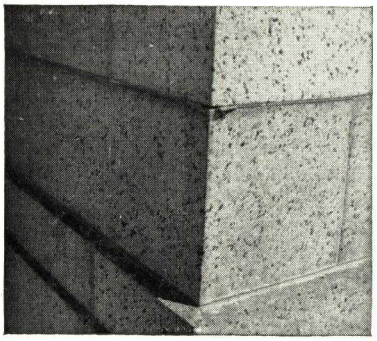
TREMCO MASTIC GLAZING COMPOUND

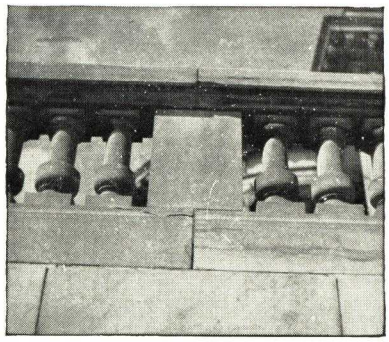
Glass may now be bedded and glazed in wood or metal sash with an airtight, watertight, permanent seal—Tremco Glazing Compound. This material is indispensable for glazing double sash in air conditioned buildings. The new professional consistency costs only slightly more than a good putty and the labor cost of installation is no higher than for putty. It is highly adhesive, absorbs vibration, and is not affected by water, steam, gases, fumes, etc. Eliminates all difficulties commonly experienced with putty. Complete specifications available upon request.

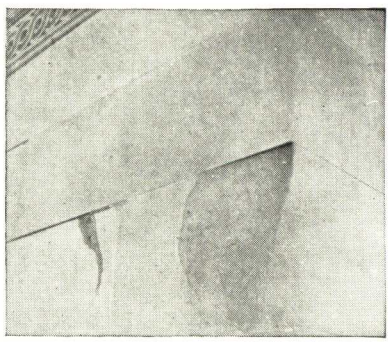
SERVICE TO ARCHITECTS

Experienced Tremco Representatives and Tremco Approved Contractors located in the United States and Canada are prepared to furnish detailed information on problems of pointing, caulking, glazing, waterproofing, flooring and painting.

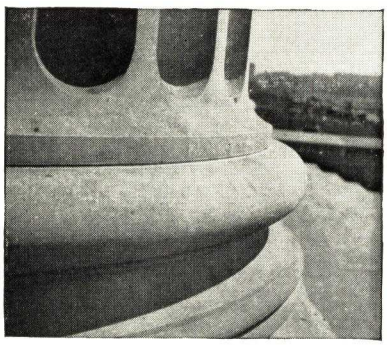
FAILURE OF MORTAR JOINT CAUSES SPALLING AND CRACKING OF MASONRY





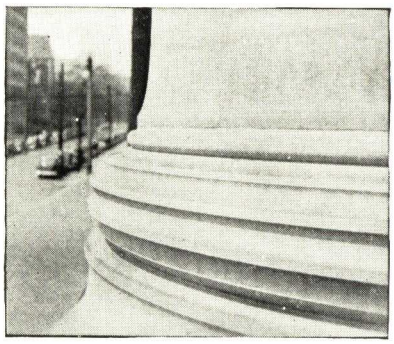


TREMCO JOINTS ARE PERMANENT, WATERPROOF AND A PROTECTION TO MASONRY



United States Supreme Court Building, Washington, D. C.
Note the perfect Tremco Joint

The Archives Building, Washington, D. C.
Note the practically invisible Tremco Joint



Mellon Institute, Pittsburgh, Pa.
Note the enduring Tremco Joint

You Can Dip this House in Water

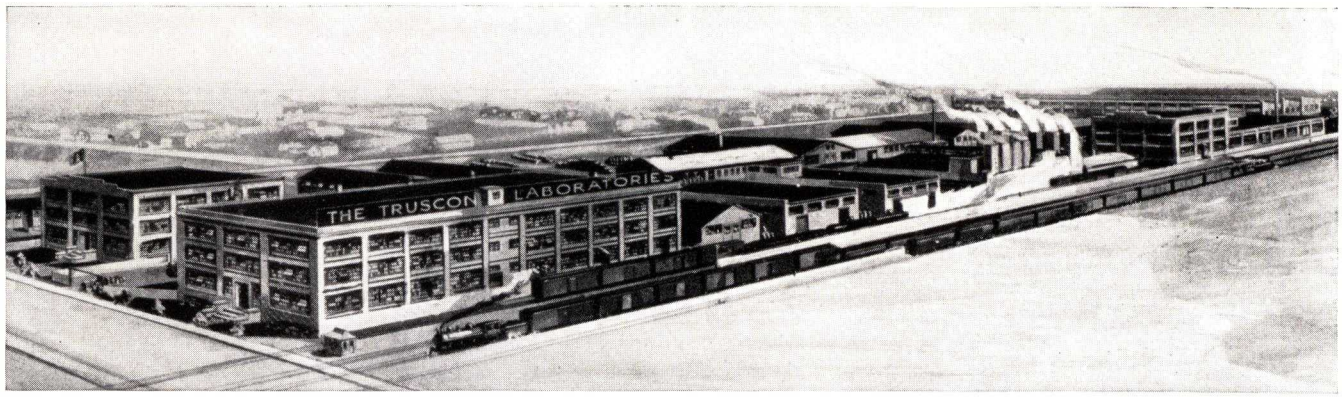
Waterproofings
Dampproofings
Floor Treatments
Caulking

By

TRUSCON

TRUSCON

FLOOR HARDENERS · WATERPROOFINGS



MAIN OFFICE AND FACTORY THE TRUSCON LABORATORIES, DETROIT, MICH

TRUSCON--an Institution

Founded on the Idea of . . . .

Better Concrete Construction

This well-known trade mark is registered in the U. S. Patent Office. It appears on every package containing a Truscon Laboratories' product. It stands for thirty years' experience in the manufacture of Waterproofings, and thirty years of researching in the waterproof construction field. It is your guarantee of the high Truscon standard of unvarying quality.

Truscon has always been an important name in concrete construction. Starting originally as a testing laboratory for Portland cement, steel, and other materials entering into concrete construction, The Truscon Laboratories immediately became interested in the problems of concrete work and producing better concrete.

If cement floors were soft and dusting, what could be done to make them hard and wearproof? If basements leaked, how could they be waterproofed? Continuous study and research along these lines together with our very close connections in the construction field placed Truscon Laboratories in an enviable position to devise methods and materials for improving concrete and masonry.

It is almost thirty years now since the first Truscon Integral Waterproofing was put on the market. Since that time, Truscon Waterproof Products have been used on practically every important structural job throughout the United States and Canada and in many foreign countries.

Every city has a large representative quota of Truscon Waterproofing and Floor Hardener jobs to which we refer with pride. Each year Truscon develops new and better means of getting more service, better satisfaction, beauty, wear. or utility out of construction materials.

Truscon maintains extensive research laboratories and consultation services to assist the architect, engineer, contractor, or owner to solve waterproofing, floor hardener, or special coating problems.

Reference Chart

REQUIREMENT	TRADE NAME	APPLICATION	COLOR	PAGE
Integral Waterproofing for Concrete	Truscon Waterproofing Paste, Concentrated	Added directly to concrete mix	No Color	2
Non-Shrinking Brick Mortar	Mortite	Added directly to mortar mix. Use less water	No Color	5
Transparent Dampproofing-Brick, Stone, etc.	Super-Por-Seal	Applied by brush or spray	No Color	7
Dampproofing and Decorating Brick, Cement	StoneTex	Applied by brush or spray	White and 10 standard brick and cement colors	8
Metallic Floor Hardener	Ferricon (or Truscon) Floor Hardener	Dusted over floor previous to troweling	Buff, Russet, Tile Red, Fr. Gray, Spanish Green, Linoleum Brown	9, 10
Non-Slip Floor Hardener	Hurundum	Sprinkled over floor previous to troweling	Same as Ferricon	10
Color & Hardener-Cement Floors (Integral)	Art-Roc	Added directly to topping mix	Same as Ferricon	10
Chemical Cement Floor Hardener	Agatex	Chemical thinned with water, swept or brushed over floor	No Color	10
Sash Glazing	Truscon Glazing Mastic	Two consistencies—gun and knife	Natural, Red, Gray, Black	8
Caulking	Truscon Caulking Compound	Two consistencies—gun and knife	Natural Gray	8

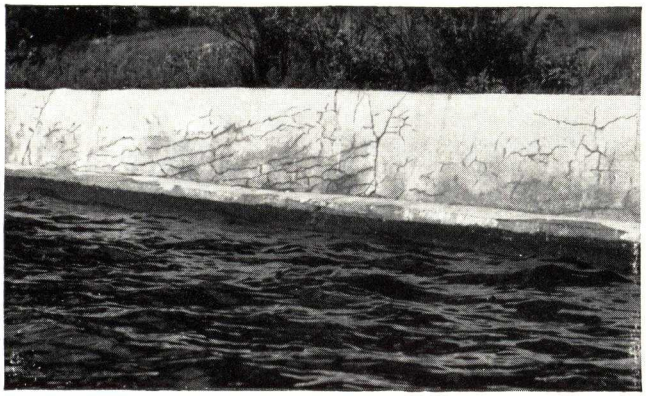


Fig. 1

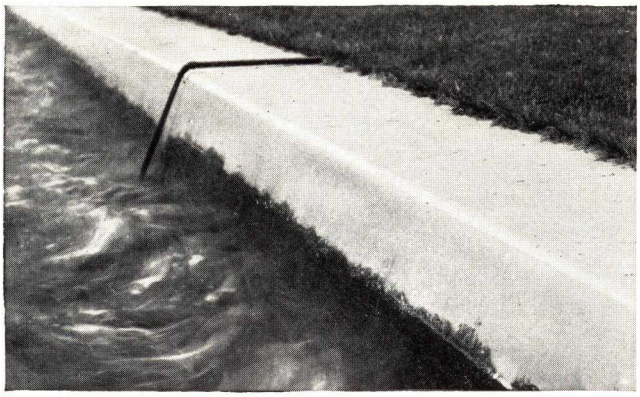


Fig. 2

Waterproof Concrete Is PERMANENT CONCRETE

It isn't only to make concrete "leakproof" that integral waterproofing is used, but to make it disintegration-proof and weatherproof as well.

For this reason, we don't think of waterproofing as adapted solely to basements and sub-grade construction but for above-grade concrete as well, where the action of rain and snow, alternate wetting and drying, freezing and thawing do much greater damage to concrete than most below-grade exposures.

Fig. 1 shows a concrete sea wall built eight years ago; Fig. 2 a neighboring sea wall built about the same time. The concrete in Fig. 2 was waterproofed with Truscon Waterproofing Paste. That used in Fig. 1 was not waterproofed. Note the difference.

No concrete is so good but that it can be made better with integral waterproofing. By keeping water out of concrete, we keep out destruction and help to make concrete permanent.

Originally intended largely to waterproof against hydrostatic head (as in basements, reservoirs, or tunnels), Truscon Waterproofing Paste is today used as often for **weather**proofing above-grade construction as for waterproofing below grade. But Truscon Waterproofing Paste does more than waterproof—it produces a smoother working, a more plastic concrete, with less water. Truscon densifies the mix, producing a stronger concrete.

Some advantages of the use of Truscon for waterproofing above or below grade concrete mixes are:

1. **WATER REPELLENT** — Truscon Waterproofing Paste, Concentrated, lines the capillary pores of concrete with a permanently water-repellent material, thus transforming the naturally water-absorptive character of concrete into definite water repellency. Water, instead of being "sucked" into the pores, is definitely held back or repelled.

2. **PLASTICIZES AND DENSIFIES**—Lubricates the mix, producing concrete which flows readily and is easily worked around intricate reinforcing. Due to better distribution of the ingredients resulting from improved workability, Truscon Waterproofing Paste provides a dense, compact mass and minimizes segregation.

3. **LOWERS WATER-CEMENT RATIO**—Recognized as a big influence towards increased strength in concrete.

4. **MIXES READILY WITH WATER**—Is of such chemical composition that it mixes promptly and actively with water, assuring ready distribution throughout the concrete mass.

5. **PRESERVES REINFORCING**—and prevents corrosion by holding lime in concrete.

6. **CONTAINS NO SOLUBLE MATERIALS**—deleterious to concrete or to reinforcing steel. Waterproofing cannot be leached out.

7. **INERT**—Does not react chemically with cement, hence does not lower strength of concrete.

8. **CONCENTRATED**—Contains no clay, lime, or similar material which is merely added for bulk and weight. Truscon Waterproofing Paste is all concentrated waterproofing, hence—

9. **ECONOMICAL**—Because only a minimum amount is required for each cubic yard of concrete for effective waterproofing results.

10. **TIME-TESTED**—Used by leading architects, engineers, and building contractors all over the world for a quarter of a century. (**List of nationally-known buildings, tunnels, reservoirs waterproofed with Truscon gladly furnished on request.**)

GENERAL MOTORS BLDG., Detroit, Mich. Albert Kahn, Inc., Architects
Basements and Sub-basements waterproofed in 1919

TRUSCON
You can Dip this House in Water
WATERPROOFINGS · FLOOR HARDENERS
You can Dip this House in Water
TRUSCON

TRUSCON

FLOOR HARDENERS · WATERPROOFINGS

TRUSCON

WATERPROOFING BY MASS CONCRETE METHOD

Specifications

Applicable to Foundations, Basements, Subways, Tunnels, Standpipes, Cisterns, Reservoirs, and Similar Structures

Note: *The production of waterproof concrete does not alter or change the ordinary concrete operation. There is no change in the method of mixing the materials or their proportions or the placing or pouring of the concrete. The only change is the addition of Truscon Waterproofing Paste and the* **use of less water** *owing to the lubricating qualities of Truscon Waterproofing Paste. In the following specifications are eliminated many of the standard clauses customarily included in the Concrete Specifications. The clauses here given apply particularly to the waterproofing of the concrete and pertinent to the waterproofing division of the specification. They may be merged with the Concrete Specifications or, if included under a separate heading, cross reference should be made to the Concrete Specification and particularly to the standard clauses omitted here.*

Note: *Notes in italics are explanatory or advisory only and should not be included in the specifications.*

Note: *Wherever words or phrases occur in the body of the specification paragraph printed in heavy type and enclosed in parentheses, choose that word or phrase which applies. Where the word "specify" occurs thus* (**specify**)*, add the particular word or clause applicable.*

Note: *Select and include only those clauses which apply to the particular work supplemented by special conditions not here included.*

(1) WORK INCLUDED

The work included under this heading is the waterproofing by the Integral Mass Concrete Method of the following areas:

Note: *Here list and locate definitely the areas which shall be made watertight. If complete detailed drawings are furnished, reference should be made to them. Lacking such details, it is advisable and customary to list and locate the footings, walls, floors, etc. which are to be waterproofed.*

Note: *See suggestions under heading "Waterproofing Data and Details."*

(2) STRUCTURAL PROVISIONS

(**2a**) Walls (**and**) floors (**and roofs**) to be waterproofed shall be constructed (**in accordance with the detail drawings**) of sufficient strength to withstand the hydrostatic head and shall be properly reinforced to withstand temperature or any other stress to which they may be subjected.

(**2b**) Floor slabs shall be keyed into the walls or other vertical surfaces.

(**2c**) Expansion or important construction joints shall be so designed and constructed that they shall be water tight.

Note: *Amplify to include any special provisions included under this contract.*

(3) RELIEVING WATER PRESSURE

(**3a**) Water shall be kept out of the pit while concrete is being poured and until thoroughly hard.

(**3b**) The method of effectively eliminating water during the concreting operation shall be optional with the contractor, but when determined upon shall be submitted to the (**architect**) (**specify**) for final approval.

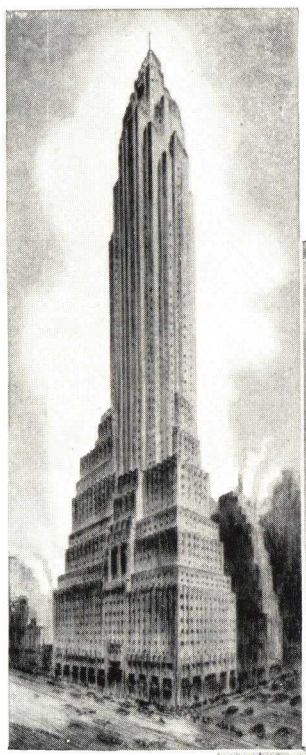
Note: *Where definite methods of water elimination are determined upon involving drain tile, under-floor beds of gravel or cinder fill, temporary sumps, bleed pipes, etc., these should be here specified in detail.*

(4) MATERIALS

(**4a**) **Integral Waterproofing**—Integral waterproofing shall be Truscon Waterproofing Paste Concentrated, as manufactured by The Truscon Laboratories, Detroit, Michigan.

Drums of Truscon Waterproofing Paste shall be kept air tight until ready to use and protected from freezing.

(**4b**) **Cement**—The cement shall be a high grade Portland, which has been carefully tested and found to satisfactorily pass the requirements of the Standard Specifications of The American Society for Testing Materials, and preferably ground so that eighty per cent (80%) shall pass a standard two hundred (200) mesh sieve.



60 WALL TOWER BLDG., New York City

Clinton and Russell, Holton and George, Architects

James Stewart & Co., Contractors

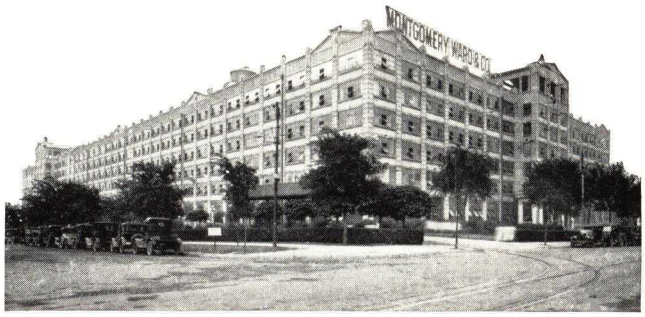
Truscon Waterproowng Paste used in all below-grade construction as well as in all brick mortar

FIRST NATIONAL BANK BLDG., St. Paul, Minn.

Graham, Anderson, Probst and White, Chicago, Architects

Paul Steenberg Construction Co., St. Paul, General Contractor

All below-grade waterproofed with Truscon



MONTGOMERY WARD & CO., Kansas City, Mo.
McKechin and Trask, Kansas City, Architects
Foundations integrally waterproofed with Truscon
Truscon Metal Sash Putty used on all steel sash

SEARS-ROEBUCK & CO., Philadelphia, Pa.
Nimmons and Nimmons, Chicago, Architects
Irwin and Leighton, Philadelphia, Contractors
Sub-grade construction integrally waterproofed

(**4c**) **Sand**—The sand shall consist of spherical grains of any hard rock that is practically free from clay, absolutely free from organic matter, and uniformly graded in size from coarse to fine.

(**4d**) **Stone**—The stone shall be washed gravel or hard crushed trap rock and shall for forty per cent (40%) of its bulk be uniformly graded between the diameters of one (1) and one and one-half (1½) inches, and for sixty per cent (60%) of its bulk be uniformly graded between diameters of one-quarter (¼) and one (1) inch.

(**4e**) **Water**—Water shall be clean and free from alkali or other impurities.

(5) MIXING

(**5a**) **Concrete**—Concrete shall be composed of cement, sand, and stone in proportions not leaner than a 1:2:4 by volume. To this mixture shall be added Truscon Waterproofing Paste in the proportions of one (1) full Truscon Measure to each bag of cement.

***Note:** A Truscon Measuring Cup is furnished with each drum of Truscon Waterproofing Paste, attached under the lid of the container.*

The cement and aggregate shall be first mixed dry to a uniform color—then only sufficient water shall be added to provide a plastic mix.

***Note:** Less water is required in concrete containing Truscon Waterproofing Paste than ordinary concrete. By plastic is meant a concrete which can be readily molded, but which when the mold is removed flows sluggishly — without segregation of the water or the fine materials from the coarse.*

Machine mixed concrete shall be mixed at least two (2) minutes after all materials have been dumped from the skip.

***Note:** Normal operation of mixer is from 15 to 25 revolutions per minute.*

(**5b**) **Cement Mortar Floor Topping**—Cement mortar floor topping shall be mixed in the proportions (by volume) of one (1) part of cement to two (2) parts of sharp sand. To the dry cement and sand shall be added Truscon Waterproofing Paste in the proportions of one and one-half (1½) full Truscon Measures to each bag of cement.

Topping shall be mixed as above specified for concrete.

(**5c**) **Slush Coat**—Slush coat shall consist of one part cement and one part sand, to which 20 pounds of Iso-Vol bonding per bag of cement is added and mixed to a thick, buttery consistency with water.

(6) PLACING

(**6a**) **Concrete Footings, Walls, Etc.**—All waterproofed concrete shall be placed (so far as is possible) in one continuous operation, each pouring sufficiently spaded and worked to insure uniform density.

Where joints are absolutely unavoidable, exercise special care before leaving the concrete just poured to remove all laitance and roughen the surface preparatory to the continuance of the concreting operation. Before placing the new concrete against the old surface, thoroughly wet the concrete and apply a slush coat (thoroughly broomed) immediately before placing additional concrete.

(**6b**) **Reinforcement**—All reinforcement shall be accurately placed in exact accordance with the details. Concrete shall be so placed as not to disturb reinforcement and in such a manner (spaded or rodded) as to completely surround it with concrete of uniform density.

(**6c**) **Floors**—Before placing floors, thoroughly clean the concrete of footings, walls, etc., at the floor slab junctures. Immediately before the placing of the floor base, thoroughly wet and slush coat the concrete surfaces as specified above for "joints."

The ground to receive floors shall be accurately leveled (pitched if required) and settled to assure uniform thickness of the floor slab.

The waterproofed concrete base shall be poured and screeded to the full thickness, levels and pitches detailed in one continuous operation. Placing of concrete shall be accomplished as above specified. As soon as the base has set but before it has dried, apply the waterproofed cement mortar floor topping to a minimum thickness of (**specify**) troweled to a smooth hard surface.

Condensed Data

Ingredients

1 part	(by volume)	Portland Cement
2 parts	(by volume)	Clean Sand
4 parts	(by volume)	Stone

Waterproofing

1st. Use the Truscon Measure supplied with each drum of Truscon Waterproofing.
2nd. Add one (1) Truscon Measure per sack of Cement to the dry cement and aggregate. Then temper with clear water as usual.

Quantity Required

Estimate 7 pounds of Truscon Waterproofing Paste to every cubic yard of concrete poured.

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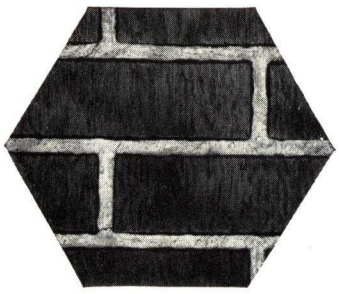

Fig. 1. Shrinkage in Ordinary Brick Mortar

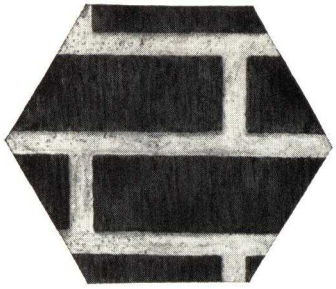

Fig. 2. With Mortite—No Shrinkage

TRUSCON MORTITE

SHRINKPROOF—WATERPROOF MORTAR

"Dry Mixes Made Workable"

It has long been known that the excess water required for proper workability in cement and lime mortars is productive of a great deal of harm. Such excess water must escape somehow, which it does by evaporation. As it evaporates, it causes a loss in mortar volume, which loss in volume results in contraction or shrinkage of the mortar.

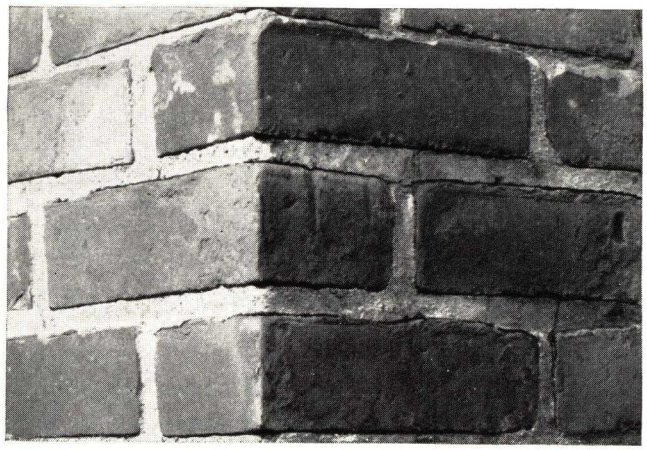

Fig. 3—Close-up view of brick wall showing shrinkage cracks in mortar joints not ordinarily noticed except on close inspection

Experiments with various types of mortars have proved conclusively that shrinkage is in direct ratio to the quantity of excess water. The greater the amount of excess water, the more active the shrinkage. Conversely, the drier the mix, the less the shrinkage.

The ideal cement or lime mortar then would be one in which no excess water was used. That would give a "dry mix" —too stiff and harsh to be workable— such a dry mix does not have the proper wetting or spreading qualities required of a mortar.

For years, the research and technical departments of the Truscon Laboratories have addressed themselves to the problem of obtaining better wetting and better workability wih a dry mix—knowing that the dry mix eliminates shrinkage. As an example of how successful this work has been, we refer to the photographs at the top of page 6.

Fig. 5 is a 1:3 cement and sand mortar mixed with insufficient water for workability. It is obviously too dry a mix for use. However, by the addition of a small quantity of Truscon Mortite, the very same mix becomes a mortar of ideal, creamy consistency (Fig. 6).

Nevertheless, it is the same dry mortar shown in Fig. 5. No water added—therefore, no more water to evaporate—therefore no shrinkage, as the mortar occupies substantially the same space after it has dried as it did when wet.

Mortite, a product of the research laboratories of Truscon, is a most valuable contribution to the building industry because it finally reconciles the age-old problem of dry mixtures with maximum

Fig. 4—Bricks removed from wall shown in Fig. 3. View shows back, unexposed ends and sides of brick. Note water and dirt stains where same have entered through shrinkage cracks in mortar. Backs of these bricks were wet when taken out of wall

Fig. 5. A stiff, harsh mortar—non-shrinking— ***too dry*** *to use*

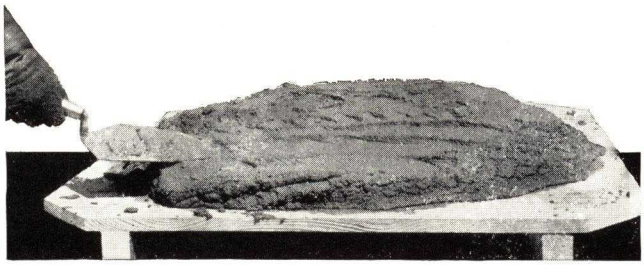

Fig. 6. Same dry mix, with MORTITE—still non-shrinking, *but* ***workable***

workability. The result is a non-shrinking lime or cement mortar.

Work of independent testing laboratories investigating Mortite has proved the practicability of a dry mix with this material, through slump tests showing from 90% to 130% greater slump with Mortite than without the Mortite.

Experiments have also shown that Mortite has a very beneficial influence on cement and lime mortars by "locking" the lime, or rendering it insoluble. Mortite contains ingredients capable of combining with calcium hydroxide to form water-insoluble compounds. Tests by independent laboratories have shown that where as little as 5% of Mortite was added to a lime water solution, it has resulted in the fixation of as high as 56% of the soluble lime.

Such lime is immediately converted into stable and insoluble elements. It helps increase the strength of the mortar and renders it less sensitive to the corrosive action of sulphur and other chemical compounds which exist in the smoke and gases of industrial centers.

Because such lime cannot be washed out of the mortar by moisture, the formation of lime stains or white deposits on the surface of the brick, often referred to as "efflorescence", is greatly minimized or entirely eliminated.

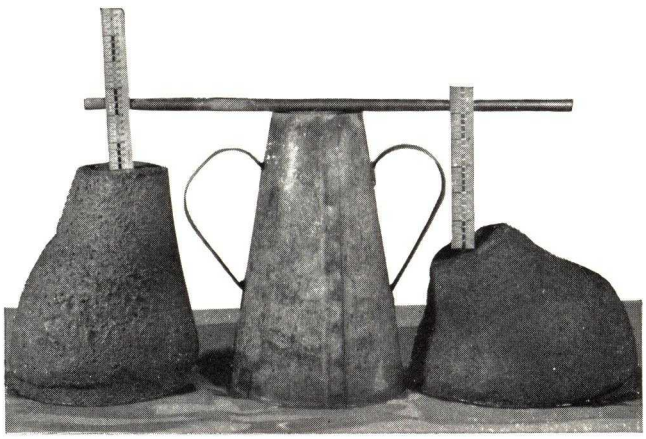

Fig. 5—Increased slump—indication of less water needed in mortar to obtain same workability. Mortite ranges from 90% to 130% greater slump for various mixes—permits use up to 25% less water

Mortite confers all these benefits on lime and cement mortar without in any way impairing its strength. In fact, tests show that bond strength and compressive strength are increased—compressive strength sometimes as high as 17%.

For stronger bond, waterproof mortar joints, and elimination of shrinkage and efflorescence, specify Truscon Mortite on your next masonry job.

WHY MORTITE SHOULD BE USED IN ALL LIME AND CEMENT MORTAR

1. Mortite enables the mason contractor to use a dry mix—with perfect workability.
2. It eliminates shrinkage, crazing, and hair checks in mortar joints because it reduces the amount of water necessary for a workable mix.
3. Such mortar, though drier, is easier spreading because it wets easier.
4. Increases mortar strength.
5. Waterproofs by introducing water-repellency.
6. Renders the lime insoluble.
7. Greatly reduces or eliminates efflorescence.
8. Resists corrosion from smoke and gases.
9. Because of better wetting, provides closer contact with the brick—fewer voids and stronger bond.

Specifications

Stir contents of can thoroughly with a wide paddle. Keep stirred occasionally while using.

To the mortar add 1 quart Truscon Mortite per sack of cement and 1 quart for each cubic yard of lime. (On the basis of 1:1:6 mix—1 part Portland cement—1 part lime—6 parts sand—use 2 quarts of Mortite.)

Estimated Quantity Required:

¼ to ⅜ in. mortar joints—½ gal. Mortite per 1000 brick.

½ to ⅝ in. mortar joints— 1 gal. Mortite per 1000 brick.

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TRUSCON SUPER-POR-SEAL

Stainless Damproofing for Masonry and Concrete

A very significant discovery has been made in the last few years relating to the part that moisture plays in soiling buildings. Buildings of identical light-colored stone, constructed at about the same time in the same neighborhood, have shown marked differences in their appearance when the outside surface of these buildings was treated with Super-Por-Seal transparent dampproofing. The dampproofed building remains not only free from decided rain streaks but also maintains a much lighter and cleaner appearance after years of exposure. This fact has been so outstanding that lately many fine structures of marble, Bedford stone, or other limestone are being treated with an external application of Super-Por-Seal to prevent moisture from carrying soot and dirt into the pores and spoiling the appearance of the stone.

Super-Por-Seal is practically non-staining and non-yellowing on even the lightest limestone or marble. It is non-yellowing because it is not a wax type dampproofing. Super-Por-Seal is an entirely different material from the standard transparent dampproofings in that it repels moisture without changing the color or appearance of the surface. Because it is not a wax type of material, Super-Por-Seal may be painted over if later it should be decided to change the decorative scheme or appearance of the building.

In many cases, where old buildings which were badly weathered have been cleaned by sandblasting or other method, it is now customary to apply Super-Por-Seal to keep them clean.

Super-Por-Seal may be used on stucco, concrete, brick, or stone. Applied by brush or spray. Recommended for coating the embedded, unexposed sides of fine cut stone to prevent moisture stains. Also recommended for sizing mortar joints previous to caulking to prevent caulking stains.

Specifications

(1) **Condition of Surface**—Apply Super-Por-Seal only over a clean, dry surface in good condition. Cracks must be repaired either with mortar or caulking compound. Masonry around window and door frames must be tight—caulk if necessary. Repoint brick or stone work where necessary. Cut out and restucco crumbling stucco.

(2) **Application Over Concrete, Stone, Stucco**—Apply Super-Por-Seal in two liberal coats, each flowed on with a large wall brush that will carry a large quantity of liquid. Care should be taken that no sections are missed in the application—some forms of stucco are extremely absorbent, and enough material should be applied to thoroughly saturate the surface.

After the first coat of Super-Por-Seal has dried for at least 12 hours, apply the second coat.

If spray is used, give one thorough spray application.

(3) **Application over Brick**—When Super-Por-Seal is applied to a brick surface (usually less porous than others), care must be taken not to use too much; otherwise it is apt to show a white deposition on the surface indicating that more Dampproofing has been used than the brick can absorb. For this reason, it is often preferable to use but one coat of Super-Por-Seal over brick, being sure that the one coat is evenly applied. Sand lime and similar porous bricks shall be double coated exactly as specified for concrete.

(4) **Application over Bedford Stone, Marble**—Apply one coat of Super-Por-Seal as specified for concrete.

Note: *Quantity required about 1 gal. per 80 sq. ft., 2 coats, or 1 gal. per 150 sq. ft., 1 coat.*

FORD ROTUNDA, Dearborn, Mich.
Albert Kahn, Inc., Architects
Exterior limestone protected from dirt and weather staining with Super-Por-Seal

TRUSCON STONETEX

The Original (Tung Oil) Concrete and Brick Coating

CRANE COMPANY, Chicago
Over six blocks of buildings beautified and dampproofed with StoneTex

For nearly twenty-five years now StoneTex has been made in only one way—namely, with specially heat-treated or polymerized China Wood Oil (Tung Oil). This valuable oil when properly processed produces the most weather-resistant and lime resistant concrete and brick coating known.

It is the lime reaction in a concrete wall and in the mortar joints of masonry which is responsible for the short life of ordinary oil paints. With StoneTex, however, eight and ten years' service without repainting is not at all unusual, as its Tung Oil vehicle withstands moisture and lime.

Another advantage of StoneTex is its finish, which is not a high gloss, but that of a soft, dull-toned texture, so much more appropriate for concrete or masonry.

Application—By brush or spray.

Colors—Light Ivory, No. 15—Light Cream, No. 16—Light Buff, No. 17—Caen Stone, No. 57—Bedford Gray, No. 18—Portland Gray, No. 19—Concrete Gray, No. 20—Dark Brick Red, No. 10—Moss Green, No. 12—Brown Stone, No. 9—White, No. 1—Pure White, No. 11—Black, No. 13.

Specifications

(1) **Condition of Surface**—All surfaces to be covered with StoneTex must be absolutely dry.

(**1a**) Fill all cracks around window sills, etc., with Truscon Masonry Caulking Compound and allow to dry over night.

(**1b**) On stucco surfaces remove and re-stucco disintegrated sections. Cut out, thoroughly wet, and patch cracks with cement mortar (1 to 3). Keep moist for several days. Allow ample time to thoroughly dry (3 weeks or longer).

(**1c**) Remove dirt and loose particles with a stiff broom.

(**1d**) On painted surfaces showing blisters, peeling, cracking, powdering, etc.—scrape or burn off old paint. On surfaces in good condition, scrape or wire brush clean.

(2) **Application**—Mix StoneTex thoroughly before applying. Apply by brush or spray.

(**2a**) Prime all new or unpainted surfaces with one coat of StoneTex thinned with StoneTex Liquid in the proportion of 1 gal. of Liquid to 5 gals. of StoneTex. Apply in an even, uniform coat brushed well into pores. Stipple thoroughly over rough plaster surfaces. Allow priming to dry at least 48 hours (preferably 72 hours). Apply a second coat of StoneTex as it comes from the can (unthinned).

(**2b**) When applied over previous StoneTex, apply one coat as it comes from the can (unthinned).

(**2c**) When applied over previous lead and oil paint, thin StoneTex with pure boiled linseed oil in the proportions of ½ pint of oil to the gallon of StoneTex.

***Note:** Quantity required over new surfaces, 1 gal. per 100 sq. ft., 2 coats. Painted Masonry, 1 gal. per 250 sq. ft., 1 coat.*

TRUSCON CAULKING COMPOUND

(Conforms to U. S. Bureau of Standards Specifications)

Truscon Caulking Compound is non-staining, permanently elastic, and waterproof. Bonds securely to stone or metal, forming a tough skin on the surface but remaining indefinitely soft, flexible, and elastic underneath.

Caulking does not crack, check, or break away from the sides of the opening. It is compounded of oils, gums, and pigments so blended and balanced as not to stain even delicate stone, such as limestone or marble. Withstands all the standard tests of heat and cold—does not slump in warm weather—does not become brittle in cold. A material that saves many times its original cost by waterproofing and air-tighting around window and door frames, and other openings.

***Note:** Government specifications require the use of a sealer, such as Super-Por-Seal, for priming mortar joints before caulking.*

Furnished in two types—for knifing and for gun application.

Color—Natural, which blends with most stones. Special colors made to order.

***Note:** Quantity required, 1 gallon for from 75 to 80 lineal feet of ½ x ½ in. joint.*

THE NEW FIELD BUILDING, Chicago
Graham, Anderson, Probst and White, Architects
Waterproofed with Truscon Caulking Compound. Other products likewise used: Bar-Ox Steel Coating—Asepticote Washable Wall Coating

TRUSCON GLAZING MASTIC

A Modern Window Glazing Compound

Truscon Glazing Mastic was provided to fill the modern demand for a glazing compound that would definitely waterproof and windproof wood or steel sash. The secret of this material is the fact that it skin-dries, remaining soft underneath, which gives it that elasticity so desirable where large areas of steel sash have to be glazed. Another advantage is that where glass is accidentally broken and has to be replaced, the Glazing Compound does not have to be cut out with hammer and chisel. It is readily removed with a putty knife. Thoroughly waterproof—far more enduring and weatherproof than ordinary putty, Truscon Glazing Mastic makes an air-tight, water-tight, and permanent seal. No shrinkage—may be painted over. Applied by knife or gun. Colors—Natural, Dark Gray, and Red.

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FLOOR HARDENERS · WATERPROOFINGS

TRUSCON CONCRETE FLOOR TREATMENTS

TRUSCON FERRICON
TRUSCON FLOOR HARDENER
(Metallic)

Uses—"Truscon Floor Hardener" is a metallic floor hardener. "Truscon Ferricon" is an improved metallic floor hardener containing Zilicon.

Description—"Truscon Floor Hardener" is characterized by its cleanness—freedom from oil, graphite and other injurious impurities, such as metals reactive with alkali (aluminum). It is graded from coarse down to fine. The coarse particles take the wear—the fine particles fill in the spaces between the coarse particles, exactly as in the grading of good concrete.

To the above qualifications of a first-grade, pure Metallic Floor Hardener, Truscon introduces a new feature known as Zilicon. Zilicon is used in "Ferricon" (Metallic Floor Hardener) because it contributes additional advantages: Increased plasticity, improved workability, densification of mix, increased strength, absorption of the lime, thereby protecting the floor against certain acids and minimizing lime streaks. The metallic parts do not sink into the surface but tend to stay near the top.

Colors—Natural Gray, Tile Red, Spanish Green, French Gray, Buff, Russet, Linoleum Brown. Special colors formulated on request.

Specification No. 1

***Note:** Use for both Truscon Floor Hardener and Truscon Ferricon when wearing surface is laid on a set slab.*

(1A) Preparation of Set Slab Before Application of Topping—Where a topping is applied to a set slab, the hardened concrete surface shall be mechanically roughened by chipping and thoroughly cleaned with a heavy wire broom to remove all dust and dirt. Then **soaked** with water. Concrete base must be thoroughly wet to avoid any possible tendency of the hardened surface to absorb water from the bonding grout and impair its adhesive value.

To the clean, water-saturated surface, apply a slush bonding coat prepared by mixing Portland cement with water to a heavy, creamy consistency that will permit easy brush application, adding 20 pounds Iso-Vol per bag of cement. This Iso-Vol bonding coat shall be applied continuously over entire surface, rubbing it into the surface with a stiff fibre broom.

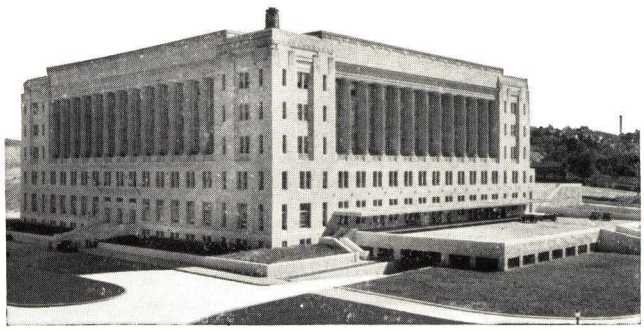
Immediately after applying the slush bonding coat, follow with the finish as described in paragraph (1C).

(1B) Hardener—Truscon (**Floor Hardener**) (**Ferricon**) as manufactured by The Truscon Laboratories, Detroit, Michigan.

(1C) Application of Topping—The topping shall be applied and properly bonded to the set slab to a thickness of not less than 1 in. (to 1½ in.) and shall consist of—

For Light Traffic Floors—
1 part Portland cement (by volume)
2 parts coarse, clean sand (by volume)

For Heavy Traffic Floors—
1 part Portland cement (by volume)
1 part coarse, clean sand (by volume)
2 parts (by volume) of clean, washed pea gravel graded from ¼ to ⅜ inch.



U. S. POST OFFICE, Kansas City, Mo.
Supervising Architects Office, Washington, D. C.
Truscon Metallic Floor Hardener used on all concrete floors, loading docks, etc.
Metal sash glazed with Truscon Metal Sash Putty

Sand shall be selected to provide grading from coarse to fine to insure maximum density. Proportions shall be accurately measured by volume and not approximated. Water shall be carefully controlled so that not more than 4½ to 5 gallons of water (including the moisture in the aggregate) shall be used per sack of Portland cement.

If hand mixed, the aggregate shall be turned over dry three times; if machine mixed, for not less than two minutes, special care being taken to avoid a sloppy consistency.

The topping shall be screeded to a true and even surface and then well floated with wood floats to close all voids and holes.

(1D) Application of Metallic Hardener—After the floating of the topping and preceding the troweling, a dry mixture of thirty (30) pounds of Truscon (**Floor Hardener**) (**Ferricon**) and twenty-two (22) pounds of Portland cement mixed thoroughly to an even, uniform color shall be sprinkled over each one hundred (100) square feet of surface.

Care shall be taken not to apply the dry mixture of cement and hardener when there is any excess or surplus of water on the floated surface.

The dry mixture of cement and hardener shall be well floated to insure perfect combination and assimilation with the concrete and then troweled to an even, smooth surface.

The surface shall receive a second troweling when the finish has set sufficiently to finish smoothly.

***Note:** In the case of a floor subjected to heavy service, such as in forge shops, railroad shops, loading platforms, use 40 lbs. of Truscon Floor Hardener or Truscon Ferricon and 30 lbs. of Portland cement to the 100 sq. ft. (For Super-Service Concrete Floors, see Specification No. 3).*

It is recommended that expansion joints be used at regular intervals in the topping. Joints shall be cut through the full thickness of the topping with narrow tool, and edges shall be hard finished.

(1E) Protecting the Floor—After the cement finish has hardened (about 48 hours), it shall be covered with a non-staining waterproof paper such as Sisalkraft and kept thoroughly wet for at least seven days and for a longer period if practical conditions will permit. Finish shall not be subjected to light traffic until it has set for about ten days, nor subjected to heavy traffic under three weeks of favorable weather conditions.

Specification No. 2

***Note:** Use for Truscon Floor Hardener and Ferricon when hardening and densifying Monolithic Concrete Floors.*

(2A) Hardener—Note: Same as specified in (1B) above.

(2B) Preparation of Floor to Receive Hardener—Concrete base or slab shall consist of concrete of such compressive strength as specified by the architect.

Materials shall be mixed not less than two minutes—placed, tamped, and screeded to a level surface. Do not leave holes. (Should low spots appear, these may be leveled by dusting on a dry mixture of 2 parts sand and 1 part cement—and again carefully screeded or floated.)

(2C) First Application of Hardener—Immediately following leveling off the slab, deposit uniformly upon the surface a dry mixture of

1 Bag Truscon (**Floor Hardener**) (**Ferricon**)
2 Bags Portland cement
3 Bags clean, coarse sand.

Sprinkle uniformly over 1,000 sq. ft. Float with heavy, wooden float.

(2D) Immediately following floating of the above Hardener finish, make another mixture of

2 Bags Truscon (**Floor Hardener**) (**Ferricon**)
1½ Bags Portland cement

and sprinkle uniformly over the same 1,000 sq. ft.

Under no circumstances shall this dry mixture be applied when there is any surplus water on floated surface.

This second application of Hardener shall be floated in with wooden floats and steel troweled to a smooth surface as soon as

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concrete has hardened sufficiently to prevent excess of fine material from working to the top. Surface shall receive a second troweling when the cement has set sufficiently to finish smoothly.

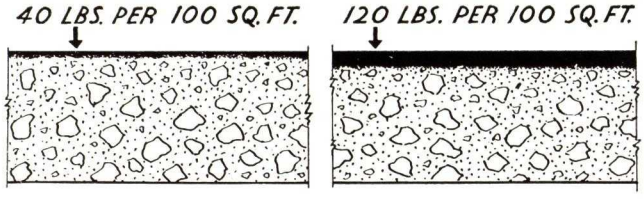
***Note:** In the case of a floor subjected to heavy service, such as in forge shops, railroad shops, loading platforms, etc., use the following proportions of cement and sand for the second application, leaving the first application as in (2C). For Super-Service Concrete Floors, see Specification No. 3).*

Second Application—
4 Bags Truscon (**Floor Hardener**) (**Ferricon**)
3 Bags Portland cement

(2E) Protecting the Floor—Note: Same as specified in (1E).

Specification No. 3
Super-Service Concrete Floors

In the case of floors subjected to extremely heavy traffic, a much greater poundage of Ferricon Floor Hardener can be worked into the topping by a special mechanical device than would ordinarily be possible. Through the use of this device, as much as from 90 to 120 pounds Ferricon can be worked into the cement surface per 100 square feet, providing a finish so dense, hard, and tough as to be practically waterproof. Sketch below shows in cross section the relative difference in the amount of Ferricon in the ordinary cement floor and the super-service Ferricon floor. For detailed specifications, address Home Office at Detroit or nearest branch.



TRUSCON HURUNDUM

Use—Non-slip Floor Hardener.

Description—Hurundum aggregate is similar in principle to Ferricon. However, it contains no iron but instead an aggregate like carborundum in its hardness. Hurundum aggregate has a porous surface texture enabling the cement paste to key to it, forming an exceedingly hard, wear resistive, non-slip surface.

Non-Rusting—Hurundum is especially recommended in public places such as corridors and steps; around oil stations; in and about airplane hangars. Its non-rusting and non-slip qualities make it very desirable.

Colors—Natural Gray, Tile Red, Spanish Green, Buff, Linoleum Brown, French Gray, and Russet. Special colors formulated on request.

Specifications

(1) Non-Slip Hardener—Truscon Hurundum as manufactured by The Truscon Laboratories, Detroit, Michigan.

(2) Application with Topping—After topping has been screeded and floated, dust on 30 lbs. of Hurundum as it comes from the package, for every 100 sq. ft. of surface. Again float and steel trowel. When set sufficiently, give surface a final troweling. Never apply Hurundum when there is any surplus water on surface, and do not float or trowel cement surface when it is too wet. Best results are obtained by working the surface only after the water has gone down. Working the topping when the surface is too wet tends to suck the fines and laitance to the surface, dulling the color, burying the Hurundum aggregate and leaving a soft layer of fines on the surface.

(2a) If a greater degree of hardness is desired, an additional 10 lbs. or 15 lbs. of Hurundum per 100 sq. ft. can be sprinkled on after the first 30 lbs. has been floated in.

(3) Application with Monolithic Floors—After the 1:2:4 concrete slab has been poured and properly screeded, dust on surface a mixture of 1 part cement to 2 parts sand. Use about 50 lbs. of this mixture to each 100 sq. ft. Float this into the surface but do not steel trowel.

When the concrete has stiffened sufficiently to hold up knee boards, dust on the surface Truscon Hurundum as follows:

***Note:** Specify application as above in par. (2) and (2a).*

TRUSCON ART-ROC

Use—Coloring, hardening, waterproofing concrete and Portland cement mortar.

Description—Truscon Art-Roc contains no calcium chloride. It is a waterproof product—an essential feature of any floor coloring material assuring permanency, uniformity, and brilliancy of color.

Art-Roc is distinctive in color brilliance; color uniformity; stainproofness; ease of handling (workability); waterproofness; low water-cement ratio, resulting in (a) greater strength, (b) increased hardness, (c) increased wear resistance and resistance to disintegration from chemicals.

It is a semi-liquid added directly to the concrete mix.

The advantage of Art-Roc is that the color is integrally carried throughout the topping to a depth of ⅜ in. or even ¾ in. Because the color is in liquid form it mixes readily with the cement, aggregate and water and gives uniform distribution. By controlling the water-cement ratio, "sloppiness" and segregation of the coarse particles or laitance is avoided.

Art-Roc adsorbs the lime, preventing lime streaks and resulting in sharper and more brilliant colors. It is not only adapted to floors and sidewalks but may be used on the vertical surfaces of cement plasters or stuccos.

Unlike mortar colors, Art-Roc increases the strength of concrete. An Art-Roc surface is harder than ordinary concrete and is free from dusting.

Colors—Tile Red, Linoleum Brown, French Gray, Buff, Russet, Spanish Green, Natural or Colorless. Special colors formulated on request. The Colorless makes concrete floors waterproof, durable and chemical-resistant.

Specifications

***Note:** Use for Art-Roc Topping applied to a set slab.*

(1) Preparation—Note: Same as paragraph (1A) Preparation of Set Slab before Application of Topping, page 9.

(2) Topping—Immediately after the slush coat, apply the Art-Roc cement topping to a thickness of not less than 1 inch (to 1½ inch). For specifications, see paragraph (1C) Application of Topping, page 9.

(3) Mixing Art-Roc with Topping Finish—Stir contents of Art-Roc can thoroughly. Add directly to topping mix in proportion of 1 gal. of Art-Roc per sack of cement. (For Art-Roc Colorless, use ¼ gal. per sack of cement.)

Temper with sufficient mixing water to obtain desired workability. Use not over a total of 4½ to 5 gals. of water per sack of cement (including the water in the aggregate).

(4) Laying Art-Roc Finish—Apply Art-Roc finish and float and trowel in usual manner. Hard trowel surface again when it begins to set to a smooth, glossy tile-like hardness.

(5) Protecting the Floor—Note: Same as specified in (1E), page 9.

(6) Wax Finish—After floor is thoroughly dry, apply a coat of Art-Roc Wax, Clear, and polish, using a weighted brush.

TRUSCON AGATEX

Use—Chemical Hardening.

Description—Agatex is a chemical mixed with water, flushed over a concrete floor and worked into the pores by sweeping. It combines with the free lime and other elements in the cement, forming new compounds which add considerable density and hardness to the surface. Because of the ease and convenience of application and the economy of this material, Agatex is widely used as a maintenance product—in factories, garages, public buildings, even in residences—to stop sanding and dusting of cement and to keep floors in condition. May be used on new floors after they are cured and dried.

Agatex, made in two forms—crystals and liquid, is colorless and does not change appearance of concrete.

When used in canning establishments, it prevents disintegration of concrete from fruity or other vegetable acids.

Quantity Required:

Agatex (Liquid)—About 1 gallon to each 100 to 125 sq. ft., 3 coats.

Agatex (Crystals)—About 1 pound to each 40 sq. ft., 2 coats.

THE TRUSCON LABORATORIES
DETROIT, MICHIGAN, U. S. A.

TRUSCON
You can Dip this House in Water
WATERPROOFINGS · FLOOR HARDENERS
You can Dip this House in Water
TRUSCON

You Can Dip this House in Water

THE TRUSCON LABORATORIES

Home Office, Factory and Research Laboratories
Detroit, Michigan

OFFICES AND BRANCHES

*Atlanta, Ga.	128 Marietta St., N.W.
*Boston, Mass.	38 Chauncy St.
*Chicago, Ill.	1500 So. Western Ave.
*Grand Rapids, Mich.	433 Ionia St., S.W.
*Houston, Tex.	823 Merchants & Mfrs. Bldg.
*Kansas City, Mo.	1817 McGee St.
*Milwaukee, Wis.	203 No. Broadway
*Minneapolis, Minn.	738 Baker Bldg.
*New York, N. Y.	153 E. 44th St.
*Philadelphia, Pa.	906 Architects Bldg.
*Pittsburgh, Pa.	430 Frick Bldg.
*Syracuse, N. Y.	215 E. Water St.
*Toledo, Ohio	130 Summit St.
*Toronto, Ontario, Canada	32 W. Front St.

* Indicates warehouse in connection with office.

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TRUSCON

PRINTED IN U. S. A.

TRUSCON PRODUCTS

MORTITE
Shrinkproofing and waterproofing for brick mortar.

TRUSCON WATERPROOFING PASTE, CONCENTRATED
Plasticizes and integrally waterproofs. Mix requires less water for same workability.

TRUSCON FLOOR HARDENER
Standard metallic floor hardener in natural and six attractive colors.

FERRICON
Improved metallic floor hardener in natural and six attractive colors.

HURUNDUM
Non-slip floor hardener. Natural and six attractive colors.

ART-ROC
Integral hardener and coloring. Six attractive colors.

AGATEX
Chemical hardener for cement.

GRANITEX
Transparent filler and hardener.

TRUSCON FLOOR ENAMEL

SUPER-POR-SEAL
Transparent dampproofing for exterior concrete, stucco, masonry.

STONETEX
For decorating, dampproofing and protecting exterior brick, concrete, and stone.

TRUSCON CAULKING COMPOUND
Meets U. S. Government specifications.

Also complete line of wood paints, steel paints, enamels and paint products.

Also special coatings for treatment of or resistance to rust, acids, alkali, chemical fumes, etc.

THE VORTEX MANUFACTURING CO.

Gun Applied Dampproofing and Plaster Key

1978 West 77th Street, CLEVELAND, OHIO

APPLIED BY PAR-LOCK APPLIERS IN

ALBANY, N. Y.	CHICAGO, ILL.	DALLAS, TEX.	MILWAUKEE, WIS.	PHILADELPHIA, PA.	TORONTO, ONT.
BALTIMORE, MD.	CINCINNATI, OHIO	DETROIT, MICH.	MINNEAPOLIS, MINN.	ST. LOUIS, MO.	TRENTON, N. J.
BUFFALO, N. Y.	CLEVELAND, OHIO	HOUSTON, TEX.	NEW YORK, N. Y.	SCRANTON, PA.	WILKES-BARRE, PA.

STANDARDIZED NATIONAL SERVICE BY PAR-LOCK APPLIERS

THE VORTEX MANUFACTURING CO., owner of the Dens-tect Process, furnishes equipment especially designed for application, and manufactures all asphalt materials. The Par-Lock Appliers operate under agreement with THE VORTEX MANUFACTURING CO., insuring application in accordance with proven specifications, the result of experience on a wide variety of work covering thousands of applications throughout the whole country, during a period of fifteen years.

Materials—The asphalt compounds used are blended under strict supervision to produce the specific physical qualities necessary to meet the requirements of each type of service.

All asphalt is applied through equipment especially designed to handle heavy bodied asphalts, insuring greater protection. Exclusive devices have been developed for use in conjunction with the asphalt gun for the application of the various specifications.

Complete Service by Par-Lock Appliers—Par-Lock Appliers, with carefully prepared and tested materials, with specially designed equipment and experienced operatives under supervision of trained engineers, render complete service on all types of dampproofing and waterproofing required in building construction, including the following:

Dampproofing of masonry walls to be plastered direct.
Dampproofing back of furring.
Spandrel beam waterproofing.
Membrane waterproofing for basement walls, floor footings, etc.
Foundation waterproofing for exteriors below grade.
Dampproofing surfaces to be finished with portland cement or tile.
Dampproofing walls to be insulated with corkboard.
Gun-applied protective coatings on cold storage interiors.

Descriptive Literature, Specifications, Data—Write to THE VORTEX MANUFACTURING CO., 1978 West 77th Street, Cleveland, Ohio, or any Par-Lock Applier.

Dens-tect Specification for Interior of Exterior Walls

Dens-tect Treatment—Provides an impervious coating of tangible thickness. Recommended for interior of exterior masonry walls and other masonry surfaces where a higher degree of dampproofing than afforded by regular Par-Lock Plaster Key is required.

Dens-tect
Permanent Plaster Protection

Dens-tect Is Applied by Special Air Gun—The Dens-tect application comprises a heavy gun-applied priming coat of asphalt followed by a coating of asphalt and finely graded aggregate thoroughly mixed at the nozzle.

Introduction of the aggregate into the asphalt at high velocity and at right angles to the surface drives it into all minor cracks and crevices common to all masonry, and builds up a heavy, uniform thickness of mastic coating, from six to eight times the thickness of film dampproofing.

Advantages of Dens-tect Wall Treatment—(1) Provides an effective check against wall leakage by filling voids and offering a continuous coating over wall surface.

(2) It supplants furring, saving cost and floor space and eliminates ceiling and floor troubles resulting from moisture which is absorbed through outer wall and transmitted to floor slab from space between wall and inside of furring.

(3) Provides a uniform plaster base, overcoming irregular suction in masonry and insuring uniform quality of plaster-finish and permanence of decoration. Roughened surface formed by aggregate, together with manner in which application follows contour of wall, provides ample bonding properties.

Dens-tect Specification—The interior of all exterior walls above grade shall be treated in accordance with the Dens-tect Specification of THE VORTEX MANUFACTURING CO., Cleveland, Ohio.

Surfaces receiving Dens-tect are to be turned over to Par-Lock Applier clean and free from dirt, oil and other foreign matter, with all large projections removed and all holes and masonry joints pointed up in a workmanlike manner, in proper condition to receive Dens-tect application.

Note: All plastering materials are recommended for use, over this specification, except plasters made of portland cement mortar or putty gauged with portland cement.

Par-Lock Plaster Key for Surfaces to Be Plastered Direct

Par-Lock Treatment—The Par-Lock Plaster Key is a nationally used and approved treatment which dampproofs and at the same time forms a plaster key or bond for ceiling and wall surfaces to be plastered direct.

Par-Lock
The Master Plaster Key

Par-Lock treatment consists of multiple coats of specially blended pure asphalt, gun-applied under high pressures, and a final coat of special graded grit which is likewise mechanically applied to the final coat, providing a positive key of definite strength.

Par-Lock Insures Permanent Plastering—The Par-Lock Plaster Key insures permanent plastering by:

(1) Dampproofing the structural surface back of the plaster.
(2) Providing a key or clutch with a strength many times in excess of the requirements imposed by the weight of the plaster.
(3) Preventing the breakdown of the plaster crystal by reactions which many times result from contact between the structural surface and the plaster.
(4) Adjusting the difference in expansion and contraction between the plaster material and the structural surface.
(5) Overcoming insufficient, excessive or irregular suction in the structural body.

Recommended Applications of Par-Lock Plaster Key—Par-Lock is recommended as preparation for the following surfaces when plastered direct:

(1) Concrete ceilings.
(2) Tile and concrete joist ceilings.
(3) Concrete beams, columns and stair soffits.
(4) Interior of exterior walls.

Plaster Key Specification—All (architect to indicate surfaces here) within the building receiving plaster finish direct are to be prepared for plastering according to Par-Lock Plaster Key Specification of THE VORTEX MANUFACTURING CO., Cleveland, Ohio.

Surfaces receiving Par-Lock are to be turned over to Par-Lock Applier clean and free from dirt, oil and other foreign matter and with all large projections removed and all holes and masonry joints pointed up in a workmanlike manner, in proper condition to receive Par-Lock application.

Note: Any plastering materials may be used over this specification, except plasters made of portland cement mortar or putty gauged with portland cement.

WESTERN WATERPROOFING COMPANIES

Waterproofing and Weatherproofing Contractors

NEW YORK CORPORATION

NEW YORK, N. Y., Grand Central Terminal Bldg.
BOSTON, MASS., 82 W. Dedham St.

MISSOURI CORPORATION

ATLANTA, GA., Healey Bldg.
ST. PETERSBURG, FLA., P. O. Box 2879
MIAMI, FLA., 16 N. W. 7th St.
BIRMINGHAM, ALA., 18 Steiner Bldg.
AUGUSTA, GA., S. F. C. Bldg.
SAVANNAH, GA., P. O. Box 445
CHARLOTTE, N. C., 110 E. 4th St.
ROANOKE, VA., Boxley Bldg.
KNOXVILLE, TENN., P. O. Box 1224
ST. LOUIS, MO., Syndicate Trust Bldg.
KANSAS CITY, MO., 1219 Wyandotte St.
TULSA, OKLA., 1843 E. 16th Place
DENVER, COLO., 887 So. Broadway
LITTLE ROCK, ARK., 208 Pyramid Life Bldg.
NEW ORLEANS, LA., 318 Carondelet St.
HOUSTON, TEX., 500 M. & M. Bldg.
CHICAGO, ILL., 1842 Conway Bldg.

OHIO CORPORATION

CINCINNATI, OHIO, Dixie Terminal Bldg.
LOUISVILLE, KY., 539 So. 2nd St.
INDIANAPOLIS, IND., 6117 College Ave.

MICHIGAN CORPORATION

DETROIT, MICH., Murphy Bldg.
CLEVELAND, OHIO, 1521 Builders Exchange Bldg.
TORONTO, ONT., 67 Carlton St., Rm. 5
MONTREAL, QUE., 519 Keefer Bldg.

PENNSYLVANIA CORPORATION

PHILADELPHIA, PA., Liberty Trust Bldg.
SCRANTON, PA., 711 Linden St.
HARRISBURG, PA., 1515 No. Cameron St.
BALTIMORE, MD., 308 Baltimore Life Bldg.
WASHINGTON, D. C., 1427 Eye St., N. W.

Services

IRONITE SYSTEM (the original "iron method") of waterproofing and dampproofing below grade against a head of water, such as basement walls and floors, concrete tunnels, sewers, pools, and water tanks.

RESTO-CRETE SYSTEM of weatherproofing and damp-proofing porous masonry surfaces above grade.

RESEARCH LABORATORY to study materials and methods. All work guaranteed; no material for sale.

Advantages of Using Ironite

IRONITE waterproofing may be applied on the inside of the wall thus facilitating repairs where breaks, and structural cracks occur. It can be applied to either a wet or a dry wall, while most other treatments must be applied to a dry surface. IRONITE becomes an integral part of the wall structure—it has the same inorganic chemical nature as the concrete. It does not prevent the holding by the masonry of necessary water to cause proper hardening of the concrete over a period of years, yet it will successfully resist any hydrostatic head of water.

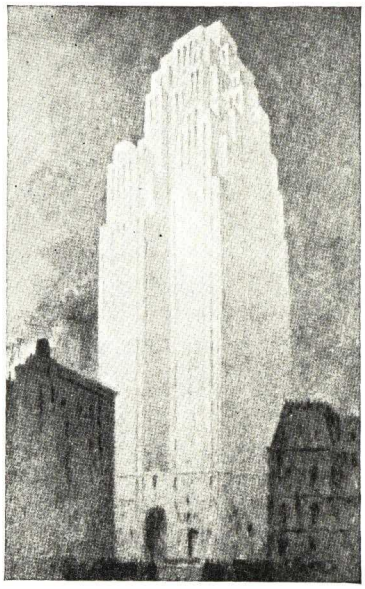
Ironite Specifications—It is our preference to write a separate specification for each condition encountered, depending on the requirements of the job.

THE IRONITE SYSTEM

Below Grade

Material — "IRONITE" is the oldest and best known powdered iron product used as a densifying material for waterproofing masonry. IRONITE is manufactured by the IRONITE COMPANY and has been in constant use for over thirty years. IRONITE is unexcelled in efficiency for this work. IRONITE is a registered trade mark owned by IRONITE COMPANY, of Chicago, Illinois.

Method—Waterproofing with IRONITE consists of successive surface applications of a solution of IRONITE suspended in water, thoroughly scrubbing into all the pores, "turning over", and properly oxidizing until the dark brown crust is formed which serves as a base for a subsequent series of portland cement plaster or brush coats. The IRONITE expands during oxidization, thus filling the capillary channels, and so rendering the wall impermeable to water under pressure.



Penobscot Building, Detroit
SMITH, HINCHMAN & GRYLLS, Architects
Waterproofed three basements below grade with IRONITE

Research Laboratory

Special conditions often come up in connection with waterproofing, weatherproofing, acidproofing, etc., which require more technical study than can be made offhand on the job. For this purpose we have a well equipped chemical and engineering laboratory, supervised by highly qualified technicians in this field. Address of the laboratory is 410 Murphy Building, Detroit, Michigan.

Publications—In order to further the knowledge of the art of weatherproofing among architects, engineers, and building managers, we have Technical Bulletins and a quarterly journal, THE RESTO-CRETER, on hand for free distribution. Address your nearest representative, or the Laboratory direct.

Representative Ironite Jobs

Radio City—Four Buildings—New York, N. Y.
New York Central Passenger Station, Syracuse, N. Y.
Christian Science Publishing Society Building, Boston, Mass.
Aetna Life Insurance Company Building, Hartford, Conn.
National Press Building, Washington, D. C.
The Cincinnati Time Star Building, Cincinnati, Ohio
Statler Hotel, St. Louis, Mo. and Boston, Mass.
Anheuser-Busch Co., St. Louis, Mo.
Orthopedic Hospital, University of Chicago.
Hiram Walker Distillery, Peoria, Ill.
Parke-Davis Company Buildings, Detroit, Mich.
Grand Rapids Civic Auditorium, Grand Rapids, Mich.
Dominion Public Building, Toronto, Ont.
Royal Bank, Vancouver, B. C.
Subways and Baths, City of Montreal

THE RESTO-CRETE SYSTEM

For New and Old Buildings Above Grade

The Resto-Crete Principle

A little boy once saved his country by forcing his finger into a hole in the dyke. By forcing RESTO-CRETE into the porous, capillary surfaces of your masonry structure we can save it from further disintegration. If the building is new, we can follow behind the brick masons or the concrete men and so densify and waterproof these surfaces that disintegration is prevented from ever getting started.

Water penetration is the basic cause of disintegration. Water is a powerful solvent. But acids in the air, soot, tar, freezing and thawing conditions, unequal humidity pressure—all these things further disintegration, too. Therefore, any densifying pore-filling surface material which will itself withstand these conditions, must be relatively inert after application, and it must have great bonding power.

It must form a non-capillary seal on the exterior which will at the same time permit the building to breathe outward at will. Further, no material is of any value unless it be properly and skillfully applied.

The Resto-Crete Material

The RESTO-CRETE material has been designed specifically for these conditions. It has been tested and retested ever since its inception. It is applied only by our associated companies, under guarantee, and according to specific methods for each type of work. Any color tone and effect may be secured. Special RESTO-CRETE formulas are constantly being developed in the laboratory to meet special chemical-corrosion conditions ecountered. RESTO-CRETE is applied under basic patents. RESTO-CRETE is a registered trade mark owned by the WESTERN WATERPROOFING COMPANY, of Detroit, Michigan.

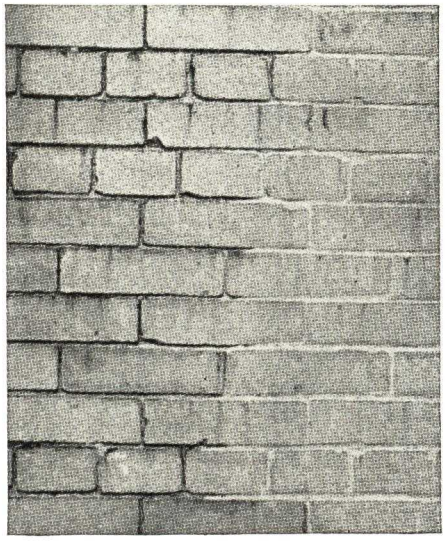
Service on New Buildings

Instead of attempting to secure waterproofness in walls on new buildings by the old integral methods, many architects have found that a RESTO-CRETE application, fitted to the type of masonry at hand, actually does secure waterproofness. Costs in most cases are lower, and a uniform color coat results. Most important is the fact that every square foot of finished surface is carefully scrubbed full of RESTO-CRETE, thus compensating for errors in workmanship, shrinkage cracks, and minor adjustments. The surface thus treated is literally prepared to meet the ages.

Mortar Joints—These, in new brick buildings quite frequently leak even when the best so called "non-shrinking" "waterproof" mortars are used. All cementitious materials shrink during hardening to some extent, and if the job is not big enough to warrant an extensive investigation of proper brick and mortar combination, the probability is great that capillary channels between mortar and brick will result. Interior dampproofing seldom helps in such cases, but RESTO-CRETE fills the capillary openings after they are formed, and permanently locks itself in place.

Monolithic Concrete Buildings — These offer unique architectural possibilities, and a number have been treated with RESTO-CRETE recently. In such cases, we apply a slush coat treatment immediately after stripping of forms, and then finish with RESTO-CRETE in color. Our experience will help to minimize structural finish errors if you will call on us while designing. RESTO-CRETE in dead white or blue-green shades has been used on many *concrete swimming pools* in the past few years. We have simplified structural designs to offer on such jobs.

Limestone—These surfaces get dirty rapidly, and are also rapidly disintegrated by sulphuric acid in smoky cities. We have applied our Limestone shade RESTO-CRETE on many beautiful limestone buildings to prevent these troubles. A particular RESTO-CRETE treatment has been well proven for *Cinder and Haydite* block houses, which are now extremely popular, and on which many other treatments have caused unlimited trouble. The first cost is slightly greater but there is relatively little upkeep.



Joints Shown at Right Are Scrubbed Full of Resto Crete

Contrast the density here as compared to the original porous, hair-cracked condition

Repair of Old Buildings

RESTO-CRETE has been used on millions of square feet of old building surfaces throughout North America in recent years. Our success has been due to the fact that we contract for the complete job of repointing, repairing broken areas, cleaning, plastercoating where desired, and finishing. We guarantee this work and our materials must stand up; our methods of application and execution must be carefully fitted to the job at hand. Skilled engineers are employed for estimating, and special conditions are referred to the laboratory for analysis.

Western RESTO-CRETE Representative—A. O. Miller Co., 1920 West Seventh Street, Los Angeles, Calif.

Representative Resto-Crete Jobs

Art-In-Buttons Co. Plant, Rochester, N. Y.
Worcester County Tuberculosis Hospital, Boylton, Mass.
Liberty Title & Trust Building, Philadelphia, Pa.
Standard Publishing Company, Cincinnati, Ohio.
Centre College Stadium, Danville, Ky.
Crunden-Martin Co., St. Louis, Mo.
Bell Telephone Company and A. T. & T. Buildings throughout the country
General Foods Corporation, Post Products Division, Battle Creek, Mich.
Ingraham Bldg., Miami, Fla.
Lever Bros Co., Ltd., Toronto, Ont.
Canadian National Railways' Hotels, Halifax, N. S. and Charlottetown, P. E. I.
Grain Elevators, Montreal Harbors Commission
Grace Dart Home Hospital, Montreal, Que.

W. F. WEBSTER CEMENT CO.

ESTABLISHED 1848

Manufacturers of Adhesive, Caulking and Waterproofing Compounds

CAMBRIDGE, MASS.

Experience

The W. F. Webster Cement Co. has been manufacturing Adhesive, Caulking and Waterproofing Compounds for almost a century. The products described here are the results of this long experience, and are guaranteed to give entire satisfaction when used according to our directions and for the purpose designed.

Our purpose has been to formulate Protective Products for use from the foundation to the roof, and for all types of structures. The architect, builder, home owner, industrial plant engineer, roofer, and waterproofer can now secure from one source a complete line of Waterproofing Materials.

WEBTEX PRODUCTS

Acoustical Glue

A proven cement for securing acoustical and insulating tile and wall board to concrete, metal, plaster or wood surfaces. The surface where glue is to be applied must be clean and dry. All loose or blistered paint should be removed and glossy surfaces washed thoroughly with a solution of sal-soda and, if necessary, rough with a wire brush to kill gloss.

Packed in 1, 5 and 8-gallon containers.

Asphalt Emulsions

Clay and soap types, fibrated and non-fibrated. Can be used for mastic floors, roofs and waterproofing purposes. Contain a high percentage of asphalt.

Packed in 1, 5, 30 and 55-gal. containers.

Asphalt Paint

A tough and elastic gilsonite paint for metal roofs, machinery, steel sash, tanks, ventilators, brick, and concrete. It is resistant to acid fumes and salt air. Gives great coverage and spreads easily. Drys quickly to a high gloss. Black and maroon.

Packed in 1-qt., ½, 1 and 5-gal. containers.

Asphalt Primers

For best results it is sometimes necessary to prime surfaces before applying foundation coatings, floor mastics, glass mastics, roof coatings or asphalt waterproofings. These primers act much the same as a primer for paint and help to give a better bond and greater coverage to the finish coat.

Packed in 1, 5, 30 and 55-gal. containers.

Caulking Compounds

A plastic and non-staining compound for filling and waterproofing openings under staff beads, around steel or wood sash and pointing mortar joints. Standard colors are limestone, light and dark gray and black in gun consistency. Light gray knife grade. Other colors made to order. The lighter colors can be painted over. The black is an inexpensive compound of maximum durability for use wherever color is not important. One gallon will caulk approximately 100 lin. ft.

Packed in 1 and 5-gal. containers.

Colorless Waterproofing

A colorless and transparent liquid which can be brushed or sprayed on to exterior walls of brick, cast stone, stone and concrete structures to prevent penetration of water, staining and deterioration of mortar joints. All loose mortar should be dug out and joints repointed before applying. One gallon will cover approximately 100 sq. ft., two coats.

Packed in 1, 5 and 55-gal. containers.

Elastic Cement

Webster's original elastic cement has been a standby for over eighty years and is used for bedding slate, caulking boats, setting glass, sealing aquariums and wherever waterproof cement that can be painted over is required. Colors are reddish brown, black and gray. The gray is particularly made for use with asbestos shingles or as a less expensive caulking and pointing material. Can be used with a caulking gun.

Packed in 2½, 5, 10, 25 and 50-lb. containers.

Fabric

Cotton fabric saturated with asphalt in all standard weights and specifications.

Rolls 1 yd. wide and 50 yds. long.

Floor Mastic

Very sticky asphalt and asbestos mastic of the correct consistency for cementing wood or composition flooring to concrete. Will not bleed. Temperature should be 70 degrees or over when applying.

Packed in 1 and 5-gal. containers.

Foundation Coating

Composed of specially prepared asphalt and oils, with minimum of solvent required to permit easy application with a brush or spray gun to exterior foundation walls below grade. Can be used for membrane waterproofing.

Packed in 1, 5, 30 and 55-gal. containers.

Spray Mastic

Specially compounded asphalt, asbestos, oils and solvent, designed to be used with an improved spraying machine developed by the W. F. Webster Cement Co.

The application of mastic with this spray gun makes a practical and more satisfactory method of waterproofing. The use of the spray machine insures uniform, denser and faster application.

Structural Glass Mastic

An asphalt mastic for cementing structural glass to store fronts. Used successfully throughout New England by outstanding contractors.

Packed in 1 and 5-gal. containers.

Plaster Bond Dampproofing

A combination of specially prepared asphalt and oils, which stays tacky. When applied to the interior of exterior walls above ground it effectively stops the penetration of water and forms a suitable base for plastering. Can be applied with a brush or spray gun to brick, concrete, stone or tile.

Packed in 1, 5, 30 and 55-gal. containers.

Plastic Cement

An asphalt and asbestos compound of the highest quality, contains no tar and will not melt or run. Applied with a trowel it is unexcelled for sealing flashings, gutters, eaves, chimneys, ventilators, parapet walls and badly leaking roofs. Colors, black and red.

Packed in 1, 5, 10, 25, 50, 300, and 550-lb. containers.

Roof Coating

A high grade asphalt and asbestos material for preserving and making watertight roofs of canvas, concrete, felt, metal, asphalt shingles and roll roofing. This coating contains no tar and is applied with a brush. Depending on the type of roof, 1 or 2 gal. per 100 sq. ft. are required. A strip of fabric 8 in. wide cemented over nails in roll roofing and covered with roof coating will stop leaks at that point for life of roof. Same material without fibre can be supplied when desired. Black and maroon.

Packed in 1, 5, 30 and 55-gal. containers.

Slater's Cement

Same as elastic cement.

Waterproofing Mastic

This is an easy working asphalt and asbestos material of troweling or spraying consistency and gives the maximum protection against water when applied on the exterior of foundation walls below grade and on interior of exterior walls above grade. Can be used as a plaster bond and with or without membrane fabric around structural steel on buildings and bridges.

Packed in 5, 30 and 55-gal. containers.

ROOFING 6
- SECTION -

Section Number 1/5 Catalog Number

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- **American Rolling Mill Co.** 6/39
- **American Zinc Institute Inc.** 6/40
- Armco 6/39
- Beth-Cu-Loy 6/41
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- Cop-R-Loy 27/7
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- Lyonore Metal 6/42
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- Specifications 6/41

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- Careystone 6/14
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- Eternit 6/17
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- **Flintkote Co.** 6/13

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Creo-Dipt Co., Inc. 6/59
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James Lumber Co. 6/61
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See Vent Connections—Roof

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Guards

See Guards—Snow

SPANDRELS

Felt, Cloth or Fabric

See Flashings—Fabric

Lead Covered Sheet Metal

See Sheet Metal—Lead Coated

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Hood, B. Mifflin, Co. 6/29
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Roofing—Metal

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Specifications 6/2; 27/23

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Snow Guards

See Guards—Snow

WOOD

Shingles

See Shingles—Wood

BARRETT
TRINIDAD LAKE
ASPHALT PRODUCTS
The Barrett Company, New
NEW YORK PHILADELPHIA CHICAGO
MAGISTONE LTD.

TRINIDAD LAKE ASPHALT PRODUCTS

The Barber Company, Inc.

NEW YORK PHILADELPHIA MADISON, ILL. CHICAGO

BARBER *Genasco*

and

The Vital Element

The Names that mean MOST in ASPHALT

The Vital Element

ASPHALT IN MODERN CONSTRUCTION

Modern construction practice demands an asphalt that combines durability with a properly balanced ratio of adhesiveness (indicating self-healing properties) to cohesiveness (toughness). These properties are inherent to *The Vital Element*—Trinidad Native Lake Asphalt.

BE SURE OF GETTING THE BEST

By specifying Barber Genasco you can be sure of getting the *most* in asphalt because only in Barber Genasco Built-up Roofings . . . Shingles . . . Mastic Floorings . . . will you find *The Vital Element.*

Barber Genasco Trinidad Lake Asphalt Built-Up Roofings consist of alternate layers of Barber Genasco All-Rag or Asbestos Felts cemented together with Trinidad Lake Roofing Asphalt containing *The Vital Element.* Both laboratory and service tests have convinced Architects and those in charge of roof maintenance that Barber Genasco Trinidad Lake Asphalt Roofs give longer service. They will be bonded for 10, 15 or 20 years, depending upon the type of roofing applied.

Barber Genasco Asphalt Shingles used for residential roofing, are made with *The Vital Element*—have been proved best by the Triple Test—The Test of Time—the Slam Test—and the Weather-Ometer Test.

"ASPHALT HEADQUARTERS"

The Barber Company, Inc., "Asphalt Headquarters Since 1883," is the largest miner, refiner and distributor of native lake asphalt in the world. For nearly three-quarters of a century Barber has been producing high-grade asphalt . . . has been specializing in asphalt in research, and today all this knowledge and experience is at your disposal.

"Asphalt Headquarters" is ready to serve you . . . to acquaint you with the possibilities and limitations of asphalt in building construction. Your inquiries will be welcomed without cost or obligation.

The Vital Element—Trinidad Native Lake Asphalt—was made by Nature. It is "mined" from the asphalt lake on the Island of Trinidad shown in the map above.

HISTORICAL FACTS

For millions of years *The Vital Element*—Trinidad Native Lake Asphalt—has been constantly "stirred" by Nature . . . exposed to the scorching rays of a year-round summer sun . . . the fury of tropical tempests.

Trinidad Native Lake Asphalt has come through these centuries with a natural vitality which it retains indefinitely.

DESCRIPTION

Trinidad is an intimate mixture of an extremely adhesive bitumen and inherent mineral filler so dispersed in the asphalt as to be in colloidal suspension.

The bitumen has unparalleled ductility, indicating extreme *self-healing and adhesive qualities.*

The colloidal mineral filler accounts for the great toughness, indicating *cohesiveness.*

Trinidad is unique in combining these two vitally necessary properties in a well balanced ratio.

The Barber Genasco Line of Asphalt Products Includes:

SHINGLES • SIDINGS • ROLL ROOFINGS • BUILT-UP ROOFINGS

MASTIC FLOORINGS : WATERPROOFING ASPHALTS AND FABRICS : DAMPPROOFING ASPHALTS : ASPHALT PROTECTIVE PRODUCTS (Plastics and Liquids)
SPANDREL BEAM WATERPROOFING (Spandrel Cloth and Cement) : RESATURATORS AND RESURFACERS

THE BARBER COMPANY, INC.

"Asphalt Headquarters Since 1883"

PHILADELPHIA, PA.

CHICAGO MADISON, ILL. NEW YORK

TRINIDAD LAKE ASPHALT

IS

The Vital Element in *Trinidad Lake* ROOFING ASPHALT

Trinidad Lake Asphalt . . . Nature's Own Waterproofing Material . . . is Recognized the World Over.

Trinidad Lake Asphalt is a waterproofing material which has given long and satisfactory service when exposed directly to the elements. It is recognized the world over for its weather resistance, wearing and waterproofing qualities. It is Nature's own waterproofing material.

IMPARTIAL

Tests

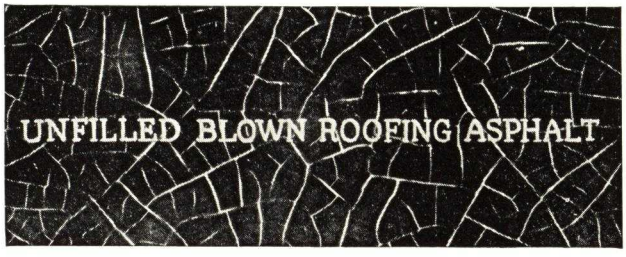
PROVE THE OUTSTANDING QUALITIES AND ADVANTAGES OF ROOFS USING TRINIDAD LAKE ROOFING ASPHALT

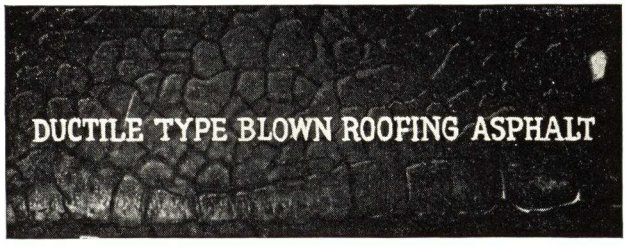
Four Types of Built-Up Roofing Asphalts Were Recently Subjected to Severe Tests in the Weather-Ometer

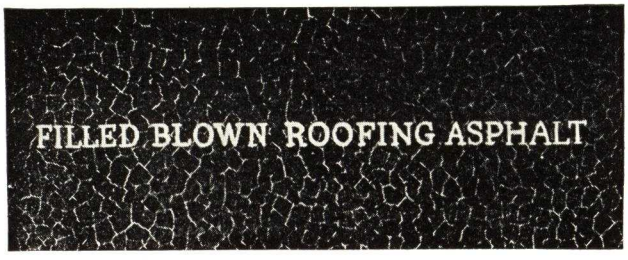
Such Tests Are Wholly Impartial

The Weather-Ometer is a mechanical device which makes possible accelerated weathering tests on coating films, or, in other words, hastens the destruction of such coating films by an exaggeration of natural weather conditions. When films of asphalt are subjected to the Weather-Ometer test they take more punishment in a few months than they would ordinarily receive on a roof during a period equivalent to at least ten years' outdoor exposure.

Recently the four types of asphalt generally used for built-up roofing purposes were subjected to the impartial Weather-Ometer tests. The illustration above shows how Trinidad Lake Roofing Asphalt came through the test—without a sign of failure after the equivalent of at least ten years of ordinary weather exposure. The three illustrations at the left show how the other types of asphalt checked or cracked or failed in a comparatively short time.







Every Practical Weather Condition

In these tests, continuous films of the four types of asphalt were applied on aluminum panels and placed in the Weather-Ometer. They were then exposed to a devastating cycle of frigid cold, soaking "rain" and scorching "sunlight."

Failure in the Weather-Ometer is judged to take place when the asphalt film on the aluminum panel breaks down so that cracks or fissures in the asphalt extend to the panel. This is determined by an ingenious electrical device which transmits the current when the asphalt fails, indicating a break in the film.

Bonds

Barber Genasco Trinidad Lake Asphalt Built-up Roofings will be bonded by a nationally known bonding company which guarantees against maintenance expense for 10, 15 or 20 years, depending upon the type of roofing applied.

BARBER *Genasco* TRINIDAD LAKE ASPHALT BUILT-UP ROOFINGS

Designation	Type of deck	Limitation of pitch, inches	Surface finish	Composition: Layers of felt	Composition: Number mopping of asphalt	Weight of Materials, lbs.: Weight of felts	Weight of Materials, lbs.: Trinidad Lake roofing asphalt	Weight of Materials, lbs.: Barber Genasco primer	Weight of Materials, lbs.: Gravel surfacing	Weight of Materials, lbs.: Slag surfacing	Total weight per square applied, lbs.: Smooth surfaced	Total weight per square applied, lbs.: Gravel surfacing	Total weight per square applied, lbs.: Slag surfacing	Underwriters' laboratories rating	Specification number
All Rag Felts—Asphalt Saturated															
10 year Bonded roof	Wood	¼–6	Smooth	1-30 lb. felt (base) 2-15 lb. felts	3	60	90	....	....	....	150	....	....	C	R-10-B
	Concrete *	¼–6	Smooth	3-15 lb. felts	4	45	120	10	....	....	175	....	....	C	R-10-C
15 year Bonded roof	Wood	¼–3	Gravel or slag	1-30 lb. felt (base) 2-15 lb. felts	3	60	110	....	400	300	....	570	470	A	R-15-BG
	Concrete *	¼–3	Gravel or slag	3-15 lb. felts	4	45	140	10	400	300	....	595	495	A	R-15-CG
20 year Bonded roof	Wood	¼–3	Gravel or slag	1-30 lb. felt (base) 3-15 lb. felts	4	75	140	....	400	300	....	615	515	A	R-20-BG
	Concrete *	¼–3	Gravel or slag	4-15 lb. felts	5	60	170	10	400	300	....	640	540	A	R-20-CG
10 year Wide-Selvage roof	Wood	3–9	Mineral Granules	2-15 lb. felts 2-Wide Selvage	3	118	90	....	....	....	....	208[2]	....	C	R-WS-10-B
	Concrete	3–9	Mineral Granules	1-15 lb. felt 2-Wide Selvage	3	103	90	10	....	....	....	203[2]	....	C	R-WS-10-C
10 year Spray Deck roof	Wood	½–2	Smooth	1-45 lb. felt (base) 1-Sat. Fabric 2-15 lb. felts	3 & 2[3]	75 & 8[4]	90 & 147[3]	....	....	....	320	....	....	....	R-SD-10-B
	Concrete	½–2	Smooth	2-15 lb. felts 1-Sat. Fabric 2-15 lb. felts	5 & 2[3]	60 & 8[4]	150 & 147[3]	10	....	....	375	....	....	....	R-SD-10-C
10 year Prom. Tile	Concrete	¼–½	Tile	3-15 lb. felts	3 & 1[5]	45	90 & 375[5]	10	....	....	1470[6]	....	....	....	R-PT-10-C
20 year Prom Tile	Concrete	¼–½	Tile	4-15 lb. felts	4 & 1[5]	60	120 & 375[5]	10	....	....	1515[6]	....	....	....	R-PT-20-C
Standard Trinidad roof	Wood	¼–6	Smooth	1-30 lb. felt (base) 2-15 lb. felts	3	60	90	....	....	....	150	....	....	C	S-R-B
	Concrete *	¼–6	Smooth	3-15 lb. felts	4	45	120	10	....	....	175	....	....	C	S-R-C
Economy Trinidad roof	Wood	¼–6	Smooth	1-30 lb. felt (base) 1-15 lb. felt	2	45	60	....	....	....	105	....	....	C	E-R-B
	Concrete	¼–6	Smooth	1-30 lb. felt (base) 1-15 lb. felt	3	45	90	10	....	....	145	....	....	C	E-R-C
Asbestos Felts—Asphalt Saturated															
10 year Bonded asbestos roof	Wood	¼–6	Smooth	1-35 lb. asb. felt (base) 2-20 lb. asb. felts	3	75	90	....	....	....	165	....	....	A	A-10-B
	Concrete *	¼–6	Smooth	1-35 lb. asb. felt (base) 2-20 lb. asb. felts	4	75	120	10	....	....	205	....	....	A	A-10-C
10 year Comb. asbestos roof	Wood	¼–6	Smooth	1-30 lb. rag felt (base) 2-20 lb. asb. felts	3	70	90	....	....	....	160	....	....	....	AR-10-B
	Concrete *	¼–6	Smooth	1-30 lb. rag felt (base) 2-20 lb. asb. felts	4	70	120	10	....	....	200	....	....	A	AR-10-C
15 year Bonded asbestos roof	Wood	¼–6	Smooth	1-60 lb. asb. base sheet 2-20 lb. asb. felts	3	100	90	....	....	....	190	....	....	A	A-15-B
	Concrete	¼–6	Smooth	1-60 lb. asb. base sheet 2-15 lb. asb. felts	4	90	120	10	....	....	220	....	....	A	A-15-C
	Insulation *	¼–6	Smooth	3-20 lb. asb. felts	4	60	120	....	....	....	180	....	....	A	A-15-I
15 year Comb. asbestos roof	Wood	¼–6	Smooth	1-45 lb. base sheet 2-20 lb. asb. felts	3	85	90	....	....	....	175	....	....	....	AR-15-B
	Concrete	¼–6	Smooth	2-15 lb. rag felts 2-20 lb. asb. felts	5	70	150	10	....	....	230	....	....	A	AR-15-C
20 year Bonded asbestos roof	Wood	¼–6	Smooth	1-60 lb. asb. base felt 3-20 lb. asb. felts	4	120	120	....	....	....	240	....	....	A	A-20-B
	Concrete	¼–6	Smooth	1-60 lb. asb. base felt 2-20 lb. asb. felts	4	100	120	10	....	....	230	....	....	A	A-20-C
	Insulation *	¼–6	Smooth	4-20 lb. asb. felts	5	80	150	....	....	....	230	....	....	A	A-20-I
20 year Comb. asbestos roof	Wood	¼–6	Smooth	1-45 lb. base sheet 3-20 lb. asb. felts	4	105	120	....	....	....	225	....	....	....	AR-20-B
	Concrete	¼–6	Smooth	2-15 lb. rag felts 3-20 lb. asb. felts	5	90	180	10	....	....	280	....	....	A	AR-20-C

Note: Special specifications for unusual conditions are available on request.
2. Mineral Granules. 3. Plastic Cement. 4. Saturated Fabric. 5. Asphalt Tile Cement. 6. Including 950 lbs. tile. *Used for Steel Decks—Gypsum—Insulation.

CONDENSED SPECIFICATIONS BARBER *Genasco* TRINIDAD LAKE ASPHALT BUILT-UP ROOFINGS

All-Rag Felts, Asphalt Saturated

R-10-B *Smooth Surface* 10 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 6" per ft. Underwriters' Classification "C"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-10-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer of Barber Genasco Extra-Heavy Felt lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply two layers of Barber Genasco Standard Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-10-C *Smooth Surface* 10 YEAR BONDED

For Use Over Concrete Gypsum or Tile on Inclines from ¼" to 6" per ft. Underwriters' Classification "C"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-10-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gal. per square; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers of Barber Genasco All-Rag Standard Felt, lapping each sheet 22". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-15-BG *Gravel or Slag Surface* 15 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 3" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-15-BG applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer of Barber Genasco All-Rag Extra Heavy Felt, lap 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply two layers of Barber Genasco All-Rag Standard Felt lapping each sheet 17". All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square. Over the felts thus laid pour 50 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and embed therein, while hot, 400 lbs. of Gravel or 300 lbs. of slag per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

R-15-CG *Gravel or Slag Surface* 15 YEAR BONDED

For Use Over Concrete Gypsum or Tile on Inclines from ¼" to 3" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-15-CG applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gal. per square; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers Barber Genasco All-Rag Standard Felt, lapping each sheet 22". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square. Over the felts thus laid pour 50 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and embed therein, while hot, 400 lbs. of Gravel or 300 lbs. slag per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

R-20-BG *Gravel or Slag Surface* 20 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 3" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-20-BG applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer of Barber Genasco Extra Heavy felt lapped 2"; mop down 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 3 layers Barber Genasco Trinidad Standard Felt lapped 22". All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square. Over the felts thus laid pour 50 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and embed therein, while hot, 400 lbs. of Gravel or 300 lbs. slag per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

R-20-CG *Gravel or Slag Surface* 20 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼" to 3" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-20-CG applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gal. per square; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 4 layers Barber Genasco All-Rag Standard Felt, lapping each sheet 24½". All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square. Over the felts thus laid pour 50 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and embed therein, while hot, 400 lbs. of Gravel or 300 lbs. of slag per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

R-WS-10-B *Mineral Surface* 10 YEAR BONDED

For Use Over Wood on Inclines Exceeding 3" per ft. Underwriters' Classification "C"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Wide Selvage Built-up Roofing R-WS-10-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply 2 layers of Barber Genasco All-Rag Standard Felt, lapping each sheet 17"; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 1 layer Barber Genasco Wide Selvage Construction Mineral Surface Roofing lapped the full width of the selvage. All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-WS-10-C *Mineral Surface* 10 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines Exceeding 3" per ft. Underwriters' Classification "C"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Wide Selvage Built-up Roofing R-WS-10-C ap-

plied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gal. per square; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 1 layer Barber Genasco All-Rag Standard Felt lapped 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply one layer Barber Genasco Wide Selvage Construction Mineral Surface Roofing lapped the full width of the selvage. All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

Note: Unless the roof deck permits of nailing, creosoted nailing strips should be provided 3′ apart and parallel with roof slope.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-PT-10-C *Promenade Tile* 10 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines ½″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-PT-10-C complete with promenade tile applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime the roof deck with Barber Genasco Concrete Primer, using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers of Barber Genasco Standard Felt, lapping each sheet 22″. All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

Spread on a layer of Barber Genasco Mastic Tile Cement uniformly ⅜″ thick; embed tiles with ⅜″ wide joints and wipe off all surplus cement.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-PT-20-C *Promenade Tile* 20 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines ½″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-PT-20-C complete with promenade tile applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime the roof deck with Barber Genasco Concrete Primer, using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 4 layers of Barber Genasco Standard Felt lapping each sheet 22″. All felts to be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

Spread on a layer of Barber Genasco Mastic Tile Cement uniformly ⅜″ thick, embed tiles with ⅜″ wide joints and wipe off all surplus cement.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

R-SD-10-B *Spray Deck* 10 YEAR BONDED

For Use Over Wood or Precast Gypsum on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing for Spray Deck R-SD-10-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply 1 layer Barber Genasco No. 45 Base Sheet lapped 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 1 layer Barber Genasco Waterproofing Fabric No. 4 lapped 3″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers of Barber Genasco All-Rag Standard Felt lapping each sheet 17″ and trowel on 2 layers of Barber Genasco Plastic Cement each uniformly ⅛″ thick. All felts and fabrics shall be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

R-SD-10-C *Spray Deck* 10 YEAR BONDED

For Use Over Concrete Gypsum or Tile on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing R-SD-10-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer, using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers Barber Genasco Standard Felt, lapping each sheet 17″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 1 layer Barber Genasco Waterproofing Fabric No. 4 lapped 3″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers Barber Genasco Standard Felt, lapping each sheet 17″ and trowel on 2 layers of Barber Genasco Plastic Cement each uniformly ⅛″ thick. All felts and all fabrics shall be thoroughly cemented together with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

SR-B *Smooth Surface* STANDARD

For Use Over Wood (or precast gypsum) on Inclines from ½″ to 3″ per ft.

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing SR-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco Extra-Heavy Felt lapped 2″ and mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

SR-C *Smooth Surface* STANDARD

For Use Over Concrete, Gypsum or Tile on Inclines from ½″ to 3″ per ft.

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing SR-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers Barber Genasco All-Rag Standard Felt, lapping each sheet 22″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

ER-B *Smooth Surface* ECONOMY

For Use Over Wood (or precast gypsum) on Inclines from ½″ to 3″ per ft.

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing ER-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco Extra-Heavy Felt Lapped 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply one layer Barber Genasco Standard Felt lapped 2″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

ER-C *Smooth Surface* ECONOMY

For Use Over Concrete, Gypsum or Tile on Inclines from ½″ to 3″ per ft.

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing ER-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply one layer Barber Genasco Extra-Heavy Felt lapped 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply one layer Barber Genasco Standard Felt lapped 2″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

BARBER *Genasco Asbestos Felts, Asphalt Saturated*

A-10-B *Smooth Surface* 10 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Asbestos Built-up Roofing A-10-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer of Barber Genasco 35 lb. Asbestos Felt lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers of Barber Genasco 20 lbs. Asbestos Felt lapped 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

A-10-C *Smooth Surface* 10 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Asbestos Built-up Roofing A-10-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt; apply one layer Barber Genasco 35 lb. Asbestos Felt lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 2 layers of Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

AR-10-B *Smooth Surface* 10 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Combination Built-up Roofing AR-10-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco Extra-Heavy Felt lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt; apply 2 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

AC-10-C *Smooth Surface* 10 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Combination Built-up Roofing AR-10-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply one layer Barber Genasco Extra-Heavy Felt lapped 2"; mop on 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 2 layers of Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 10 years.

A-15-B *Smooth Surface* 15 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Asbestos Built-up Roofing A-15-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco Asbestos Base Sheet lapping 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 2 layers of Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

A-15-C *Smooth Surface* 15 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼" to 6" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing A-15-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply one layer Barber Genasco Asbestos Base Sheet lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt; and apply 2 layers of Barber Genasco 15 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

AR-15-B *Smooth Surface* 15 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼" to 3" per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing AR-15-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco 45 lb. Base Sheet lapped 2"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; and apply 2 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

AR-15-C *Smooth Surface* 15 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼" to 6" per ft.

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing AR-15-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers Barber Genasco Standard Felt lapping each sheet 17"; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt and apply 2 layers Barber Genasco 20 lb. Asbestos Felt, lapping each sheet 17". All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

A-15-I *Smooth Surface* 15 YEAR BONDED

For Use Over Approved Insulation on Inclines from ¼″ to 6″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing A-15-I applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Mop surface of Insulation with 30 lbs. of Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 22″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 15 years.

A-20-B *Smooth Surface* 20 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing A-20-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer of Barber Gegasco Asbestos base sheet lapped 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 22″ and mopping the full width of the lap. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

A-20-C *Smooth Surface* 20 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing A-20-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gal. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply one layer Barber Genasco Asbestos base sheet lapping 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 2 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 17″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

AR-20-B *Smooth Surface* 20 YEAR BONDED

For Use Over Wood (or precast gypsum) on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing AR-20-B applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Apply one layer Barber Genasco 45 lb. Base Sheet lapping 2″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers of Barber Genasco 20 lb. Asbestos Felt lapping each sheet 22″. All felts to be thoroughly cemented together and rotected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

AR-20-C *Smooth Surface* 20 YEAR BONDED

For Use Over Concrete, Gypsum or Tile on Inclines from ¼″ to 3″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing AR-20-C applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Prime roof deck with Barber Genasco Concrete Primer using 1¼ gals. per square; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square; apply 2 layers Barber Genasco All-Rag Standard Felt lapping each sheet 17″; mop on 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 3 layers Barber Genasco 20 lb. Asbestos Felt lapping each sheet 22″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

A-20-I *Smooth Surface* 20 YEAR BONDED

For Use Over Approved Insulation on Inclines from ¼″ to 6″ per ft. Underwriters' Classification "A"

INSERT UNDER ROOFING—Built-up roofing shall be Barber Genasco Trinidad Lake Asphalt Built-up Roofing A-20-I applied as follows and in strict accordance with the detailed specifications of The Barber Company, Inc.

Mop surface of Insulation with 30 lbs. Barber Genasco Trinidad Lake Roofing Asphalt per square and apply 4 layers of Barber Genasco 20 lb. Asbestos Felt lapping each sheet 24½″. All felts to be thoroughly cemented together and protected with Barber Genasco Trinidad Lake Roofing Asphalt applied at the rate of 30 lbs. per mopping per square.

FLASHING—Barber Genasco Special Flashing shall be used.

BOND—Manufacturer's bond on roofing and/or flashing shall be furnished for a period of 20 years.

INSULATION

Over Boards—After nailing or securely fastening the insulating materials to the board deck in the manner prescribed by the manufacturers thereof mop surface of insulation and apply roofing as prescribed for application over concrete, eliminating Primer.

Non-Combustible Decks—The specification for application over concrete shall be followed—priming roof deck and mopping with asphalt, into which while hot embed insulating materials in manner prescribed by manufacturers thereof. Joints shall not be wider than $\frac{5}{16}$ of an inch.

Mop surface of insulating material thoroughly and apply roofing as prescribed for application over concrete, eliminating Primer.

Where slope exceeds one inch to the foot, insulation shall be secured to nailing strips or other suitable devices provided in decks incapable of receiving nails.

For Conditions of High Humidity Within Building Arising from Industrial Businesses

Apply a layer of Barber Genasco Standard Felt, lapped 6″ and mop the full width of the lap with hot asphalt. This felt shall be nailed sufficiently to hold in place to board decks or thoroughly cemented with hot asphalt to non-combustible roof decks.

Mop the felt thus laid with hot asphalt, into which embed insulation. Where slope exceeds one inch to the foot, insulation shall be secured to nailing strips or other suitable devices provided in decks incapable of receiving nails.

Insulation shall be isolated into areas approximately 25 feet square, and water cut-offs provided consisting of a continuous layer of felt sufficiently wide to extend 4″ over top edge of insulation in place, down and 4″ under edge of adjoining insulation. Similar cut-offs extending 4″ under and up and 4″ over top of insulation shall be installed at all edges of insulation adjoining upward projections from roof.

All felts composing cut-offs shall be thoroughly cemented to underlying surfaces with hot asphalt.

After insulation is complete, mop the surface thereof and apply roofing as prescribed for application over concrete, eliminating Primer.

Note:—Where more than one layer of insulation is used each successive layer shall be mopped solidly with hot asphalt to preceding layer and nailed in addition thereto with nails one inch longer than total thickness of insulation where the slope exceeds one inch to the foot.

Note:—No more insulation shall be laid than can be completely covered the same day. Roofing felts shall be turned down over the edge of insulation at the end of each day and completely sealed with hot asphalt to keep out dampness.

Wet insulation is of little or no value and is almost certain to cause trouble and expense, and The Barber Company, Inc. may at its option refuse to bond Barber Genasco Trinidad Bonded Roofing applied over wet or defective insulation.

All decks shall be thoroughly dry prior to the application of insulation, otherwise The Barber Company, Inc. may at its option require a layer of felt applied as prescribed under humid conditions.

BARBER Genasco

ASPHALT FLOORINGS

BARBER GENASCO ASPHALT MASTIC

. . . For Hot Application

A bituminous mixture of Trinidad Native Lake Asphalt, Flux, and properly graded mineral aggregate. When hot it is sufficiently plastic to spread with a wooden trowel or float in one continuous sheet. It hardens as it cools and is ready for use 2 or 3 hours after being laid.

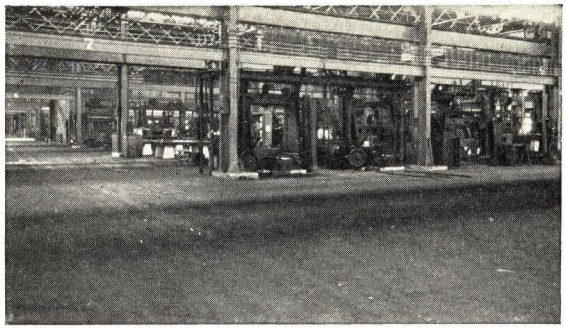
Advantages—(1) Will withstand heavy trucking—is resilient and therefore less tiring to employees who must stand at their work. (2) Sanitary, odorless, non-dusting, non-absorbent and non-glaring, and is waterproof. (3) Not only recommended for new construction but can be laid over old floors of any material.

Available Specifications—Indoor and Outdoor foot and light traffic; indoor and outdoor heavy trucking and traffic; cold storage (over foundation of wood, cork, concrete, or other firm and stable base); plating rooms; acid tank rooms; and floors subjected to acid liquors.

EMULMASTIC . . . *For Cold Application*

Advantages—Floors may be resurfaced on Saturday and a new, smooth surface be ready on Monday morning.

Recommended for patching or resurfacing floors and decks and for levelling old floors prior to application of linoleum, tile or wood blocks.



Guide Bearer Shop, Baldwin Locomotive Works, Eddystone, Pa., Floored with Barber Genasco Trinidad Lake Asphalt Mastic

Emulmastic is resilient, comparatively noiseless, easy under foot and cushions the shocks of heavy trucking. Will not soften or melt in summer heat, or crack due to cold weather. Provides a non-skid surface. Is odorless, therefore suitable for use in food storage rooms. Is vermin-proof and relatively dustless.

For light foot traffic, Emulmastic is ready for use within 24 hours. For unusually heavy loads, a longer period is required.

Application—No special skill is required to patch or resurface with Emulmastic, provided specifications are followed. No expensive equipment is necessary. The Emulmastic mortar is applied on the base, screeded and later troweled to a smooth finish.

BARBER Genasco

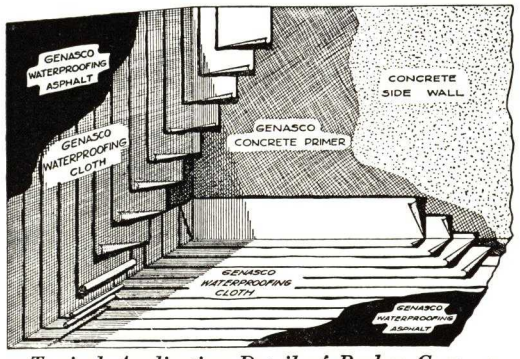
MEMBRANE WATERPROOFING

Waterproofing a Vital Necessity—For the life and stability of foundations of buildings, tunnels, subways or other forms of sub-construction, reservoirs, bridges, retaining walls, etc.

Suitable for Exacting Conditions—Barber Genasco Membrane Waterproofing consists of plies of Barber Genasco Waterproofing Fabric mopped with hot Barber Genasco Waterproofing Asphalt.

Comply with A.S.T.M. Specifications—Barber Genasco Waterproofing Asphalts are furnished in various consistencies suitable for use above and below ground. They comply with specifications of the American Society for Testing Materials and many other specifications. Through years of successful use, they have withstood the most severe service conditions.

Resists Hydrostatic Pressure—Barber Genasco Membrane Waterproofing is most successful in waterproofing structures exposed to hydrostatic pressure or conditions of continual dampness or moisture, particularly in below-ground work.



Typical Application Detail of Barber Genasco Membrane Waterproofing

Technical Service—If you have a waterproofing problem, our Technical Bureau will be glad to work with you and to recommend specifications to meet your particular needs.

BARBER Genasco

DAMPPROOFING

For All Brick or Concrete Foundations Where Back-Fill Will be Used

All surfaces shall be brushed free of dirt or foreign materials and all cracks, voids or open joints in masonry shall be properly pointed up with Portland Cement mortar.

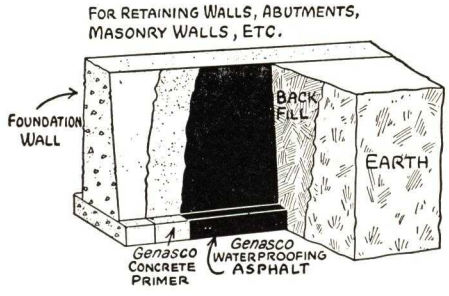
For Hot Application—*First*—Apply Barber Genasco Concrete Primer over the entire surface to be dampproofed, using not less than 1¼ gals. per 100 sq. ft.

Second—Over the surface thus primed mop down a uniform coating of Barber Genasco Asphalt Compound 356, using not less than 40 lbs. per 100 sq. ft.

Third—The back-fill shall then be solidly tamped in place, care being taken not to puncture the asphalt film thus applied.

For Cold Application—*Alternate No. 1—Barber Genasco Liquid* Asphalt "S" applied at the rate of 2 gals. per 100 sq. ft. over the previously primed surface can be substituted for hot asphalt where a cold application is desired. Delay backfilling until Liquid Asphalt "S" has set.

Alternate No. 2—On Surfaces Which Are Damp—Suitable for use from May to October.



All surfaces to be dampproofed shall be uniformly coated with a priming solution, using 2 gals. to each 100 sq. ft. of surface. Priming solution shall consist of one volume of clean, soft water to three volumes of Barber Emulsified Asphalt 600, which shall be stirred vigorously during the addition until it is uniform. The prime coat should be allowed to dry for about 15 minutes or longer, depending upon atmospheric conditions, so that when the coating is pressed with the thumb, it will not be pulled loose when thumb is taken away.

Apply Barber Emulsified Asphalt 600 over entire previously primed surface, using not less than 2 gals. per 100 sq. ft. After the emulsion has become thoroughly set, the back-fill can be tamped into place. Extreme care must be used in placing backfill to prevent abrasion of the film of asphalt, otherwise the efficiency of the dampproofing will be seriously impaired.

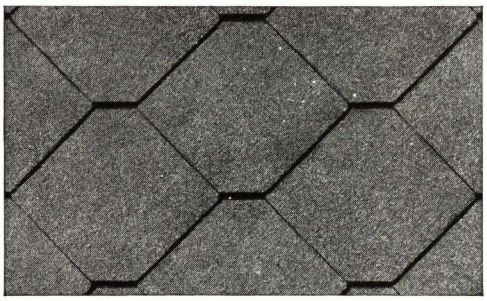
BARBER *Genasco* SHINGLES & SIDINGS

• • • Only Barber Genasco Shingles and Sidings Contain

The Vital Element

Barber Genasco Latite Shingles

These are square except for a turned under corner and lay up to a hexagonal form. A patented metal band or "Key" at the butt locks each shingle to the adjoining ones so that they lay tight and stay tight. Furnished in two sizes: 16x16 in., approximate average weight 126 lbs. per square; 14x14 in., approximate average weight 150 lbs. per square. Furnished in many beautiful colors and blends.



Barber Genasco Sta-Rite Shingles

A new individual shingle that lays up to a hexagonal form on the roof. This modern shingle is not only secured to the roof by concealed nails, but is sealed to the lower course of shingles with Sta-Rite Adhesive Cement just as you would seal the flap of an envelope.

Size: 16x16 in., approximate average weight 126 lbs. per square. Furnished in many beautiful colors and blends.

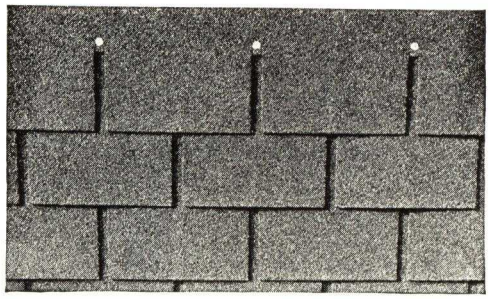
Barber Genasco Barb-Lock Shingles

Rectangular individual shingles measuring 13x18 in. which are laid by the "Dutch Lap" method. These shingles have a fold-under locking device. Approximate average weight 133 lbs. per square. Furnished in many beautiful colors and blends.

Barber Genasco Sealbac Individual Shingles

Furnished in two sizes: Standard Weight, 9x12¾ in., approximate average weight 257 lbs. per square. Extra-Heavy, 12x16 in., approximate average weight 327 lbs. per square.

Furnished in many beautiful colors and blends.



Barber Genasco Sealbac Strip Shingles

Furnished in the following sizes and weights: 10x36 in., approximate average weight 210 lbs. per square; 12½x36 in., approximate average weight 266 lbs. per square; 12x36 in. (Extra-Heavy), approximate average weight 257 lbs. per square.

Barber Genasco Sealbac Strip Shingles are furnished in many beautiful colors and blends.

Titles to Illustrations

Lower Left:

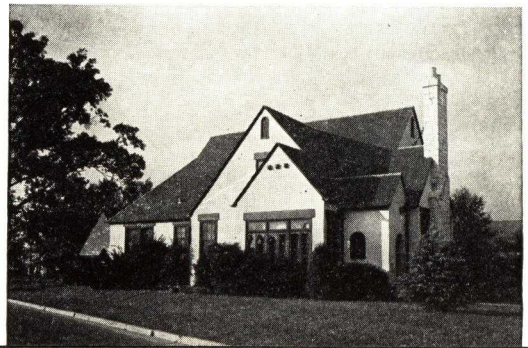
Barber Genasco Latite Shingles Used on Roof of This Attractive Residence, Portland, Ore.

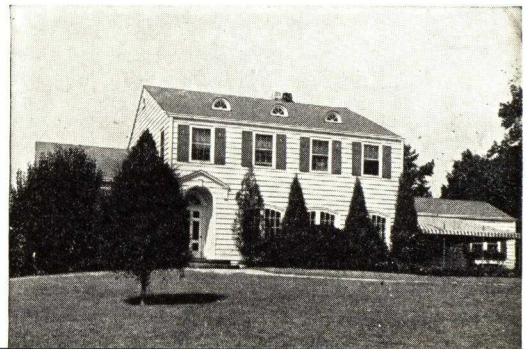
Lower Center:

Barber Genasco Extra-Heavy Individual Shingles Were Used to Roof This Baton Rouge, La., Residence.

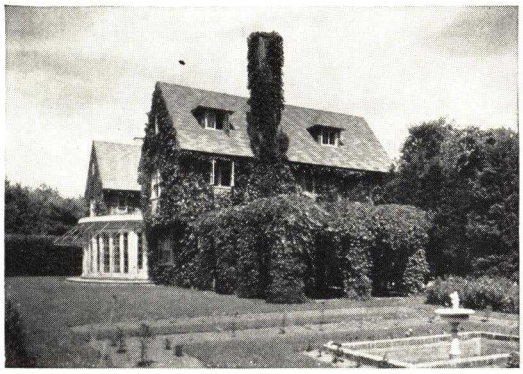
Lower Right:

Barber Genasco Sta-Rite Shingles on Roof of This Home in Birmingham, Ala.





Barber Genasco Barb-Lock Shingles Used to Re-roof This Residence at Meadowbrook, Pa.



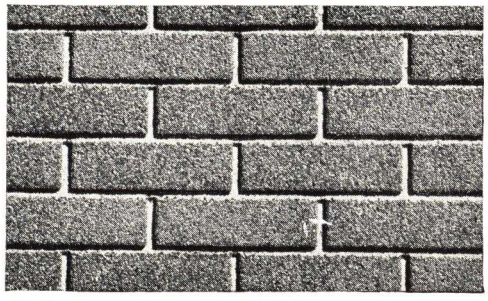
Residence at Ridgefield, Conn., Roofed with Barber Genasco Mas-Tab Shingles

Barber Genasco Brick-Like Siding Used for Re-siding This Passaic, N. J., Home

Barber Genasco Mas-Tab Strip Shingles

These shingles measure 12x36 in. Furnished in two types: (1) Barber Genasco Mas-Tab Doubl-Dipped Strip Shingles (approximate average weight 230 lbs. per square) having an extra coating of asphalt and mineral granules applied by hand to the butts, (2) Barber Genasco Mas-Tab (Overlay Process) Strip Shingles (approximate average weight 210 lbs. per square) having an extra coating of asphalt and mineral granules which is applied mechanically to the surface of the butts. Furnished in many beautiful colors and blends.

Barber Genasco Brick-Like Siding



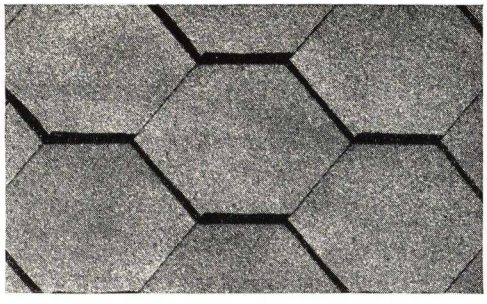
Furnished in two types: Barber Genasco Doubl-Dip Tru-Brick Siding and Barber Genasco Brick-Like (Overlay Process) Siding, which is furnished in two weights. Both types resemble real face brick and are used for re-siding old, weather-battered clapboard or wood shingle side walls. All three measure 7x36 in. and have four Tabs or "Bricks" to strip—2½ in. of Brick and ½ in. of mortar. Furnished in beautiful colors and blends with contrasting "mortar" joints.

Barber Genasco Doubl-Dip Tru-Brick Siding, approximate average weight 230 lbs. per square.

Barber Genasco Brick-Like (Overlay Process) Siding *made with coarse granules,* approximate average weight 210 lbs. per square.

Barber Genasco Brick-Like (Overlay Process) Siding *made with fine granules,* approximate average weight 160 lbs. per square.

Barber Genasco Hexagon Strip Shingles



Furnished in the following sizes:

Barber Genasco 11⅓x36 in. Hexagon Strip Shingles. Approximate average weight 167 lbs. per square. Furnished in many beautiful colors and blends.

Barber Genasco 12⅓x36 in. Hexagon Strip Shingles. Approximate average weight 185 lbs. per square. Furnished in many beautiful colors and blends.

Barber Genasco 12½x36 in. Hexagon Strip Shingles. Approximate average weight 226 lbs. per square. Furnished in many beautiful colors and blends.

Barber Genasco Trinitab 11⅓x36 in. Hexagon Strip Shingles. Approximate average weight 167 lbs. per square.

Barber Genasco 4-Point Siding Strips

These siding strips lay up in attractive diamond shape units. Strips measure 11x36 in. Approximate average weight 139 lbs. per square.

Furnished in attractive colors and blends.

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The Barber Company, Inc.

Barrett

BUILT-UP ROOFING • FLASHING • ROOF DRAINAGE • WATERPROOFING • DAMPPROOFING

Reference Manual

FOR ARCHITECTS AND ENGINEERS

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FOREWORD

This manual contains specifications and detailed drawings treating with the following subjects:

Built-Up Roofing—for flat roof decks—Section 1
Built-Up Roofing—for steep roof decks—Section 2
Roof Flashing ..... Section 3
Roof Drainage ..... Section 4
Waterproofing ..... Section 5
Dampproofing ..... Section 6

The data presented comprise the most practical methods and procedure based on three quarters of a century's experience, the essence of which is incorporated to the fullest extent possible. The details are arranged to show exactly the construction secured when the accompanying specifications are adhered to . . . the object being to provide the architect, builder or building owner with reference material which is designed from his viewpoint and with his interest in mind.

Architects and construction engineers in all parts of the country have found the methods recommended by Barrett in this manual to be entirely reliable and in accord with the most up-to-date engineering practices. The practical demonstration of their value is evidenced by their use on so many of the nation's finest and largest structures.

For any unusual roofing or waterproofing problems, or conditions not covered in this book, a construction service department is maintained, the members of which are available for consultation at any time and without obligation.

THE TECHNICAL SERVICE BUREAU

of THE BARRETT COMPANY places at the disposal of all those interested, general and technical information and facts of value in the fields served by BARRETT. This service is supplied without cost or obligation as THE BARRETT COMPANY'S contribution to the broad development of these fields in which it has been identified with leadership for many years. Address The Technical Service Bureau of THE BARRETT COMPANY, 40 Rector Street, New York, N. Y.

THE BARRETT COMPANY
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2800 So. Sacramento Avenue
Chicago, Illinois

Birmingham
(P. O. Fairfield)
Alabama

In Canada
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Montreal, Que.

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Barrett

PROTECTION FOR BUILDINGS

BUILT-UP ROOFING • FLASHING • DAMPPROOFING
MEMBRANE WATERPROOFING • ROOF DRAINAGE

LEGEND

ROOFING

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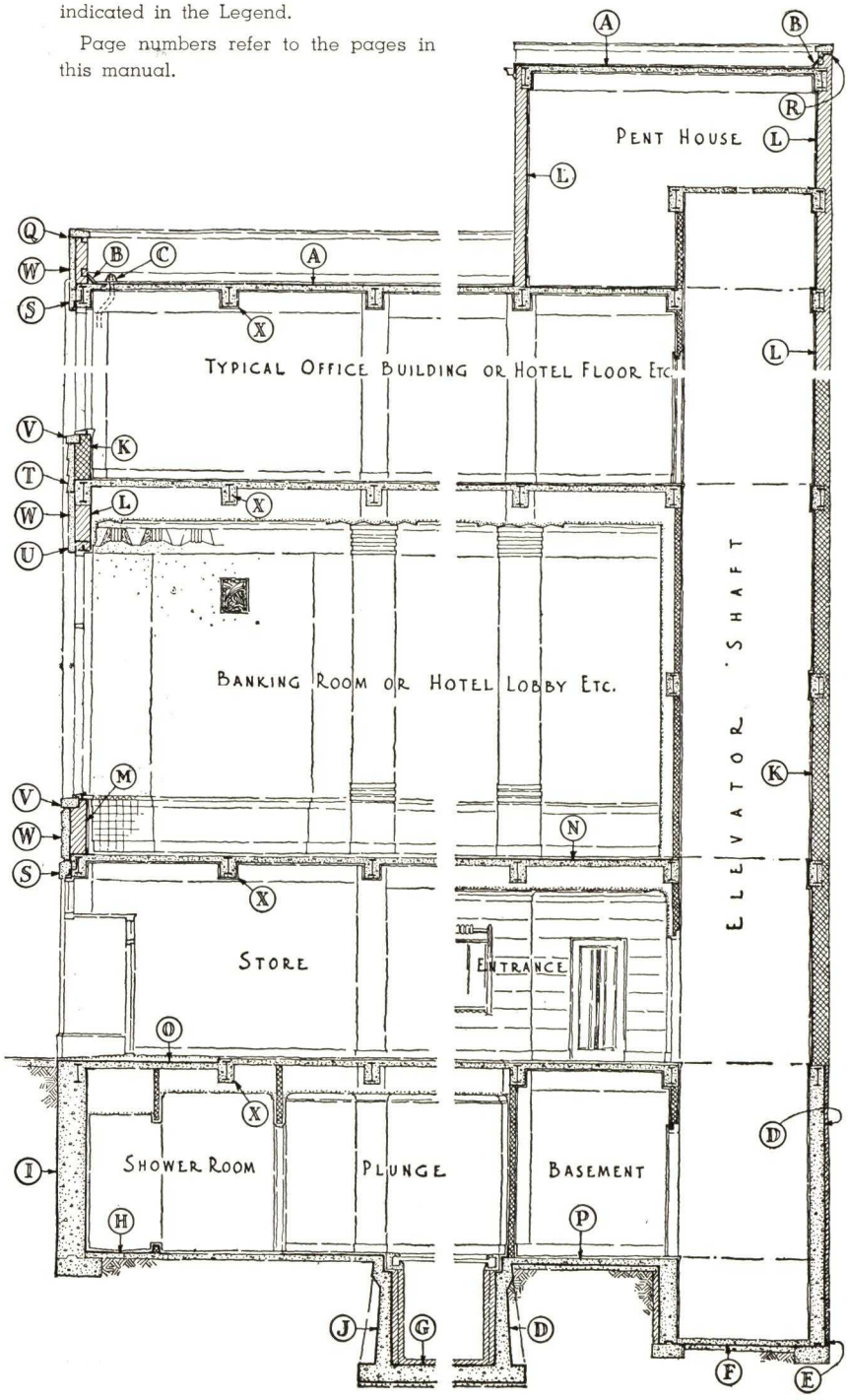
Code letters on this drawing correspond to Barrett Specifications for roofing, waterproofing or dampproofing as indicated in the Legend.

Page numbers refer to the pages in this manual.



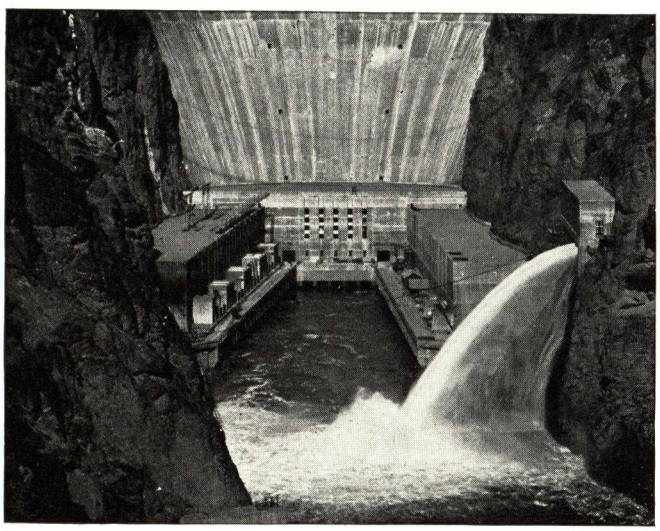
SINCE 1854

BETWEEN THE WORLD AND THE WEATHER

BARRETT'S leadership in roofing and waterproofing dates back more than three-quarters of a century. Pioneers in the field, Barrett has, since the early days of built-up roof construction, improved its materials, application methods and facilities for service, stride for stride with the advance of the building industry.

Today the famous Barrett Specification is recognized everywhere as the standard of value for built-up roof construction—a ranking consistently held since its introduction decades ago. Barrett introduced the practice of bonding roofs, definitely freeing building owners from periodical repair or maintenance expense. Barrett initiated the bonding of roof flashing, eliminating divided responsibility. The Barrett organization of approved roofing contractors was the first ever established; and Barrett's complete roof inspection service, introduced years ago, is unique in the roofing field.

Exchange Building, Boston, Mass.



Boulder Dam—the Great U-shaped Power House Is Protected by Barrett Roofing Materials

That this complete service has obtained uniformly satisfactory results is demonstrated by thoroughly authenticated records of proved performance—many of the early installations having already given 30, 40 and 50 years of service without repair or maintenance expense. Repeat business from nationally recognized organizations substantiates these records and presents staunch testimony to the enduring qualities of Barrett Roof construction.

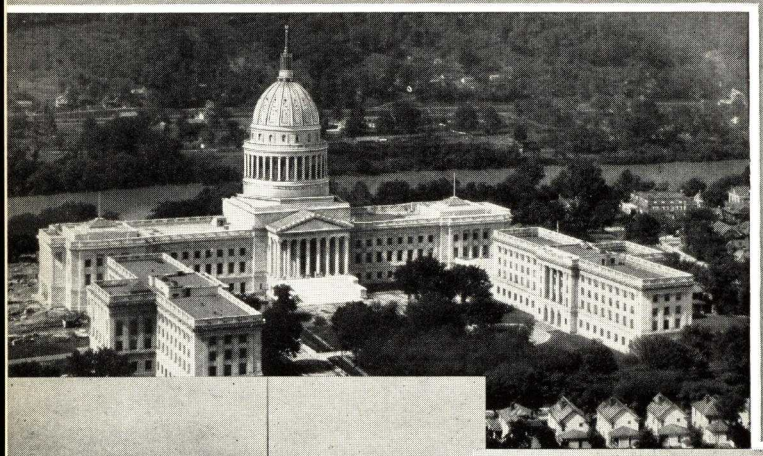
We believe that such records of performance, together with the universal acceptance of this type of roof by leading architects, engineers and builders of modern structures, convincingly demonstrate that there are no better materials for built-up roof construction than high quality coal tar pitch and roofing felt . . . and that no finer materials of this character are obtainable than those bearing the Barrett label.

Barrett

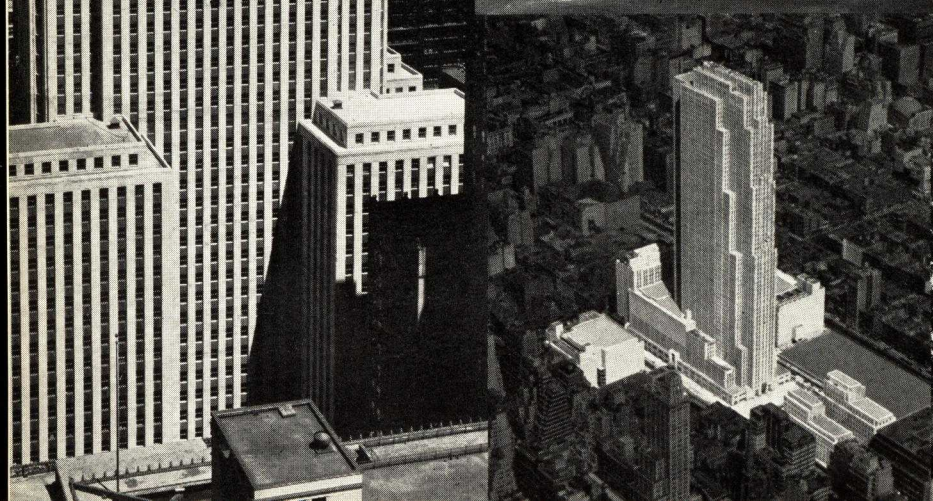
Then.....

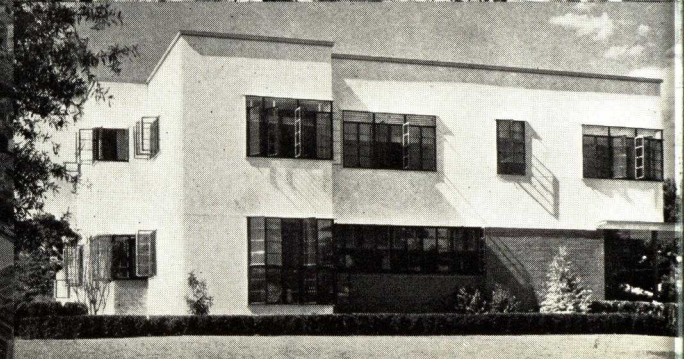
Time gives proof of roof performance. It is not unusual for Barrett Roofs to outlive the useful lives of the buildings on which they are placed. There are hundreds of Barrett Coal-tar Pitch and Felt Roofs giving 100% satisfaction after 40 to 50 years of hard service. These records, unique in the built-up roofing industry, point the way for building owners who want complete and lasting freedom from roof worries.

The dominance of Barrett Built-Up Roofs in almost every community is proof that the outstanding merit of Bar-



Barrett



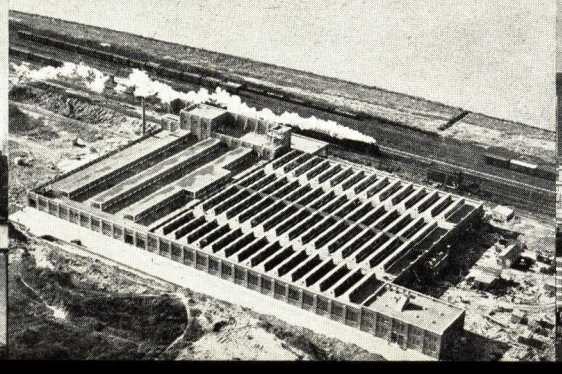


and Now

rett Roof materials and methods is today universally recognized by architects and engineers. They have specified Barrett Roofs for America's greatest buildings (every world's tallest building since the Woolworth has had a Barrett Roof) . . . for huge manufacturing plants, public buildings, hotels, apartment buildings, schools and colleges, store and office buildings, and modern flat-roofed houses.

For monumental structure or simple business block, Barrett Specification Roofs represent the soundest investment.

Roofs



Barrett Specification Roofs*

* Trade Mark Registered U. S. Pat. Off.

Exact and definite building specifications encourage fair bidding practices and promote good construction. They are welcomed by reliable contractors because they establish recognized standards and truly comparative proposals.

The Barrett Specification stipulates known quantities, known qualities and known application technique to produce a known result—a roof that will be free from upkeep and maintenance expense for 20 years, at least.

Both Barrett Specification Pitch and Barrett Specification Felt are manufactured to be—and conceded to be—the best it is possible to produce. Barrett Specification Pitch is preserved by water. Its life-prolonging oils are protected by the same dampness and moisture that weaken ordinary materials. It is self-healing; is virtually immune to climatic variations; and possesses creosote properties that outlaw fermentation or the development of fungi. Roofing gravel, slag, slate or tile provides a fire-safe, practically indestructible wearing surface which protects the membrane, reflects heat and permits the use of a maximum of waterproofing materials. Barrett Specification Roofs carry Underwriters' Class "A" rating . . . the base rate for insurance.

Barrett Specification Roofs are applied only by Barrett Approved Roofers; the selection of whom is based upon experience, ability and integrity. Architects, engineers and builders may rely on them completely to satisfactorily execute the character of work incorporated in this publication.

UNITED STATES FIDELITY & GUARANTY COMPANY

Barrett Specification Roof

20-Year Guaranty Bond

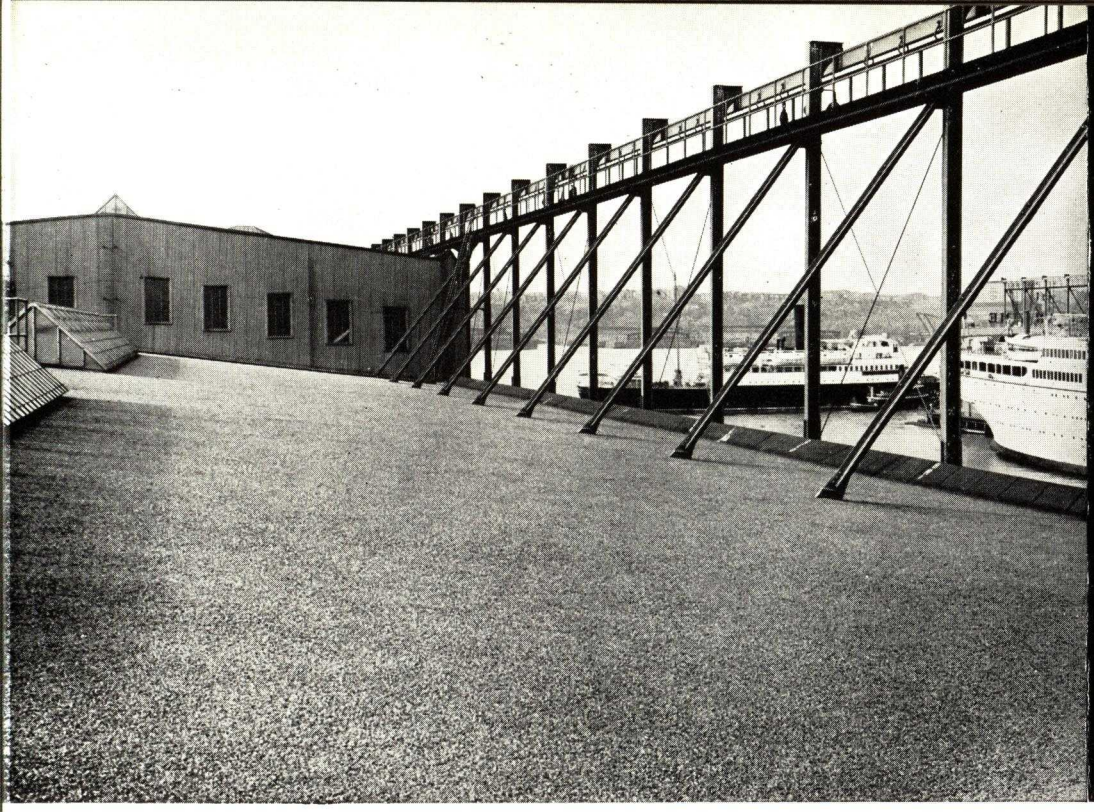
The Barrett Bond

Barrett Specification Roofs are bonded by the United States Fidelity and Guaranty Company against repair and maintenance expense, thus providing a certainty of performance that is seldom equaled in the building industry. Barrett Specification Roofs, Type "AA" are bonded for 20 years; Type "A" for 15 years, in accordance with specifications in this manual. Barrett also bonds its flashing systems for like periods when the flashing is installed in conjunction with the application of a Barrett Bonded Roof. This complete service is furnished under one contract and eliminates divided responsibility on this important work.

The Barrett Inspector Making the Famous "Section Test"

Barrett Roof Inspection Service

Barrett Roof Inspection Service, introduced by Barrett years ago, is unique in the roofing field. The work of Barrett Approved Roofers is executed under the direct supervision of technically trained Barrett Inspectors, assuring to the purchaser roof performance far beyond that prescribed in any guarantee or bond. The services of a Barrett Roof Inspector are available for consultation without cost or obligation to owners of flat-roofed buildings east of the Rockies. He will render a complete, detailed, unbiased report on conditions found and recommend adequate procedure where corrections or repairs are required.



SECTION 1

FLAT ROOFS

INCLINES NOT TO EXCEED 2 INS. TO 1 FT.

BARRETT SPECIFICATION ROOFS

TYPE "AA"—BONDED FOR 20 YEARS
TYPE "A"—BONDED FOR 15 YEARS

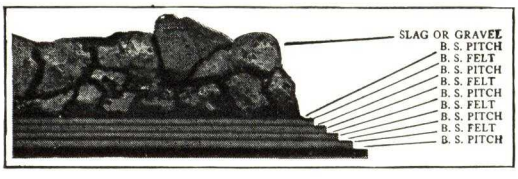
Flat Roof Classification

Roofs having inclines of not more than two inches in one foot are generally classified as flat roofs.

The practical purpose of the flat roof, or of any roof, is to protect the interior, the contents and the occupants of a building from rain, snow, heat and cold. In addition, a good roof should provide effectual protection against the spread of fire, prevent dampness, add to the character of the building, and offer freedom from periodical repair or maintenance expense.

The Barrett Specification for Flat Roofs

The Barrett Specification Roof—Type "AA" or Type "A"—meets these requirements for flat roof construction. It is constructed of highest quality coal tar pitch and roofing felt, properly applied in the membrane manner; and surfaced with gravel, roofing slag, promenade slate or quarry tile.



Barrett Specification Roofing

Built of alternate layers of Barrett Specification Pitch and Felt (the top coat of pitch is poured) with an indestructible wearing surface of gravel or slag.

Insurance Savings

Barrett Specification Roofs take the base rate of insurance. They require no painting or coating. Their moderate first cost and enduring qualities effect a cost per year of service far below that of any other type of built-up roof known. They provide a permanent part of permanent building construction.

Black Diamond Roofs

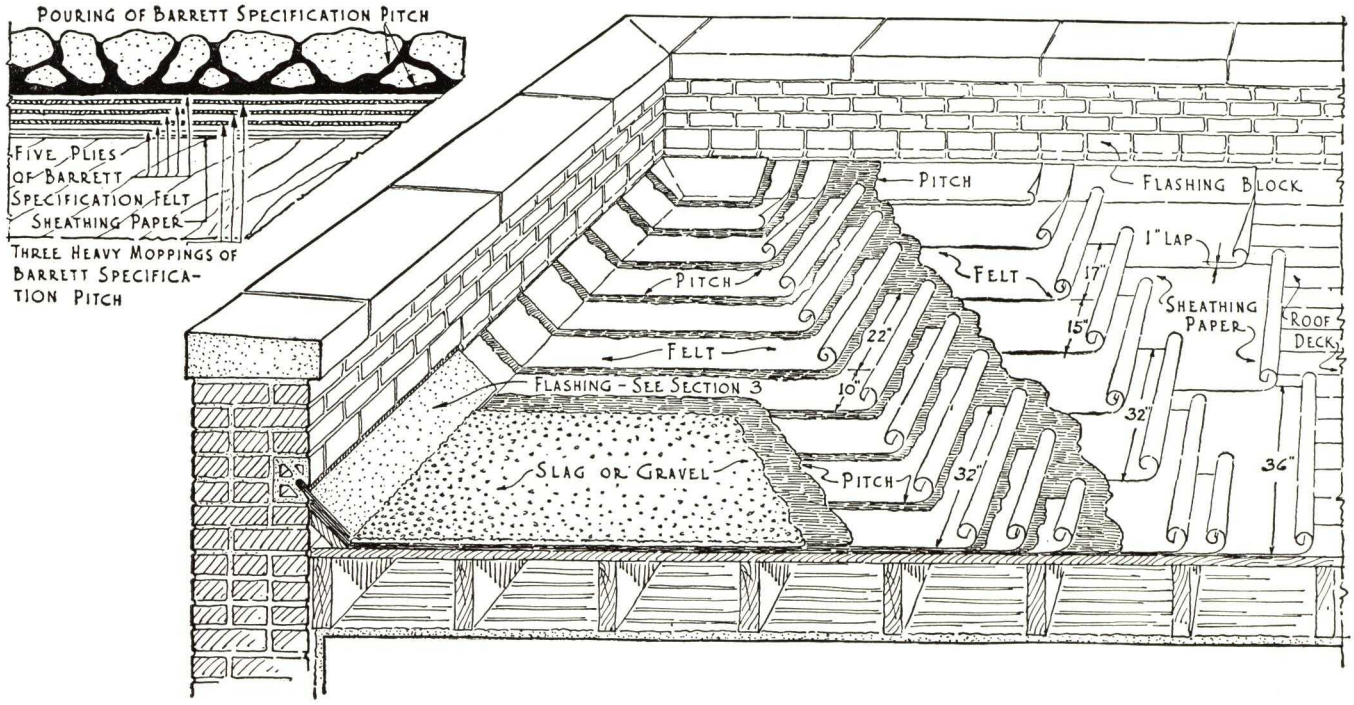
Barrett also manufactures the time-tested Black Diamond Roofing Materials. Black Diamond Pitch and Black Diamond Felt meet the exacting requirements of recognized Government, ASTM and AREA specifications. When applied by Barrett Approved Roofers, in accordance with our requirements and specification procedure contained herein, Barrett Black Diamond Roofs are bonded against repair and maintenance expense for the periods stated.

Specifications

The specifications which follow are based on proper use of materials of recognized quality and quantity. They have been formulated by THE BARRETT COMPANY and cover many particular types of flat roof construction recommended for use under the specific conditions outlined. Specifications for procedure under conditions not contained herein, or where re-roofing operations are involved, will be furnished gladly on request.

Barrett
SINCE 1854

FOR USE OVER—Wood Decks.
INCLINE—Not exceeding 2″ to 1′-0″.
TYPE "AA"—5 Ply Construction.
TYPE "A"—4 Ply Construction.



20 YEAR BOND TYPE "AA" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "AA", laid in accordance with the Barrett Specification (for use over boards), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knot holes, and free from loose material. If roof deck is inclined, it shall be properly graded to outlets.

APPLICATION OF ROOFING—First—Lay one (1) thickness of sheathing paper or unsaturated felt weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one and nail as often as is necessary to hold in place until remaining Felt is laid.

Third—Coat the entire surface uniformly with Barrett Specification Pitch.

Fourth—Over the entire surface lay three (3) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-two (22) inch lap on each sheet so that in no place shall Felt touch Felt. Such nailing as is necessary shall be done along the upper edge of each sheet so that all nails will be covered by not less than two (2) plies of Felt.

Fifth—Over the entire surface pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY's Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Co. of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs of five thousand (5000) square feet or more in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval.

15 YEAR BOND TYPE "A" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "A", laid in accordance with the Barrett Specification (for use over boards), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for fifteen (15) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

Exactly the same as for Type "AA" above, except for the following changes:

APPLICATION OF ROOFING—Fourth—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Specification Pitch the full seventeen (17) inch lap on each sheet so that in no place shall Felt touch Felt. (Balance of paragraph remains the same.)

GENERAL—Change "one hundred and fifty (150)" to "one hundred and twenty-five (125)" pounds of Pitch.

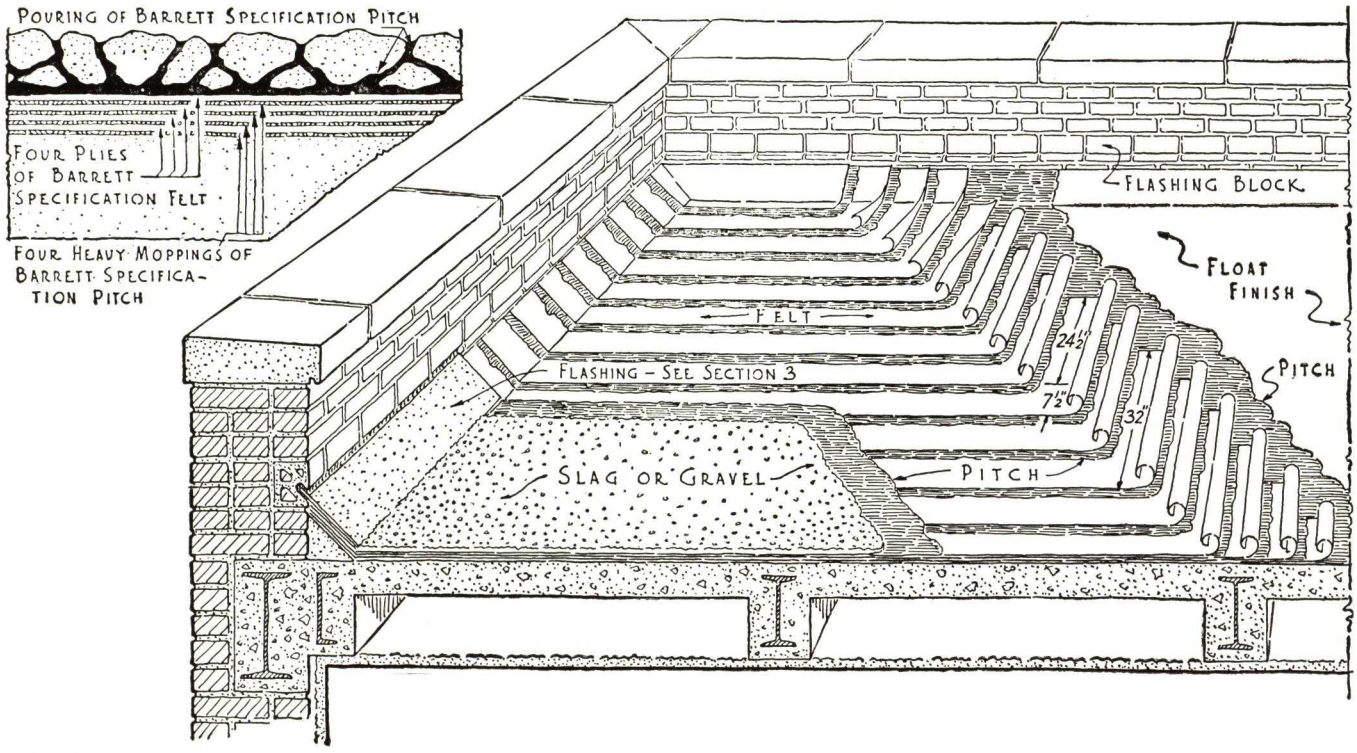
Change "period of twenty (20)" to "period of fifteen (15)" years.

Where Insulation Is Required, See Detail on Page 18.

See Section No. 3 for Specifications and Details on Flashings.

FOR USE OVER—Poured Concrete or Poured Gypsum.
INCLINE—Not exceeding 2″ to 1′-0″.
TYPE "AA"—4 Ply Construction.
TYPE "A"—3 Ply Construction.

Barrett SINCE 1854



20 YEAR BOND TYPE "AA" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "AA," laid in accordance with the Barrett Specification (for use over poured concrete or poured gypsum) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry and free from loose material. If roof deck is inclined, it shall be properly graded to outlets. On inclines exceeding one (1) inch to the foot, roof deck shall permit nailing or wood nailing strips shall be provided.

APPLICATION OF ROOFING—First—Coat the roof deck uniformly with Barrett Specification Pitch.

Second—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-four and one-half (24½) inch lap on each sheet, so that in no place shall Felt touch Felt. Such nailing as is necessary shall be done along upper edge of each sheet so that all nails shall be covered by not less than three (3) plies of Felt.

Third—Over the entire surface pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs of five thousand (5000) square feet or more in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval.

15 YEAR BOND TYPE "A" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "A", laid in accordance with the Barrett Specification (for use over poured concrete or poured gypsum) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for fifteen (15) years from date of completion, in accordance with Note. No. 1 of said specification.

COMPLETE SPECIFICATION

Exactly the same as for Type "AA" above, except for the following changes:

APPLICATION OF ROOFING—Change the first sentence under "Second" to read as follows:

Second—Over the entire surface lay three (3) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-two (22) inch lap on each sheet so that in no place shall Felt touch Felt. (The balance of this paragraph is the same as for Type "AA".)

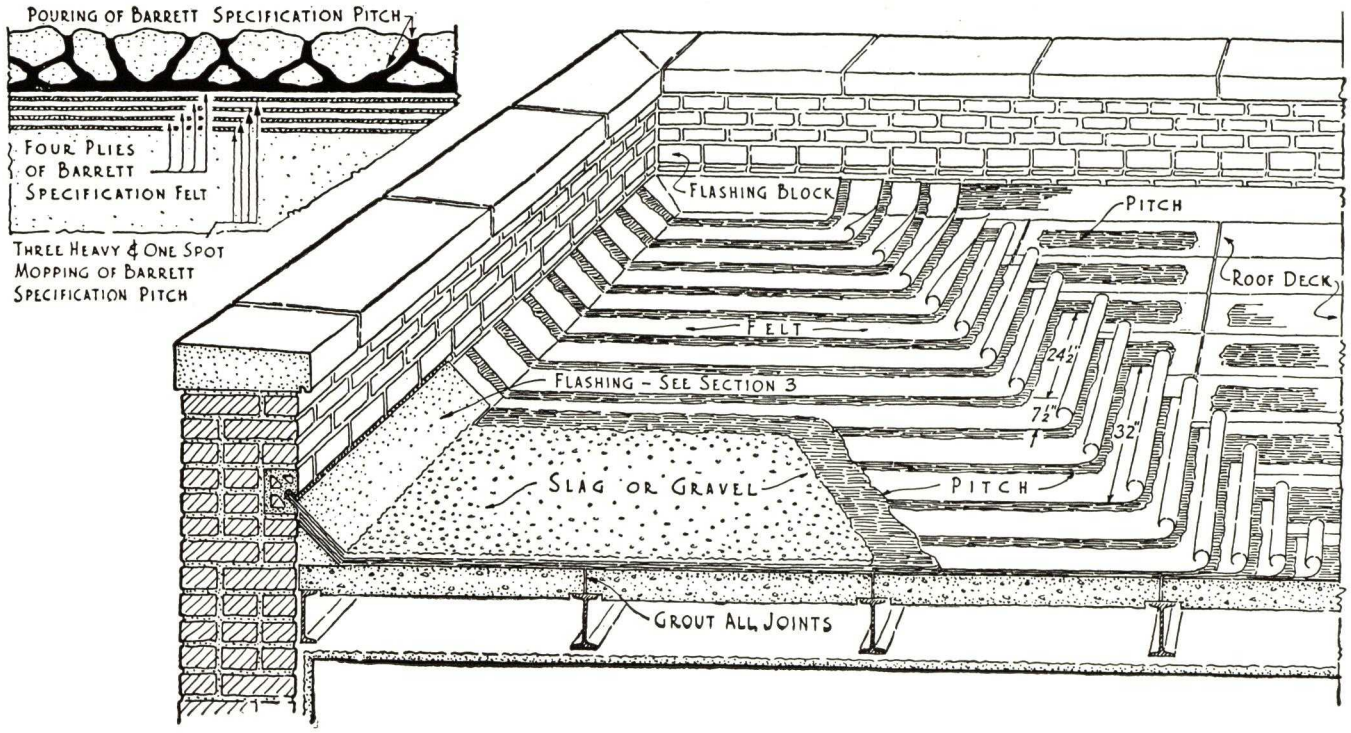
GENERAL—Change "two hundred (200)" to "one hundred and seventy-five (175)" pounds of Pitch.

Change "period of twenty (20)" to "period of fifteen (15)" years.

Where Insulation Is Required, See Detail on Page 18.
See Section No. 3 for Flashing Specifications and Details.

Barrett
SINCE 1854

FOR USE OVER—Precast Concrete Slabs.
INCLINE—Not exceeding 2″ to 1′-0″.
TYPE "AA"—4 Ply Construction.
TYPE "A"—3 Ply Construction.



20 YEAR BOND TYPE "AA" BARRETT SPECIFICATION ROOF

***Note*—Provision shall be made for Nailing Strips set parallel with incline of roof and spaced not more than three (3) feet apart.**

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "AA", laid in accordance with the Barrett Specification (for use over precast concrete slabs), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—All joints between concrete slabs shall be properly grouted.

The roof deck shall be smooth, firm, dry and free from loose material. If roof deck is inclined, it shall be properly graded to outlets.

APPLICATION OF ROOFING—First—Spot or strip mop each slab with Barrett Specification Pitch, care being taken that pitch moppings are held back to within four (4) inches from the edge of each joint.

Second—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches, over preceding one, mopping with Barrett Specification Pitch the full twenty-four and one-half (24½) inch lap on each sheet, so that in no place shall Felt touch Felt.

Third—Over the entire surface pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY's Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note. No. 1.

***Note No. 1*—THE BARRETT COMPANY will give its Guaranty Bond on jobs of five thousand (5000) square feet or more in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval.**

15 YEAR BOND TYPE "A" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "A", laid in accordance with the Barrett Specification (for use over precast concrete slabs), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for fifteen (15) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

Exactly the same as for Type "AA" above, except for the following changes:

APPLICATION OF ROOFING—Change paragraph headed "Second", to read as follows:

Second—Over the entire surface lay three (3) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-two (22) inch lap on each sheet so that in no place shall Felt touch Felt.

GENERAL—Change "two hundred (200)" to "one hundred and seventy-five (175)" pounds of Pitch.

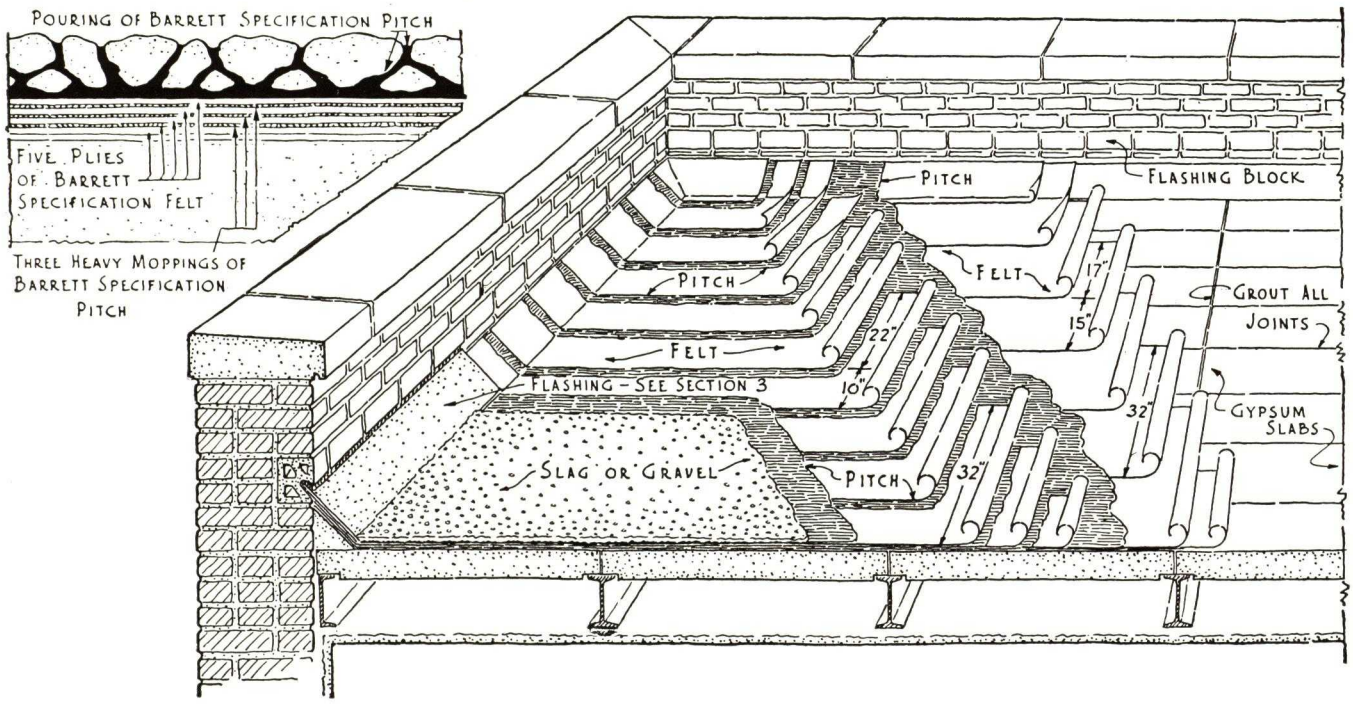
Change "period of twenty (20)" to "period of fifteen (15)" years.

Where Insulation Is Required, See Detail on Page 18.

See Section No. 3 for Flashing Specifications and Details.

FOR USE OVER—Precast Gypsum Slabs.
INCLINE—Not exceeding 2″ to 1′-0″.
TYPE "AA"—5 Ply Construction.
TYPE "A"—4 Ply Construction.

Barrett SINCE 1854



20 YEAR BOND TYPE "AA" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "AA", laid in accordance with the Barrett Specification (for use over precast gypsum slabs), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—All joints between precast gypsum slabs shall be properly grouted.

The roof deck shall be smooth, dry and free from loose material. If roof deck is inclined, it shall be properly graded to outlets.

APPLICATION OF ROOFING—First—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining Felt is laid.

Second—Coat the entire surface uniformly with Barrett Specification Pitch.

Third—Over the entire surface lay three (3) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-two (22) inch lap on each sheet so that in no place shall Felt touch Felt. Each sheet shall be nailed six (6) inches from the upper edge, nails to be spaced not more than two (2) feet apart. Nails shall not exceed seven-eighths (⅞) inch in length and shall be driven through flat tin discs one (1) inch or more in diameter.

Fourth—Over the entire surface pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs of five thousand (5000) square feet or more in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval.

15 YEAR BOND TYPE "A" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "A" laid in accordance with the Barrett Specification (for use over precast gypsum slabs), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for fifteen (15) years from date of completion, in accordance with Note. No. 1 of said specification.

COMPLETE SPECIFICATION

Exactly the same as for Type "AA" above, except for the following changes:

APPLICATION OF ROOFING—Change the first sentence of paragraph headed "Third", to read as follows:

Third—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Specification Pitch the full seventeen (17) inch lap on each sheet so that in no place shall Felt touch Felt. (The balance of this paragraph is the same as for Type "AA").

GENERAL—Change "one hundred and fifty (150)" to "one hundred and twenty-five (125)" pounds of Pitch.

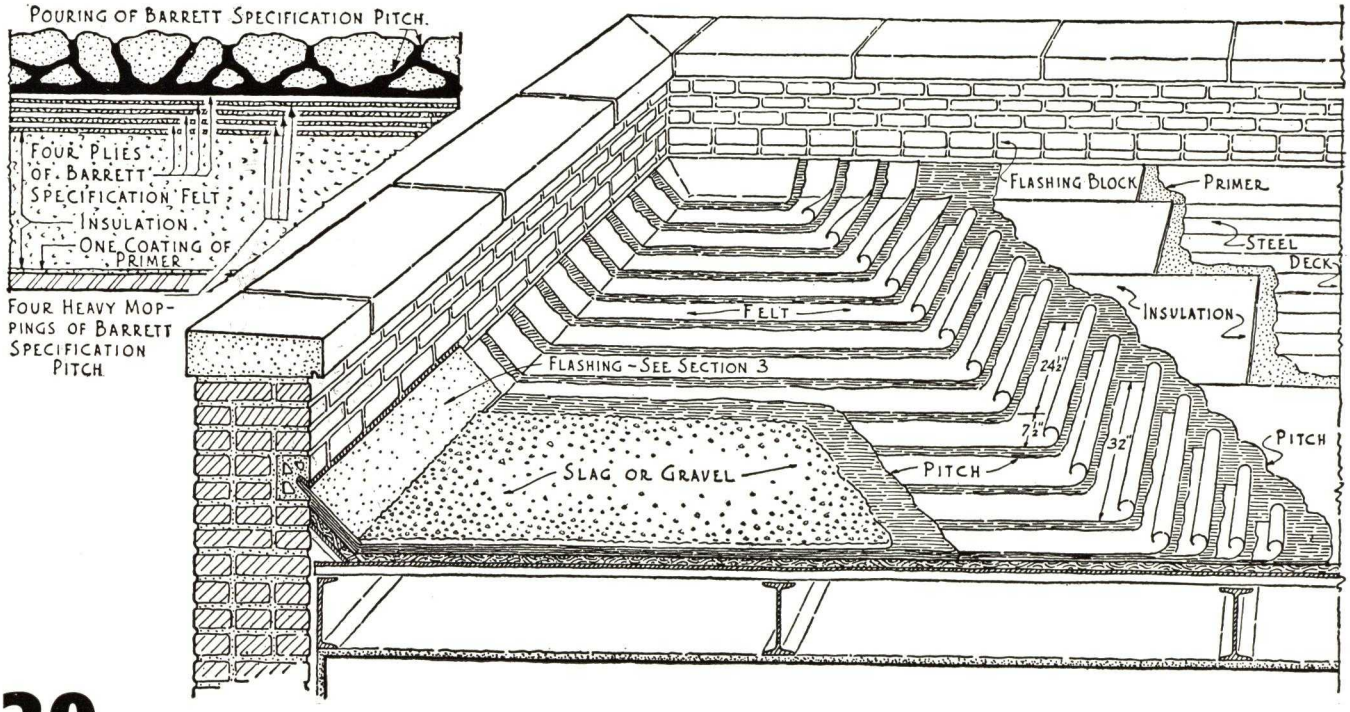
Change "period of twenty (20)" to "period of fifteen (15)" years.

Where Insulation Is Required, See Detail on Page 18.

See Section No. 3 for Flashing Specifications and Details.

Barrett
SINCE 1854

FOR USE OVER—Insulated Steel Decks.
INCLINE—Not exceeding 1″ to 1′-0″.
TYPE "AA"—4 Ply Construction.
TYPE "A"—3 Ply Construction.



20 YEAR BOND TYPE "AA" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "AA", laid in accordance with the Barrett Specification (for use over steel roof decks), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for twenty (20) years from date of completion in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry and free from rust, grease or loose material. The weather surface shall be factory-primed to receive the roof covering. If roof deck is inclined, it shall be properly graded to outlets.

APPLICATION OF ROOFING—First—Over the entire surface spread a uniform coating of Barrett STEEP Roofing Asphalt into which, while hot, embed approved rigid roof insulation as specified. Insulation shall be kept and applied in a dry condition and shall be firm and free from defects or loose materials. Cut-offs consisting of two (2) plies of Barrett Waterproofing Fabric and three (3) moppings of Barrett STEEP Roofing Asphalt shall be applied every twenty (20) feet, during the application of the insulation, and such cut-offs shall extend at least six (6) inches on roof deck and four (4) inches on top of insulation. No more insulation shall be applied than can be immediately covered with roofing. Care shall be taken that all ends are properly flashed so that at no time shall surface or edges of insulation be exposed.

Second—Coat the entire surface of the insulation with Barrett Specification Pitch.

Third—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-four and one-half (24½) inch lap, so that in no place shall Felt touch Felt. Each sheet shall be nailed three (3) inches from upper edge, with soft-nosed nails of sufficient length to extend through the insulation and clinch. Nails to be spaced not more than two (2) feet apart.

Fourth—Over the entire surface pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY's Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs of five thousand (5000) square feet or more in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval.

15 YEAR BOND TYPE "A" BARRETT SPECIFICATION ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification Roof, Type "A", laid in accordance with the Barrett Specification for use over steel roof decks, by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for fifteen (15) years from date of completion in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

Exactly the same as for Type "AA" above, except for the following changes:

APPLICATION OF ROOFING—Change paragraph headed "Third" to read as follows:

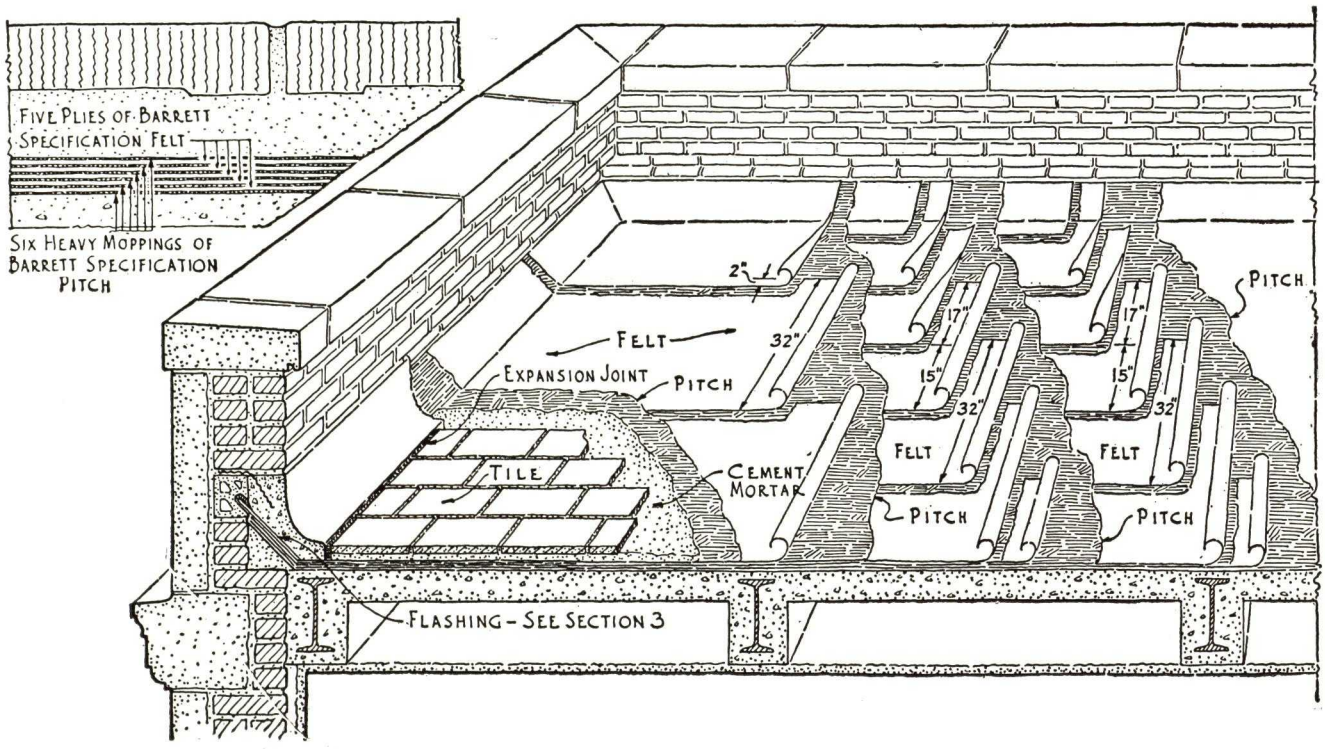
Third—Over the entire surface lay three (3) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-two (22) inch lap, so that in no place shall Felt touch Felt. (Balance of paragraph remains the same.)

GENERAL—Change "two hundred (200)" to "one hundred seventy-five (175)" pounds of Pitch.

Change "period of twenty (20)" to "period of fifteen (15)" years.

FOR USE OVER—Concrete.
INCLINE—Not exceeding 1″ to 1′-0″.
5-PLY CONSTRUCTION.
SURFACING—Promenade Tile.

Barrett SINCE 1854



BARRETT SPECIFICATION 5-PLY ROOF OVER CONCRETE FOR USE UNDER PROMENADE TILE

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification 5-Ply Roof, and shall be laid in accordance with the Barrett Specification (for use under promenade tile), by a roofing contractor approved by THE BARRETT COMPANY, who has had experience in this kind of work, and who can refer to similar installations where his work has proved satisfactory.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry, properly graded to outlets, and free from loose material.

APPLICATION OF ROOFING—First—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Specification Pitch the full seventeen (17) inch lap on each sheet, so that in no place shall Felt touch Felt.

Third—Coat the entire surface uniformly with Barrett Specification Pitch.

Fourth—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Specification Pitch the full seventeen (17) inch lap on each sheet, so that in no place shall Felt touch Felt.

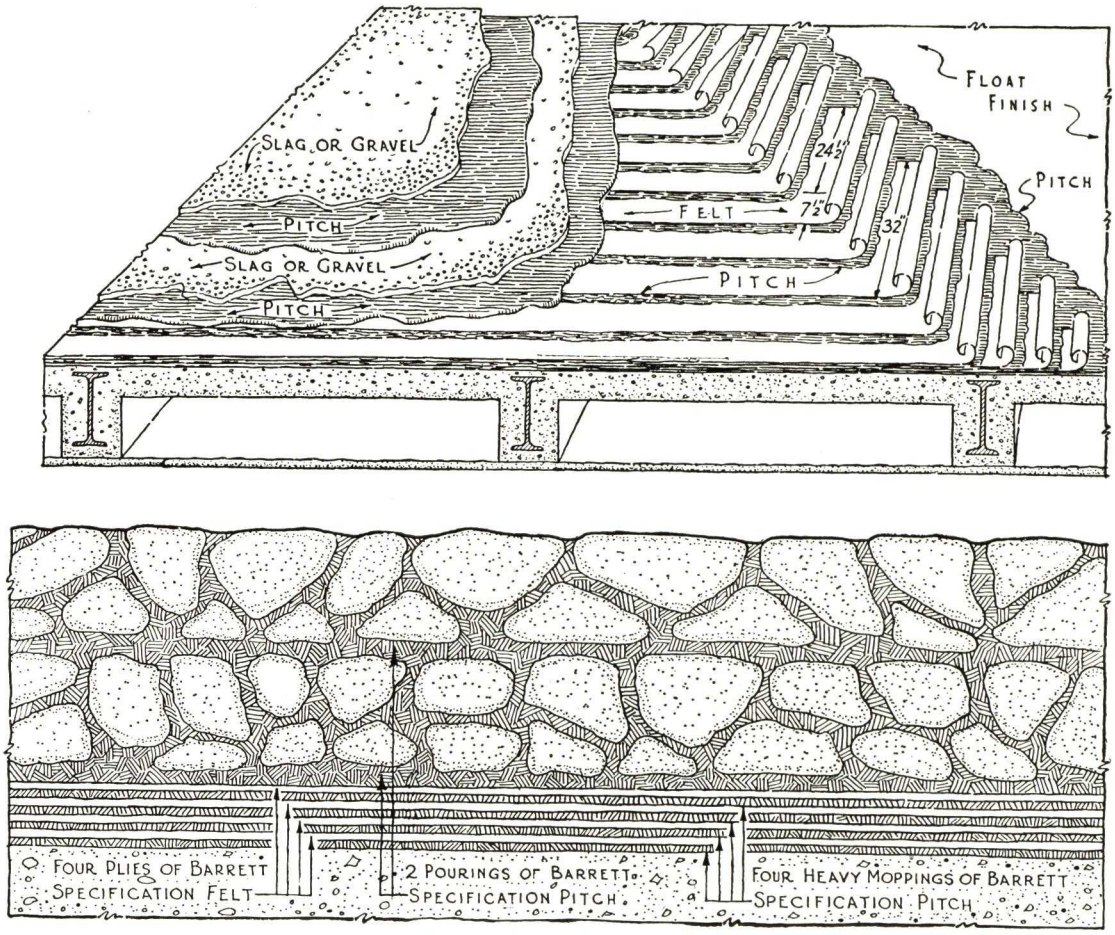
Fifth—Immediately preceding the laying of the tile, thoroughly clean the surface of the roof and mop same with Barrett Specification Pitch, into which, while hot, embed one (1) layer of Specification Felt, lapping each sheet two (2) inches over preceding one. Over this surface and immediately preceding the laying of the tile spread a heavy uniform coating of Barrett Specification Pitch. No more of the roof surface shall be covered with the final or last ply of Felt and mopping of Pitch than is covered at the same time with tile and is necessary to allow for proper connections.

Over the Felt and Pitch roofing thus laid, 1 x 6 x 9-inch vitrified clay tile (approved by the architect) shall be set in not less than three-fourths (¾) inch of Portland Cement Mortar (1 to 3 mix) and joints grouted full with Portland Cement Mortar (1 to 2 mix). The tile shall be laid to show three-sixteenths (3/16) inch to one-fourth (¼) inch joints. Expansion joints three-fourths (¾) inch wide filled with a plastic mixture (approved by the architect) shall be provided between the tile and all flashings, and either metal or mastic expansion joints shall be provided throughout the roof surface as may be necessary to take care of expansion. All expansion joints shall extend from the top of the tile through the cement mortar to the Felt and Pitch waterproofing and in no case shall expansion joints be spaced more than twenty (20) feet apart.

GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit. The roofing contract shall be awarded to a roofing contractor approved by THE BARRETT COMPANY, who has had experience in this kind of work, and who can refer to similar installations where his work has proved satisfactory.

See Section No. 3 for Specifications and Flashing Details.

FOR USE OVER—Poured Concrete.
INCLINE—Not exceeding 1/2″ to 1′-0″.
4-PLY CONSTRUCTION—DOUBLE SURFACING.



FULL SIZE SECTION

BARRETT SPECIFICATION ROOF FOR UTILITY OR SPRAY POND SERVICE

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Specification 4-Ply Roof, laid in accordance with the Barrett Specification (for use over concrete—double surfacing for utility or spray pond service), by a roofing contractor approved by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry, properly graded to outlets, and free from loose material.

APPLICATION OF ROOFING—First—Coat the concrete uniformly with Barrett Specification Pitch.

Second—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-four and one-half (24½) inch lap on each sheet, so that in no place shall Felt touch Felt. Only such nailing as is necessary shall be done along upper edge of each sheet so that all nails shall be covered by not less than three (3) plies of Felt.

Third—Immediately preceding the application of surfacing material, thoroughly clean the surface of the roofing, after which over the entire surface, pour from a dipper a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel, or three hundred (300) pounds of slag for each one hundred (100) square feet.

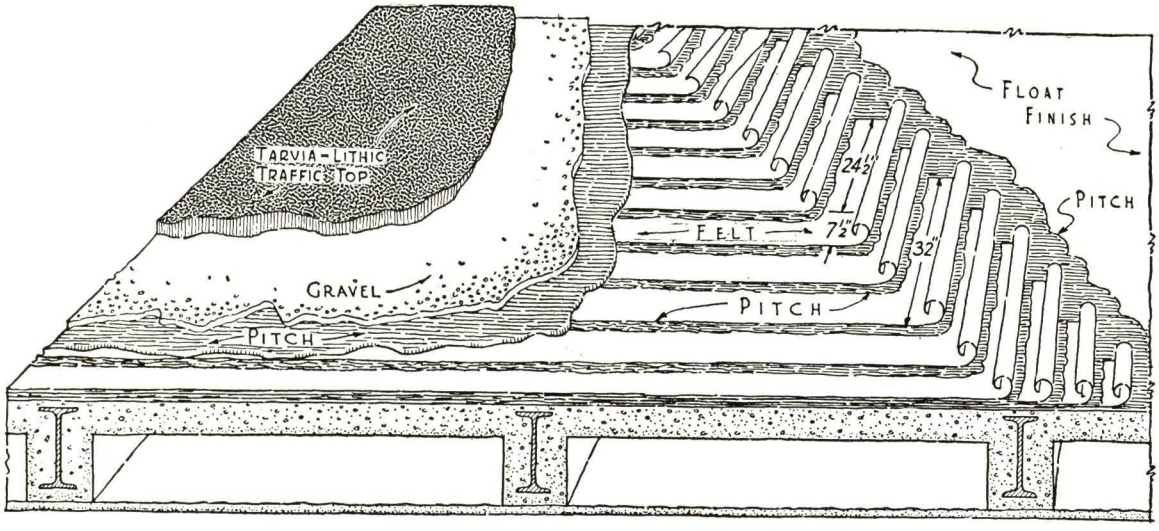
Fourth—Remove all loose or excess gravel or slag by lightly sweeping all surfaces and immediately follow with hot pouring of Barrett Specification Pitch, applied to all surfaces, into which, while hot, embed not less than three hundred (300) pounds of gravel, or two hundred (200) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt. All gravel or slag shall be firmly embedded in Pitch so that no loose particles appear in finished job. The finished surface may be lightly rolled if necessary.

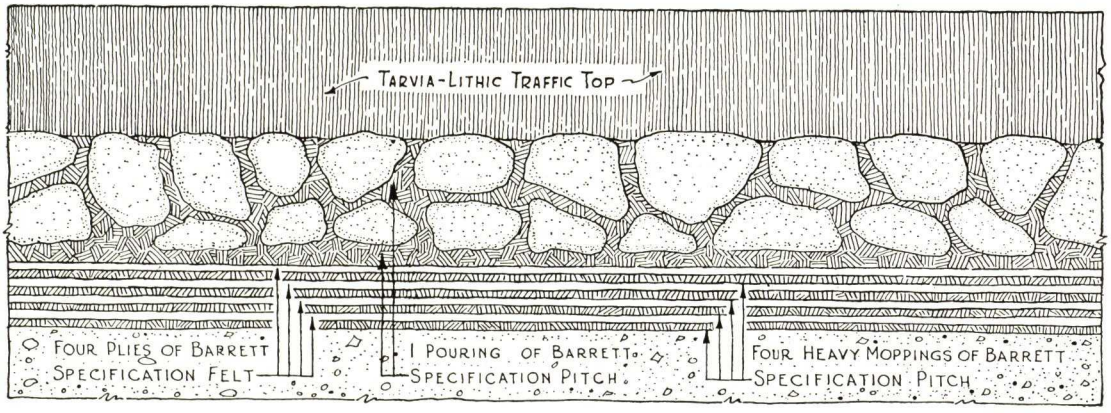
GENERAL—The Felt shall be laid without wrinkles or buckles. Not less than three hundred (300) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

The roofing contract shall be awarded to a roofing contractor, approved by THE BARRETT COMPANY, who has had experience in this kind of work, and can refer to similar installations where his work has proved satisfactory.

FOR USE OVER—Poured Concrete.
INCLINE—Not exceeding 1/2″ to 1′-0″.
SURFACING—Bituminous Traffic Top.

Barrett SINCE 1854





BITUMINOUS TRAFFIC TOP OVER ROOFING MEMBRANE

SPECIFICATION

The structural deck shall be smooth, firm, dry and free from dirt or loose material and shall be properly graded to outlets.

MEMBRANE—First—Coat the concrete uniformly with Barrett Specification Pitch.

Second—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Barrett Specification Pitch the full twenty-four and one-half (24½) inch lap on each sheet, so that in no place shall Felt touch Felt. Only such nailing as is necessary shall be done along upper edge of each sheet so that all nails shall be covered by not less than three (3) plies of Felt.

Third—Over the entire surface apply a uniform coating of Barrett Specification Pitch, into which, while hot, embed not less than three hundred (300) pounds nor more than four hundred (400) pounds of gravel per one hundred (100) square feet of surface. The gravel shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

TRAFFIC TOP—First—Over the surface of the membrane apply Tarvia-lithic Traffic Top Mix uniformly and sufficiently to compact evenly to a thickness of one (1) inch under rolling. The Tarvia-lithic Mix shall be placed on metal plates and shoveled into position rather than dumped directly on to the membrane. Metal strips one and one-half (1½) inch high shall be used to secure proper loose thickness and shall be placed on ten (10) foot centers throughout the area to be surfaced. These strips shall be coated with a thin solution of lubricating oil to prevent sticking of the mixture during application.

The traffic top shall be rolled compact and even until the mixture does not creep under the roller. The rolling shall follow immediately after spreading of the mix over the membrane. After final rolling apply cement dust uniformly over the surface of the traffic top and broom into the surface with bristle brush.

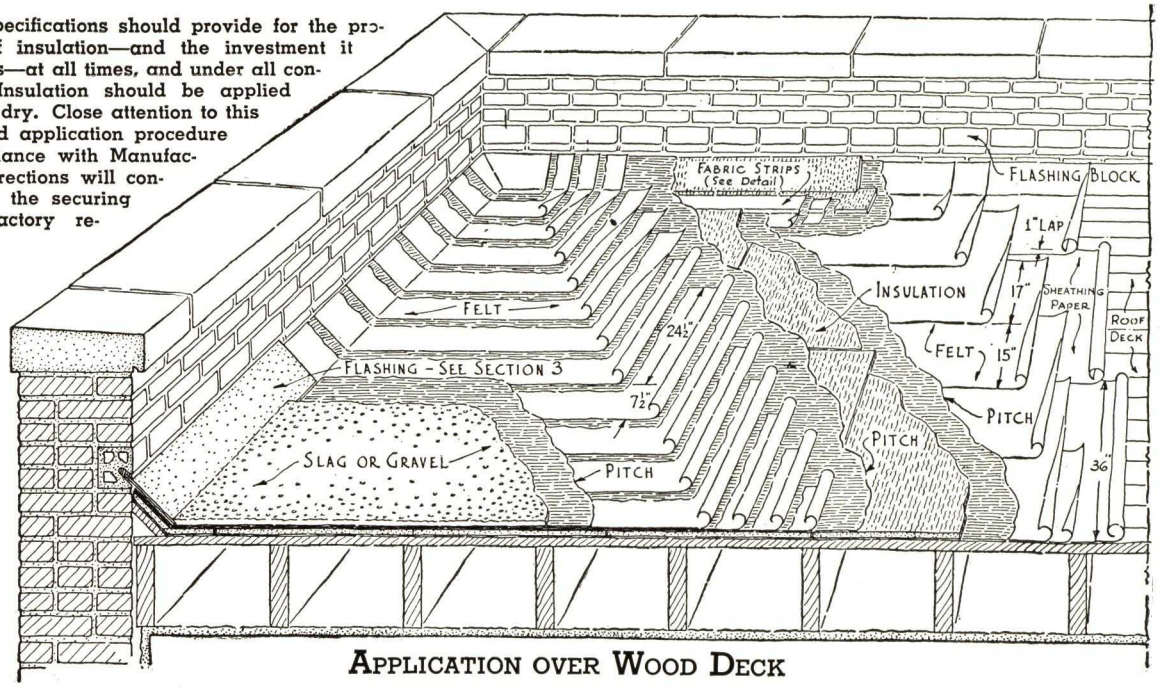
Notes—No. 1—Where outlets are provided, they shall be properly placed so as to be level with traffic top course after rolling and shall be suitably flanged and screened.

No. 2—Flashing shall be installed as required and shall be properly connected to membrane before application of the traffic top.

GENERAL—The work described above shall be applied by a contractor approved by THE BARRETT COMPANY, who has had experience on successfully applying this type of membrane and traffic top surfacing and who can refer to work of a similar nature which has been executed in a satisfactory manner.

ROOF INSULATION DETAILS. FOR USE—Where Barrett Specification Roofs Are Installed Over Rigid Roof Insulation.

NOTE: Specifications should provide for the protection of insulation—and the investment it represents—at all times, and under all conditions. Insulation should be applied and kept dry. Close attention to this detail and application procedure in accordance with Manufacturers' directions will contribute to the securing of satisfactory results.



APPLICATION OVER WOOD DECK

DETAILS OF APPLICATION AND WATERPROOFING OF INSULATION OVER VARIOUS TYPES OF ROOF DECKS

ON WOOD ROOF DECKS—On wood roof decks, the installation of a waterproofing course, over which the insulation is applied, provides protection against moisture or deterioration from below. The waterproofing course should be of 2-ply construction; i. e., one layer of Rosin-sized sheathing and 2 plies of tarred felt, each sheet lapped 17 inches over preceding one, and nailed along lower edge sufficiently to hold in place. All nails should be driven through flat tin discs and should not extend to under side of deck. The entire surface of the waterproofing course should then be coated with a uniform mopping of pitch into which, while hot, the insulation is laid.

OVER PRECAST SLABS—Over precast slabs, Rosin-sized sheathing may be omitted.

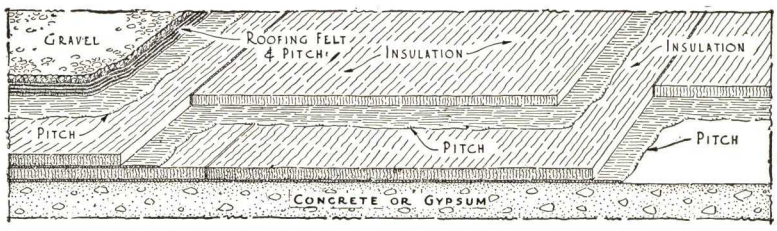
ON MONOLITHIC CONCRETE OR GYPSUM DECKS—On monolithic concrete or gypsum decks, the waterproofing course, consisting of two layers of tarred felt, is applied directly and fully to the roof deck. The felts should be stuck solidly to the deck, and together, with a uniform coating of hot pitch and the installation laid in a hot mopping of pitch applied to the surface of the two-ply membrane. The roof deck in all cases shall be smooth, firm, free from loose materials, and shall be **dry.**

OVER INSULATION—Over insulation, and where base-protection course is provided, all roofing shall be solid-mopped as specified. Water cut-offs, consisting of 2 plies of Barrett Waterproofing Fabric and alternating moppings of pitch shall be installed at all edges of insulation adjoining parapet walls, curbs, or other vertical surfaces. Supplementary and continuous cut-offs of similar construction shall be installed approximately every 20 feet in each direction during application of insulation.

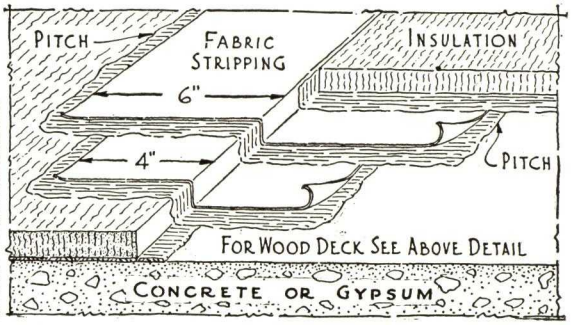
Note No. 1—Where multiple layers of insulation are installed, each succeeding layer shall break joints with underlying layer and shall be set in mopping of pitch.

Note No. 2—Insulation shall be immediately covered with roofing and edges shall be stripped and sealed after each day's work.

Where the above protection is provided, the specification for application of the roofing over insulation shall be in accordance with Type "AA" or Type "A" specification for use over poured concrete (page 11).



APPLICATION DETAIL FOR MULTIPLE LAYERS OF INSULATION



APPLICATION DETAIL FOR ONE LAYER OF INSULATION. METHOD OF INSTALLING WATER CUT-OFF

SECTION 2

STEEP ROOFS

INCLINES NOT TO EXCEED 6 INS. TO 1 FT.

BARRETT SPECIAL STEEP ROOFS

Steep Roof Classification

Roofs having inclines in excess of two inches in one foot are generally classified as steep roofs.

Such roofs are not ordinarily required to hold rain water, slush, ice and snow for protracted periods. They are, however, subjected to longer periods of exposure to the harmful actinic rays of the sun, and should be constructed so as to provide complete protection under all prevailing conditions.

Roof Construction

Great care in construction and exacting inspection are desirable in steep roof work. The use of the proper materials and the proper application thereof are of paramount importance. Materials used in the construction of Barrett Built-Up Roofs for steep surfaces are particularly suited to the requirements involved. Applied, they form a continuous waterproofing membrane which will not slide or rupture under normal deck stress or strain.

Under no circumstances should membrane coverings be left unprotected or exposed to the weather. For this reason, consistent with Barrett's policy of providing the most durable weathering surface, Barrett's steep roof construction is protected by crushed slag or gravel, or by mineralized aggregate obtainable in a variety of colors.

Application

Barrett's approved roofing organization is skilled in the application of steep roof construction, and can be relied upon to handle this type of work with the same degree of efficiency as is obtained on all Barrett Specification work.

The specifications in this section are recommended for use under the specific conditions as outlined.

BARRETT STEEP ROOF PITCH

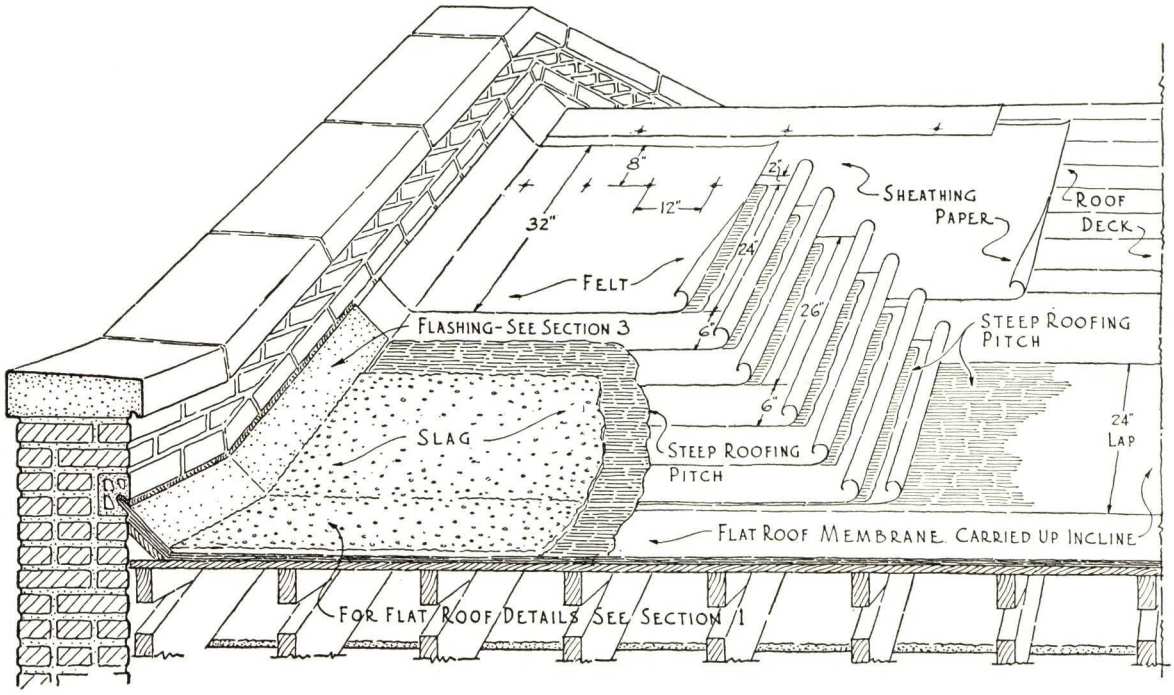
A Revolutionary, New Building Product

Barrett Steep Roof Pitch combines with **unusual stability** all the unmatched **waterproofing** and **weatherproofing** characteristics of coal tar pitch. The development of this revolutionary, new building product makes coal tar pitch, felt and gravel roofs possible on many types of buildings formerly denied this superior type of roof construction.

Practical installation experience under extreme conditions has demonstrated that Barrett Steep Roof Pitch does not slide or "bleed" at the highest temperatures to which roofs are subjected and does not crack or lose bond during extreme cold.

Roofs constructed of Barrett Steep Roof Pitch and Barrett Specification Felt with a fire-safe gravel or slag wearing surface, applied according to Barrett Specifications by Barrett Approved Roofers, are bonded by the United States Fidelity and Guaranty Company against repair and maintenance expense for 20 years.

FOR USE OVER—Wood Decks.
INCLINE—Over 2″ and not exceeding 6″ to 1′-0″.
Bonded for 20 Years—5 Ply Construction.



20 YEAR BOND BARRETT SPECIAL STEEP ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, and shall be laid in accordance with the Barrett Specification (for use over boards on steep surfaces), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and shall be firm, and free from loose material.

APPLICATION OF ROOFING—First—Lay one (1) thickness of sheathing paper or unsaturated felt weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheet at least one (1) inch. The sheathing paper shall be nailed sufficiently to hold it in place during application of the roofing.

Second—Over the entire surface lay five (5) plies of Barrett Specification Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding one. Each sheet shall be nailed with one (1) inch barbed roofing nails through flat tin discs, eight (8) inches from the upper edge and nails shall be spaced not more than one (1) foot apart.

Third—Mop back on each sheet for a distance of twenty-four (24) inches with Barrett Steep Roofing Pitch. The Felt shall follow and shall be firmly embedded into the hot moppings as applied. Care shall be taken that the Pitch moppings are even with lower edge of each overlying sheet, and that the finished Felt surface is free and clean of Pitch drippage.

Fourth—Over the entire surface, spread with a mop a uniform coating of Barrett Steep Roofing Pitch into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of finished roofing. The slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, shall be dry and free from dirt, and shall be embedded into the surface mopping immediately. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be continuous and shall cover and shall be firmly embedded into the surface coating.

GENERAL—Felt shall be laid without wrinkles or buckles. Not less than eighty (80) pounds of Pitch shall be used for constructing the membrane, and not less than fifty (50) pounds nor more than sixty (60) pounds of Pitch shall be used for embedding the slag in constructing each one hundred (100) square feet of completed roof. The Pitch shall not be heated above four hundred (400) degrees Fahrenheit nor shall it be applied to the roof below three hundred fifty (350) degrees Fahrenheit.

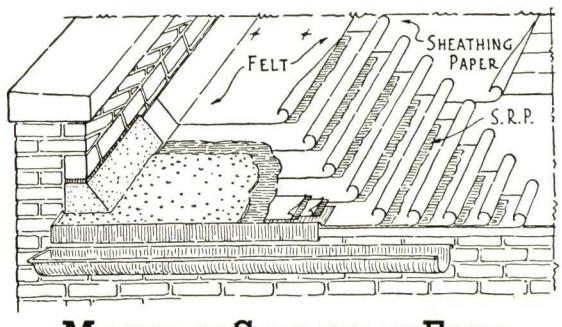
Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the inclined surfaces, not less than twenty-four (24) inches before the application of the Steep Roofing.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will issue its Guaranty Bond on jobs in the United States and Canada, where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification, and subject to Barrett inspection and approval under the following conditions:

(a) That the steep roof area shall be roofed in conjunction with the flat roof area.

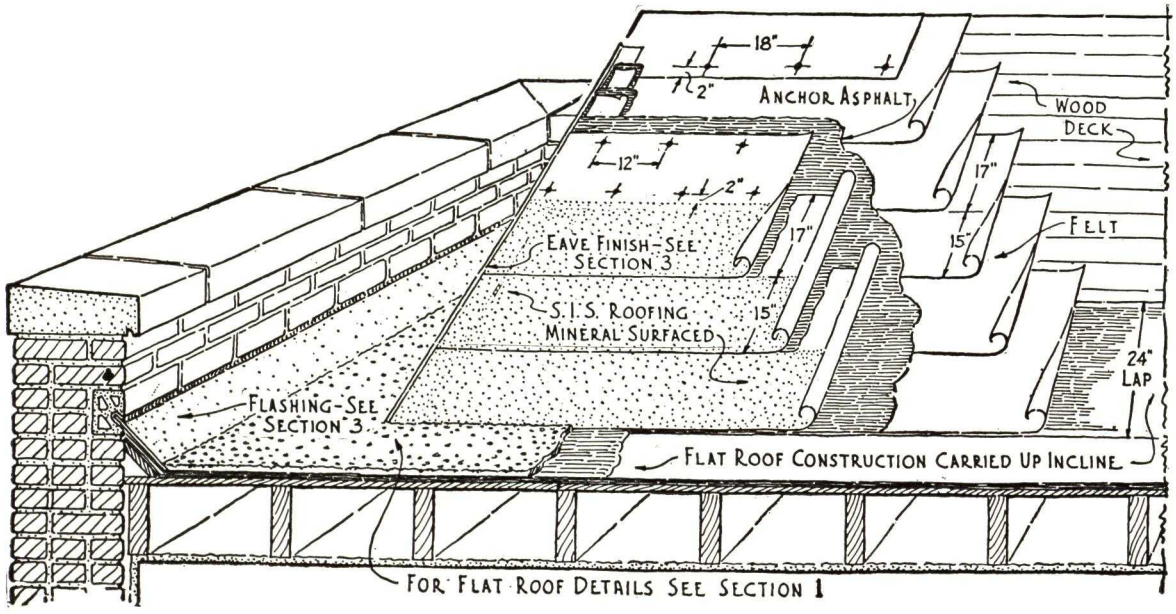
(b) That the flat roof area shall be covered with a Barrett Specification, Type "AA" or Type "A" roof.



METHOD OF STARTING AT EAVES

FOR USE OVER—Wood Decks.
INCLINE—Exceeding 4" to 1'-0".
TYPE S.I.S.—Bonded for 10 Years.

Barrett
SINCE 1854



10 YEAR BOND BARRETT SPECIAL STEEP ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, Type S. I. S., and shall be laid in accordance with the Barrett Specification (for use over boards on steep surfaces), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for ten (10) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knot holes, and free from loose material.

APPLICATION OF ROOFING—First—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt at right angles to the incline of the roof, lapping each sheet seventeen (17) inches over preceding one. Each sheet shall be nailed two (2) inches from the lower edge with barbed roofing nails, through flat tin discs, spacing the nails not more than eighteen (18) inches apart.

Second—Over the entire surface spread with a mop a uniform coating of Barrett Anchor Brand Roofing Asphalt, into which, while hot, shall be immediately rolled Barrett S. I. S. Roofing laid at right angles to the incline of the roof, lapping the sheets the full width of the seventeen (17) inch selvage. All sheets of Barrett S. I. S. Roofing shall be securely fastened in place with a double course of one (1) inch barbed roofing nails driven through flat tin discs, and placed along the selvage side of the sheet. Nailing courses to be staggered and nails to be spaced not more than twelve (12) inches or S. I. S. cement, into which shall be immediately rolled the following sheet of Barrett S. I. S. Roofing.

Third—Spread over the entire surface of the seventeen (17) inch selvage a uniform mopping of Barrett Anchor Brand Roofing Asphalt or S. I. S. cement into which shall be immediately rolled the following sheet of Barrett S. I. S. Roofing.

Fourth—All end laps shall be over-lapped at least six (6) inches. The underlying sheet of each end lap shall be nailed with six (6) nails through flat tin discs spaced five (5) inches apart starting one (1) inch from the lower edge of the sheet. The six (6) inch lap shall be coated with Barrett Anchor Brand Roofing Asphalt or S. I. S. cement and the overlapping sheet thoroughly pressed down.

Fifth—The Barrett S. I. S. Roofing shall be cut in strips not to exceed twenty (20) feet in length and shall be stacked flat in piles at least twenty-four (24) hours before using.

GENERAL—The Felt and S. I. S. Roofing shall be laid without wrinkles or buckles. Not less than thirty (30) pounds of Anchor Asphalt per mopping or two (2) gallons of S. I. S. cement shall be used per one hundred (100) square feet of completed roofing.

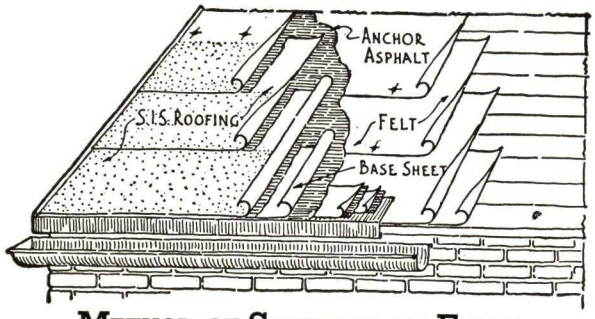
Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the inclined surfaces not less than twenty-four (24) inches before the application of the steep roofing.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of ten (10) years from date of completion in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification and subject to Barrett inspection and approval under the following conditions:

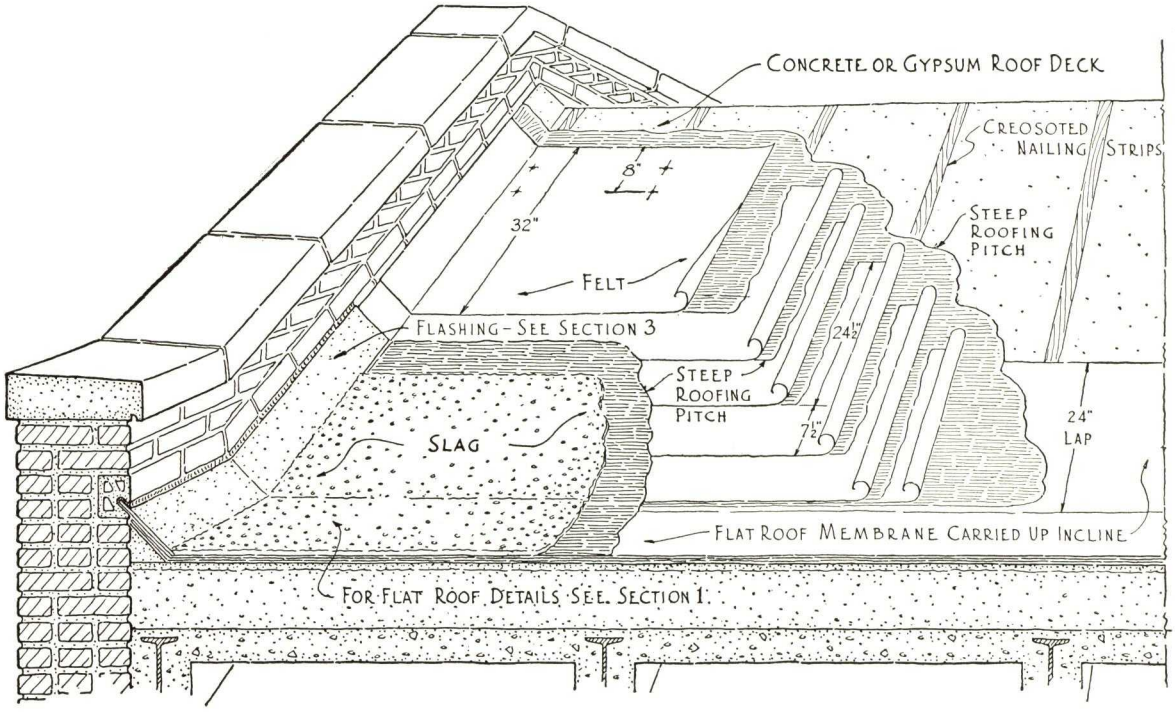
(a) That the steep roof area shall be roofed in conjunction with the flat roof area.

(b) That the flat roof area shall be covered with a Barrett Specification Type "A" or Type "AA" roof.



METHOD OF STARTING AT EAVES

FOR USE OVER—Poured Concrete or Poured Gypsum.
INCLINE—Over 2″ and not exceeding 6″ to 1′-0″.
Bonded for 20 Years—4 Ply Construction.



20 YEAR BOND BARRETT SPECIAL STEEP ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, and shall be laid in accordance with the Barrett Specification, for use over poured concrete or gypsum on steep surfaces by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry and free from loose material. The concrete or gypsum shall permit of nailing, or creosoted wooden nailing strips shall be provided. Where nailing strips are provided, they shall be laid parallel with the incline of the roof and shall be spaced not more than three (3) feet apart.

APPLICATION OF ROOFING—First—Coat the roof deck uniformly with Barrett Steep Roofing Pitch.

Second—Over the entire surface lay four (4) plies of Barrett Specification Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-four and one-half (24½) inches over preceding one. Each sheet shall be nailed with one (1) inch barbed roofing nails through flat tin discs, eight (8) inches from the upper edge, and nails shall be spaced not more than one (1) foot apart. Where nailing strips are used, the Felt shall be nailed with two (2) nails through flat tin discs (at each nailing strip) placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

Third—Mop back on each sheet the full distance of the twenty-four and one-half (24½) inch lap with Barrett Steep Roofing Pitch. The Felt shall follow and shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet and that the finished Felt surface is clean and free from Pitch drippage.

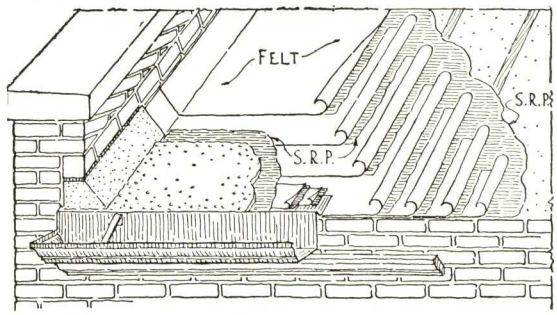
Fourth—Over the entire surface spread with a mop a uniform coating of Barrett Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of finished roofing. The slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, shall be dry and free from dirt, and shall be embedded into the surface mopping immediately. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be continuous, and shall cover and shall be firmly embedded in the surface coating.

GENERAL—Felt shall be laid without wrinkles or buckles. Not less than one hundred (100) pounds of Pitch shall be used for constructing the membrane and not less than fifty (50) pounds nor more than sixty (60) pounds of Pitch shall be used for embedding the slag in constructing each one hundred (100) square feet of completed roof. The Pitch shall not be heated above four hundred (400) degrees Fahrenheit and shall not be applied to the roof below three hundred and fifty (350) degrees Fahrenheit.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the incined surfaces not less than twenty-four (24) inches before the application of the Steep Roofing.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion in accordance with Note No. 1.

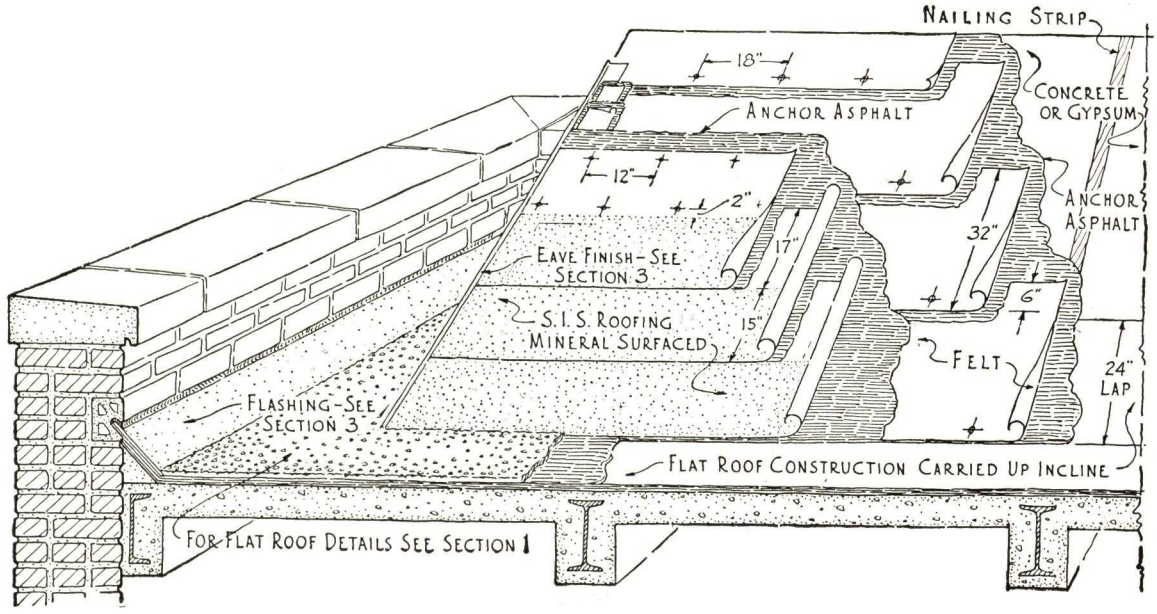
Note No. 1—THE BARRETT COMPANY will issue its Guaranty Bond on jobs in the United States and Canada, where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification, and subject to Barrett inspection and approval under the following conditions:
(a) That the steep roof area be roofed in conjunction with flat roof area.
(b) That the flat roof area shall be covered with a Barrett Specification Type "AA" or Type "A" roof.



METHOD OF STARTING AT EAVES

FOR USE OVER—Poured Concrete or Poured Gypsum.
INCLINE—Exceeding 4" to 1'-0".
TYPE S.I.S.—Bonded for 10 Years.

Barrett SINCE 1854



10 YEAR BOND BARRETT SPECIAL STEEP ROOF

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, Type S. I. S., laid in accordance with the Barrett Specification (for use over poured concrete or gypsum) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for ten (10) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—The roof deck shall be smooth, firm, dry and free from loose material. The concrete or gypsum shall permit of nailing, or creosoted wooden nailing strips shall be provided. If nailing strips are provided, they shall be laid parallel with the incline of the roof and shall be spaced not more than three (3) feet apart.

APPLICATION OF ROOFING—First—The surface of the roof deck shall be given a priming coat of Barrett Crystal Asphalt Primer. The priming coat shall be allowed to dry for not less than six (6) hours before the application of the roofing.

Second—Over the roof deck spread with a mop a uniform coating of Barrett Anchor Brand Roofing Asphalt, into which, while hot, shall be immediately embedded one (1) ply of Barrett Specification Tarred Felt, laid at right angles to the incline of the roof, lapping each sheet six (6) inches over preceding one. The six (6) inch overlap shall be thoroughly cemented together with Barrett Anchor Brand Roofing Asphalt. The Felt shall be nailed two (2) inches from the lower edge of each sheet, with barbed roofing nails through flat tin discs, spaced not more than eighteen (18) inches apart.

Third—Over the entire surface spread a uniform, mopped coating of Barrett Anchor Brand Roofing Asphalt, into which, while hot, shall be immediately rolled Barrett S. I. S. Roofing laid at right angles to incline of roof, lapping the sheets the full width of the seventeen (17) inch selvage. All sheets of S. I. S. Roofing shall be securely fastened in place with a double course of one (1) inch barbed roofing nails driven through flat tin discs, and placed along the selvage side of sheet. Nailing courses to be staggered and nails spaced not more than twelve (12) inches apart. Lower nailing course shall be held back two (2) inches from the mineral surfacing.

Fourth—Spread over the entire surface of the seventeen (17) inch selvage, a uniform mopping of Barrett Anchor Brand Roofing Asphalt or S. I. S. cement into which shall be immediately rolled the following sheet of S. I. S. Roofing.

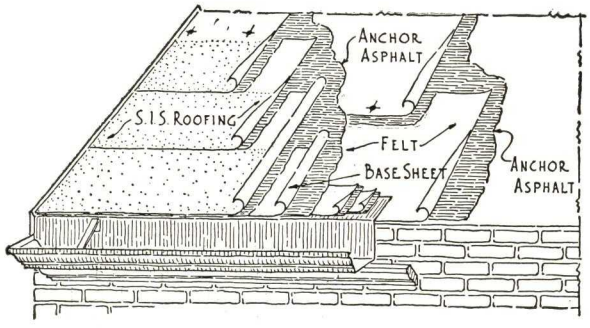
Fifth—All end laps shall be over-lapped at least six (6) inches. The underlying sheet of each end lap shall be nailed along end of sheet with six (6) nails through flat tin discs spaced evenly. The six (6) inch lap shall be coated with Barrett Anchor Brand Roofing Asphalt or S. I. S. cement and the overlapping sheet thoroughly pressed down.

Sixth—S. I. S. Roofing shall be cut in strips not to exceed twenty (20) feet in length and shall be stacked flat in piles at least twenty-four (24) hours before using.

GENERAL—The Felt and S. I. S. Roofing shall be laid without wrinkles or buckles. Not less than thirty (30) pounds of Anchor Asphalt per mopping or two (2) gallons of S. I. S. cement shall be used per one hundred (100) square feet of completed roofing. Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the inclined surfaces not less than twenty-four (24) inches before the application of the steep roofing.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company of Baltimore, covering a period of ten (10) years from date of completion.

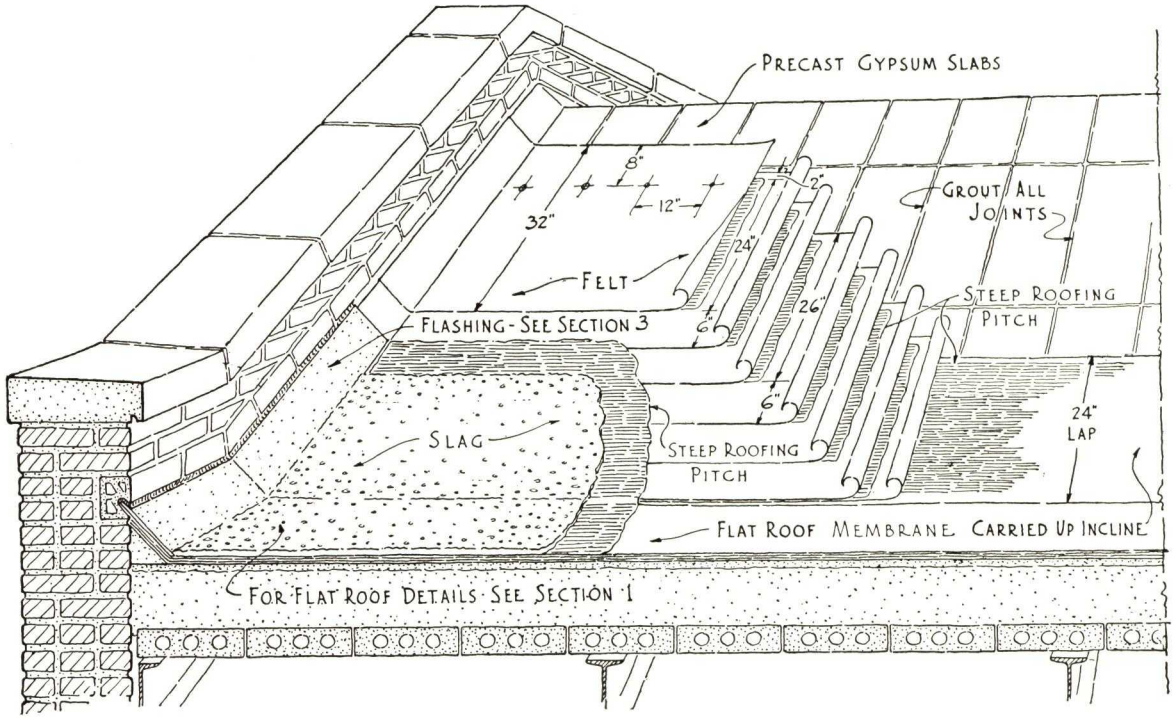
Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification, and subject to Barrett inspection and approval under the following conditions:
(a) That the steep roof area shall be roofed in conjunction with the flat roof area.
(b) That the flat roof area shall be covered with a Barrett Specification, Type "A" or Type "AA" roof.



METHOD OF STARTING AT EAVES

Barrett
SINCE 1854

FOR USE OVER—Precast Concrete and Precast Gypsum Slabs.
INCLINE—Over 2″ and not exceeding 6″ to 1′-0″.
Bonded for 20 Years—5 Ply Construction.



20 YEAR BOND BARRETT SPECIAL STEEP ROOF

For Precast Concrete Slab Decks, provision shall be made for Nailing Strips set parallel with incline of roof and spaced not more than three (3) feet apart.

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, and shall be laid in accordance with the Barrett Specification for use over precast gypsum or concrete slabs over steep surfaces, by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty (20) years from date of completion, in accordance with Note No. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—All joints between precast gypsum or concrete slabs shall be fully grouted. The roof deck shall be smooth, firm, dry and free from loose material.

APPLICATION OF ROOFING—First—Over the entire surface lay five (5) plies of Barrett Specification Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding one. Each sheet shall be nailed with one and one-half (1½) inch barbed roofing nails, through flat tin discs, eight (8) inches from the upper edge, nails to be spaced not more than one (1) foot apart.

Second—Mop back on each sheet for a distance of twenty-four (24) inches with Barrett Steep Roofing Pitch. The Felt shall follow and shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet, and that the finished Felt surface shall be free of drippage.

Third—Over the entire surface spread with a mop a uniform coating of Barrett Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of finished roofing. The slag shall be from one quarter (¼) to five-eighths (⅝) inch in size, shall be dry and free from dirt, and shall be embedded into the surface mopping immediately. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be continuous, and shall cover and shall be firmly embedded into the surface coating.

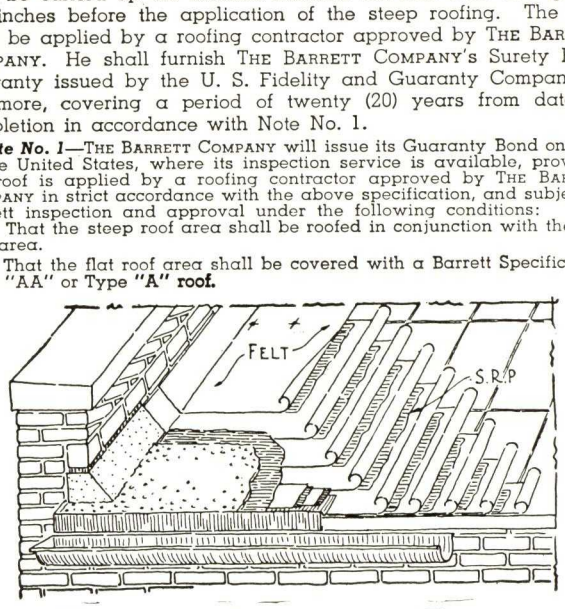
GENERAL—Felt shall be laid without wrinkles or buckles. Not less than eighty (80) pounds of Pitch shall be used for constructing the membrane, and not less than fifty (50) nor more than sixty (60) pounds of Pitch shall be used for embedding the slag in constructing each one hundred (100) square feet of completed roof. The Pitch shall not be heated above four hundred (400) degrees Fahrenheit nor shall it be applied to the roof below three hundred and fifty (350) degrees Fahrenheit.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the inclined surfaces not less than twenty-four (24) inches before the application of the steep roofing. The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity and Guaranty Company of Baltimore, covering a period of twenty (20) years from date of completion in accordance with Note No. 1.

Note No. 1—THE BARRETT COMPANY will issue its Guaranty Bond on jobs in the United States, where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification, and subject to Barrett inspection and approval under the following conditions:

(a) That the steep roof area shall be roofed in conjunction with the flat roof area.

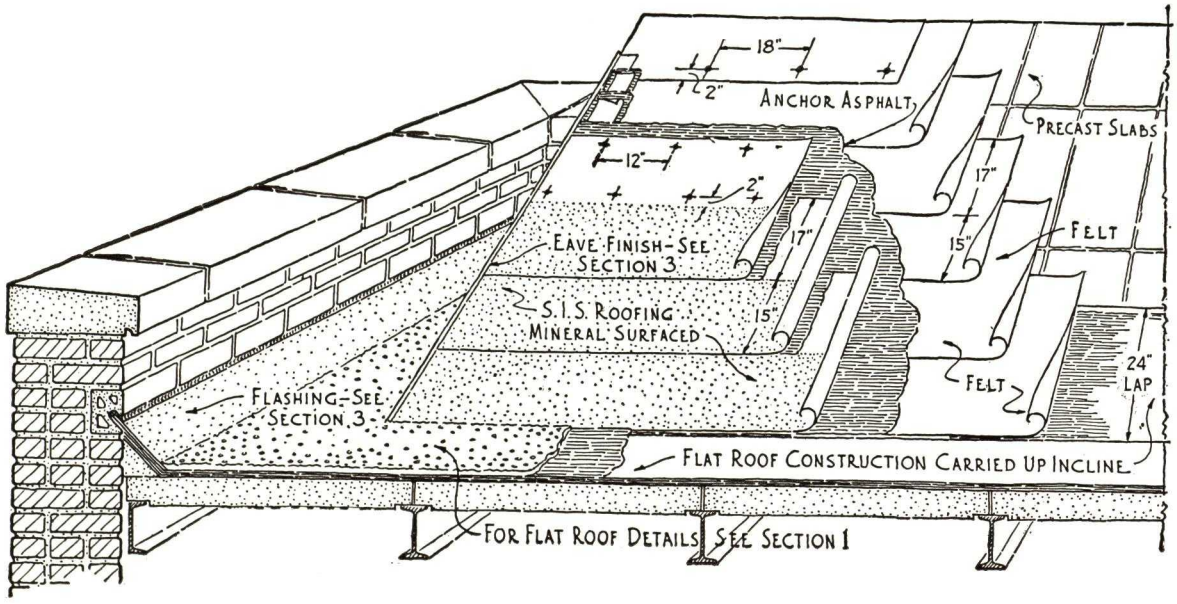
(b) That the flat roof area shall be covered with a Barrett Specification Type "AA" or Type **"A" roof.**



METHOD OF STARTING AT EAVES

FOR USE OVER—Precast Concrete and Precast Gypsum Slabs.
INCLINE—Not exceeding 4″ to 1′-0″.
TYPE S.I.S.—Bonded for 10 Years.

Barrett SINCE 1854



10 YEAR BOND BARRETT SPECIAL STEEP ROOF

For Precast Concrete Slab Decks, provision shall be made for Nailing Strips set parallel with incline of roof and spaced not more than three (3) feet apart.

CONDENSED SPECIFICATION

ROOFING—Shall be a Barrett Special Steep Roof, Type S. I. S., laid in accordance with the Barrett Specification (for use over precast gypsum slabs), by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY's Surety Bond Guaranty for ten (10) years from date of completion, in accordance with Note. 1 of said specification.

COMPLETE SPECIFICATION

PREPARATION OF DECK—All joints between precast gypsum slabs shall be properly grouted. The roof deck shall be smooth, firm, dry and free from loose material. The gypsum shall permit of nailing or creosoted wooden nailing strips shall be provided. If nailing strips are provided, they shall be parallel with the incline of the roof and spaced not more than three (3) feet apart.

APPLICATION OF ROOFING—First—Over the entire surface lay two (2) plies of Barrett Specification Tarred Felt at right angles to the incline of roof, lapping each sheet seventeen (17) inches over preceding one. Each sheet shall be nailed two (2) inches from lower edge with barbed roofing nails, through flat tin discs, spaced not more than eighteen (18) inches.

Second—Over the entire surface spread with a mop a uniform coating of Barrett Anchor Brand Roofing Asphalt, into which, while hot, shall be immediately rolled Barrett S. I. S. Roofing laid at right angles to the incline of the roof, lapping the sheets the full width of the seventeen (17) inch selvage. All sheets of Barrett S. I. S. Roofing shall be securely fastened in place with a double course of one and one-half (1½) inch barbed roofing nails driven through flat tin discs, and placed along the selvage side of the sheet. Nailing courses to be staggered and nails to be spaced not more than twelve (12) inches apart. The lower nailing course shall be held back two (2) inches from the mineral surfacing.

Third—Spread over the entire surface of the seventeen (17) inch selvage a uniform mopping of Barrett Anchor Brand Roofing Asphalt or S. I. S. cement, into which, shall be immediately rolled the following sheet of Barrett S. I. S. Roofing.

Fourth—All end laps shall be over-lapped at least six (6) inches. The underlying sheet of each end lap shall be nailed with six (6) nails through flat tin discs spaced five (5) inches apart starting one (1) inch from the lower edge of the sheet. The six (6) inch lap shall be coated with Barrett Anchor Brand Roofing Asphalt or S. I. S. cement and the over-lapping sheet thoroughly pressed down.

Fifth—The Barrett S. I. S. Roofing shall be cut in strips not to exceed twenty (20) feet in length and shall be stacked flat in piles at least twenty-four (24) hours before using.

GENERAL—The felt and S. I. S. Roofing shall be laid without wrinkles or buckles. Not less than thirty (30) pounds of Anchor Asphalt per mopping or two (2) gallons of S. I. S. cement shall be used per one hundred (100) square feet of completed roofing.

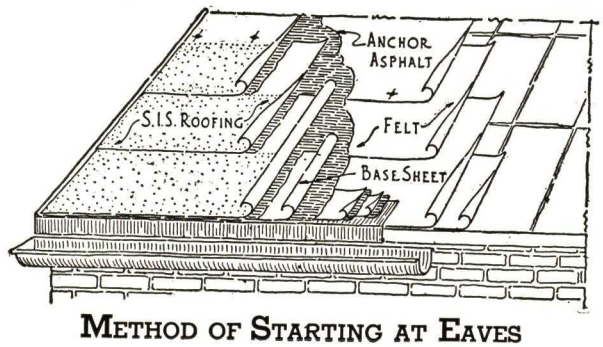
Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the inclined surfaces not less than twenty-four (24) inches before the application of the steep roofing.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY's Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Co. of Baltimore, covering a period of ten (10) years from date of completion.

Note No. 1—THE BARRETT COMPANY will give its Guaranty Bond on jobs in the United States and Canada where its inspection service is available, provided the roof is applied by a roofing contractor approved by THE BARRETT COMPANY in strict accordance with the above specification, and subject to Barrett inspection and approval under the following conditions:

(a) That the steep roof area shall be roofed in conjunction with the flat roof area.

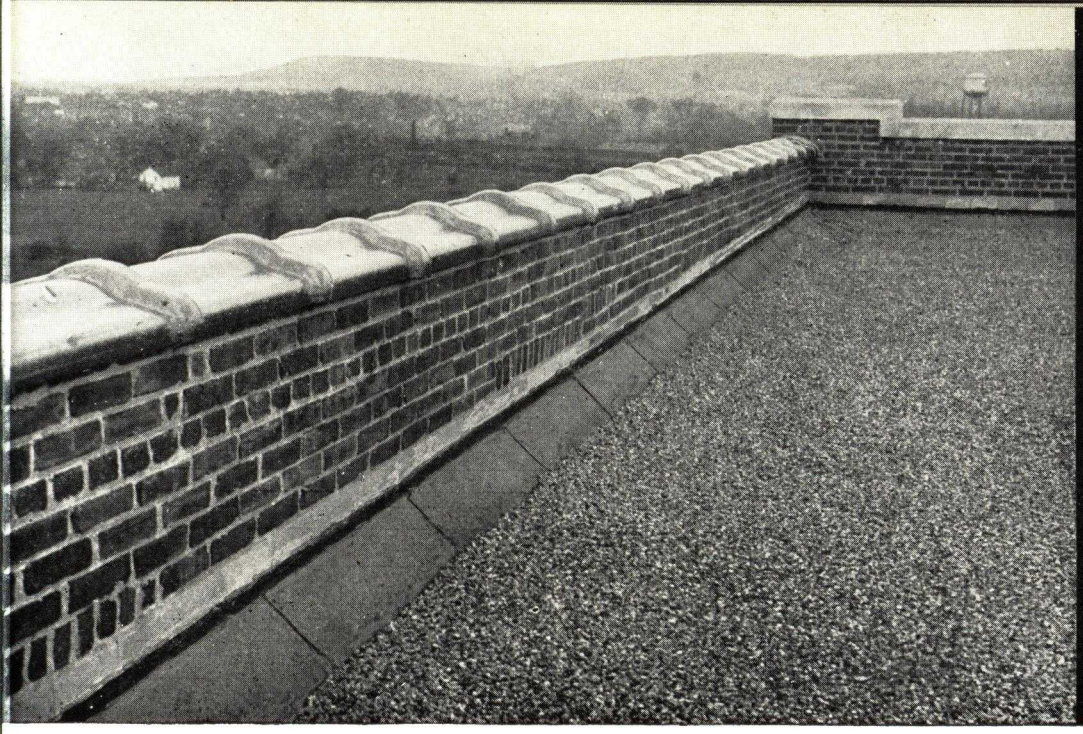
(b) That the flat roof area shall be covered with a Barrett Specification Type "A" or Type "AA" Roof.



METHOD OF STARTING AT EAVES

RISE OR INCLINE OF ROOFS PER FOOT; INCREASED AREA PER SQUARE FOOT OF STEEP ROOFS OVER FLAT ROOFS

Classification	Incline			Inclined Area Per Sq. Foot Horizontal Area	Percentage Increase In Area Over Flat Roof
	Inch Per Foot Horizontal	Angle With Horizontal	Fractional Factor		
Flat Roofs	1/8	0°-36′		1.000	0.0
	1/4	1°-12′		1.000	0.0
	3/8	1°-47′		1.000	0.0
	1/2	2°-23′	1/48	1.001	0.1
	5/8	2°-59′		1.001	0.1
	3/4	3°-35′	1/32	1.002	0.2
	1	4°-46′	1/24	1.003	0.3
	1 1/8	5°-21′		1.004	0.4
	1 1/4	5°-57′		1.005	0.5
	1 1/2	7°-8′	1/16	1.008	0.8
	1 3/4	8°-18′		1.011	1.1
	2	9°-28′	1/12	1.014	1.4
Steep Roofs	2 1/4	10°-37′		1.017	1.7
	2 1/2	11°-46′		1.021	2.1
	2 3/4	12°-54′		1.026	2.6
	3	14°-2′	1/8	1.031	3.1
	3 1/4	15°-9′		1.036	3.6
	3 1/2	16°-16′		1.042	4.2
	3 3/4	17°-21′		1.048	4.8
	4	18°-26′	1/6	1.054	5.4
	4 1/4	19°-30′		1.061	6.1
	4 1/2	20°-34′		1.068	6.8
	5	22°-37′		1.083	8.3
	6	26°-34′	1/4	1.118	11.8
	7	30°-16′		1.158	15.8
	8	33°-42′	1/3	1.202	20.2
	9	36°-52′		1.250	25.0
	10	39°-48′		1.302	30.2
	11	42°-31′		1.356	35.6
	12	45°-0′	1/2	1.414	41.4
Extra Steep Roofs	14	49°-24′		1.537	53.7
	16	53°-8′		1.667	66.7
	18	56°-19′		1.803	80.3
	20	59°-2′		1.943	94.3
	22	61°-23′		2.088	108.8
	24	63°-26′	1	2.235	123.5



SECTION 3

BARRETT ROOF and SPANDREL FLASHINGS

THE MOST VULNERABLE PART IN ANY ROOF

Purpose

The prevention of seepage or leaks at masonry walls of the modern building is a serious problem confronting every architect, engineer and builder.

These troubles are frequently traced to faulty flashing construction. Low spots where snow, ice, and rain water concentrate, are usually found along parapet walls, curbs, or other places where flashings are installed. Inadequate or faulty construction at these vital points opens the way to troublesome leaks and costly repairs.

Barrett Bonded Flashings

The Barrett system of flashing is considered a component part of the roof construction. The waterproof membrane is definitely tied in with the parapet wall by means of the flashing block. This part of the roof is reinforced, the added protection actually making it the strongest part of the roof. The flashing is flexible, and permits of movement occasioned by settlement of the deck, or by expansion and contraction in materials.

Eliminates Divided Responsibility

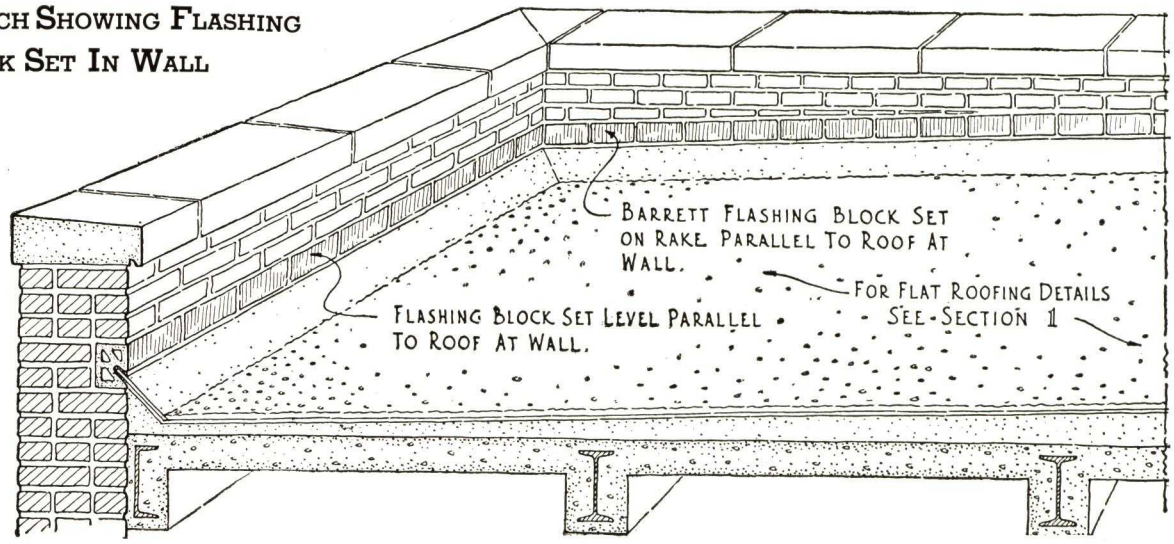
The Barrett system, used in conjunction with Barrett Specification Roofs, definitely eliminates troublesome flashing leaks at parapets, curbs, chimneys, fire-walls, etc. The responsibility for the complete roof, including flashing construction, rests with the Barrett approved roofer. The flashing is installed by the roofing contractor at the same time he applies the roofing, and its performance is fully covered in the guaranty bond.

A Good Roof Deserves Good Flashings

Good flashings promote the serviceability of good roofs. The Barrett flashing system, developed after years of practical experience, is a worthy companion to Barrett Specification Roofs. Time-tried under every conceivable condition, it is accepted generally as a standard type of construction for both flat and steep built-up roofs.

METHOD OF INSTALLING BARRETT FLASHING BLOCK IN BRICK WALLS

Sketch Showing Flashing Block Set In Wall



SPECIFICATION FOR INSTALLATION WITH VARIOUS TYPES OF ROOF DECKS

FOR MASONRY—Barrett Flashing Block shall be built into walls with the base of the block set five (5) inches above and parallel with the finished grade line of the roof at wall.

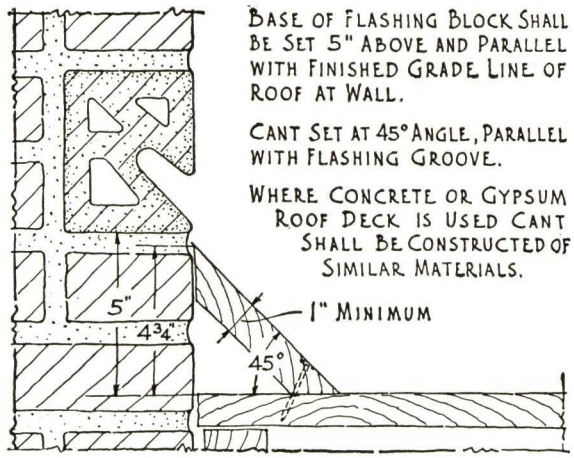
Blocks shall be laid in true alignment, set in Portland Cement Mortar, and joints shall be properly pointed. All end joints shall be solid mortar joints.

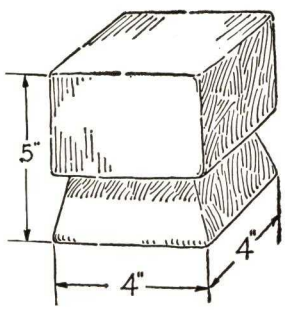
The flashing groove of the blocks shall be thoroughly cleaned of all surplus mortar.

Note—Special blocks are manufactured for use at right angle external and internal wall corners.

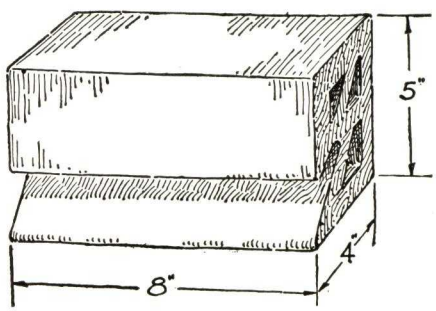
For Concrete or Gypsum Roof Deck—At angle of roof deck and the walls in which flashing block has been installed, provide a concrete cant that will permit of nailing, the upper edge of which shall terminate one-quarter (¼) inch below the flashing groove. The face of the cant shall have an incline of forty-five (45) degrees the same as the flashing groove in the block. The distance from the innermost end of flashing groove to bottom of cant strip shall not exceed ten (10) inches.

FOR CARPENTRY, BOARD ROOF DECK—At angle of roof deck and the walls in which flashing block has been installed, provide a wood cant at least one (1) inch thick, the upper edge of which shall terminate one-quarter (¼) inch below the flashing groove. The face of the cant shall have an incline of forty-five (45) degrees, the same as the flashing groove in the block. The cant shall be securely fastened to the roof deck. The distance from the innermost end of flashing groove to bottom of cant strip shall not exceed ten (10) inches.

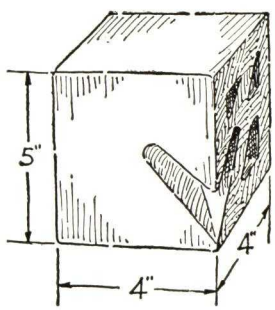




Outside Corner



Straight Flashing Block

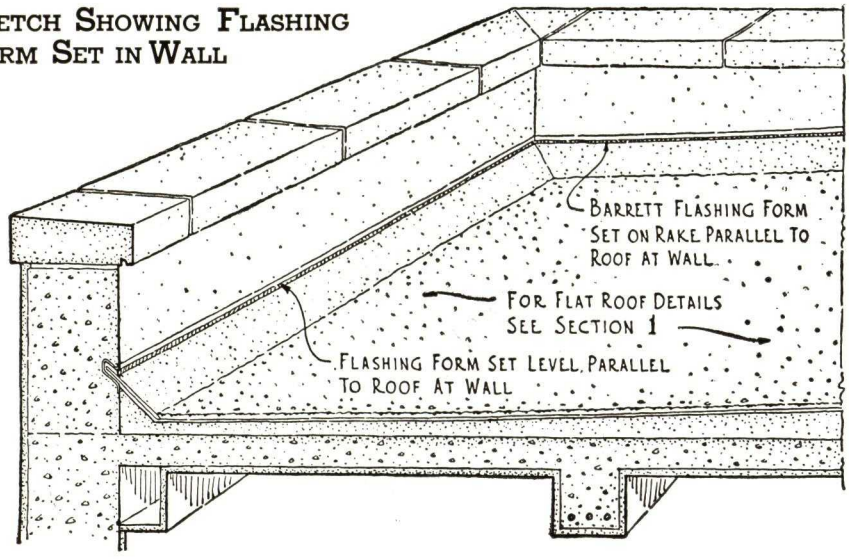


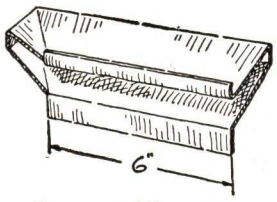
Inside Corner

METHOD OF INSTALLING BARRETT FLASHING FORM IN CONCRETE WALLS

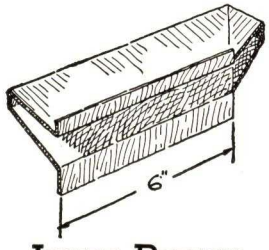
Barrett SINCE 1854

SKETCH SHOWING FLASHING FORM SET IN WALL





INSIDE RETURN LEFT HAND



INSIDE RETURN RIGHT HAND

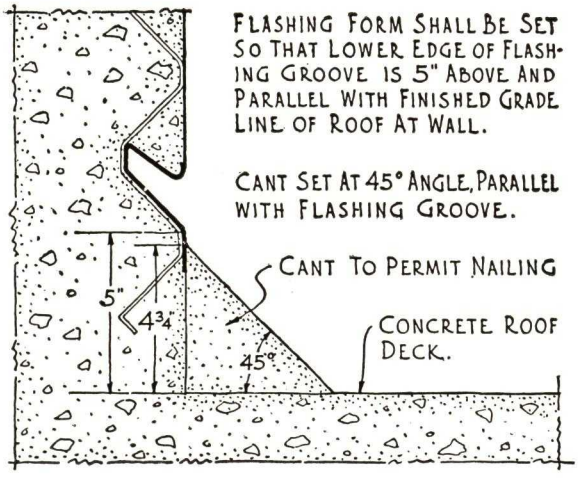
SPECIFICATION FOR INSTALLATION WITH CONCRETE ROOF DECKS

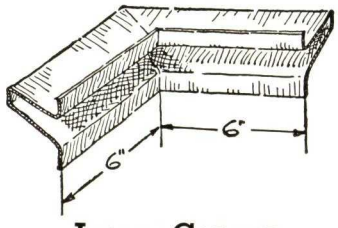
FOR CONCRETE—Barrett Flashing Form shall be attached to the inside of the wall form by means of metal strap brackets (so provided) spaced not more than two (2) feet apart and secured by one (1) inch smooth wire nails.

Barrett Flashing Form shall be set so that the lower edge of the flashing groove is five (5) inches above and parallel with the finished grade line of the roof at wall.

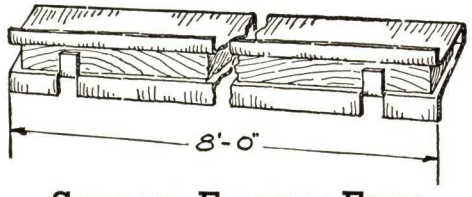
Note—Special mitred flashing forms are manufactured for use at right angle external and internal wall corners.

At angle of roof deck and the wall in which flashing form has been installed, provide a concrete cant that will permit of nailing, the upper edge of which shall terminate one-quarter (¼) inch below the flashing groove. The face of the cant shall have an incline of forty-five (45) degrees the same as the flashing groove in the block. The distance from the innermost end of flashing groove to bottom of cant strip shall not exceed ten (10) inches.

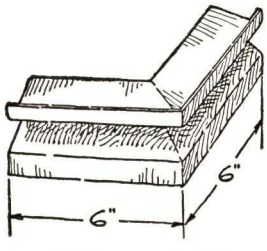




INSIDE CORNER

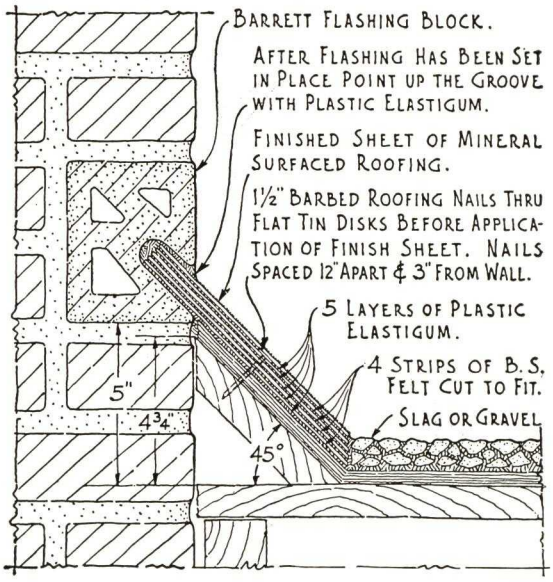


STRAIGHT FLASHING FORM

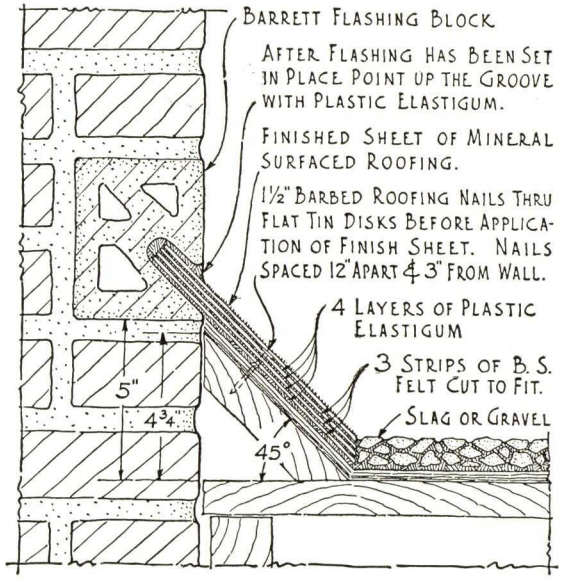


OUTSIDE CORNER

BARRETT FLASHING SYSTEM FOR BRICK WALLS
TYPE "AA"—Bonded for 20 Years.
TYPE "A"—Bonded for 15 Years.



BLOCK TYPE
FOR BRICK WALLS
20 YEAR BOND



BLOCK TYPE
FOR BRICK WALLS
15 YEAR BOND

20 YEAR BOND TYPE "AA" BARRETT FLASHING FOR BRICK WALLS

Note—This flashing shall be installed before gravel, slag, tile or other surfacing material is applied to the roof surface.

APPLICATION OF FLASHING—First—Before applying flashing material, the flashing groove shall be thoroughly cleaned of mortar or other foreign materials.

Second—The Felt and Pitch roofing shall be extended up the face of the cant to the wall line and cut off evenly at that point. The plies of Felt shall be solidly cemented together with Pitch and be free from wrinkles or buckles.

Third—Over the roofing, covering the cant, and up into the full depth of the flashing groove, apply a heavy uniform layer of Barrett Plastic Elastigum, into which embed one (1) ply of flashing strip, cut the proper width from a roll of Barrett Specification Felt. The sheets of the flashing strips shall be lapped one (1) inch and the strips shall extend into the full depth of the flashing groove. This operation shall be repeated until four (4) layers of Plastic Elastigum and four (4) plies of flashing strip have been applied. The fourth flashing strip shall be nailed every twelve (12) inches, three (3) inches from the wall with one and one-half (1½) inch barbed roofing nails through flat tin discs. Each flashing strip shall be set in separately (not folded) and shall break joints with the underlying ply.

Fourth—Over the entire surface of the flashing strips thus laid, apply a uniform trowelled coating of Plastic Elastigum. Care shall be taken so that a liberal amount of Plastic Elastigum is placed along the opening of the flashing groove. Into the Plastic Elastigum embed immediately a layer of Barrett Everlastic Mineral Surfaced Roofing of the proper width, extending into the full depth of the groove and down to the roofing. The strips of Mineral Surfaced Roofing shall be cut from across the roll so that the end of each strip shall have a two (2) inch selvage. The two (2) inch selvage shall be coated with Plastic Elastigum and shall be over-lapped by the following sheet of Mineral Surfaced Roofing and thoroughly pressed down. The flashing groove shall then be pointed up with Plastic Elastigum.

Note No. 1—IMPORTANT—No projections such as vent pipes, conductor lines or braces shall be constructed through the flashing cant. All such projections shall be placed through roof deck at a point not less than ten (10) inches from the intersection of cant with roof deck.

Note No. 2—THE BARRETT COMPANY will give its Guaranty Bond on jobs in the United States and Canada where its inspection service is available, provided the flashing is installed in strict accordance with the above specification and subject to Barrett inspection and approval under the following condition: That the flashing shall be installed during the application of a Barrett Bonded Roof.

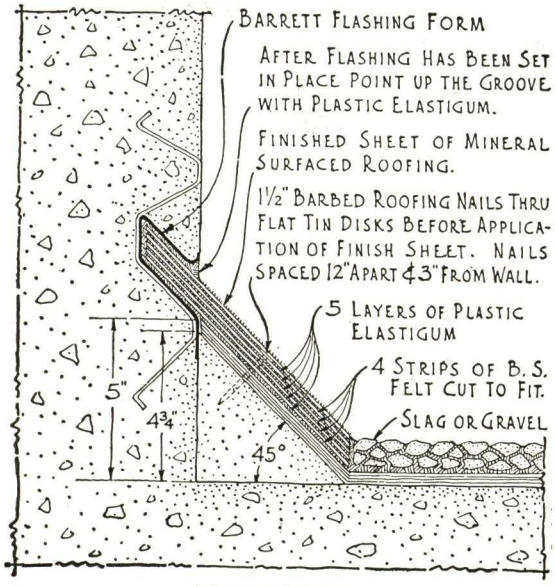
15 YEAR BOND TYPE "A" BARRETT FLASHING FOR BRICK WALLS

Same as above, except change the last half of paragraph headed "Third" as follows:

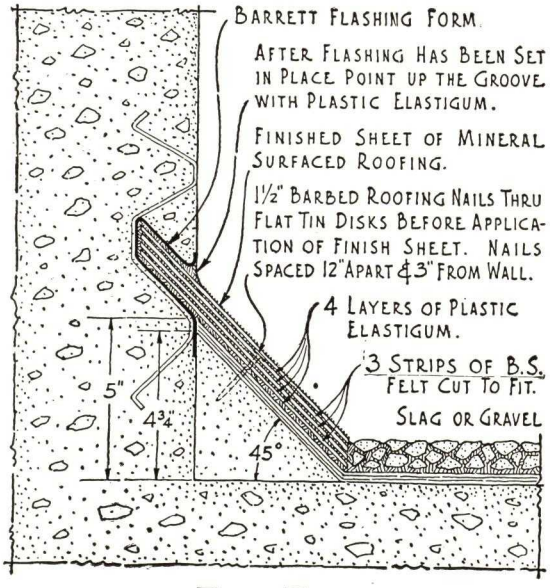
This operation shall be repeated until three (3) layers of Plastic Elastigum and three (3) plies of flashing strip have been applied. The third flashing strip shall be nailed every twelve (12) inches, three (3) inches from the wall with one and one-half (1½) inch barbed roofing nails through flat tin discs. Each flashing strip shall be set in separately (not folded) and shall break joints with the underlying ply.

BARRETT FLASHING SYSTEM FOR CONCRETE WALLS
TYPE "AA"—Bonded for 20 Years.
TYPE "A"—Bonded for 15 Years.

Barrett SINCE 1854



FORM TYPE
FOR CONCRETE WALLS
20 YEAR BOND



FORM TYPE
FOR CONCRETE WALLS
15 YEAR BOND

20 YEAR BOND TYPE "AA" BARRETT FLASHING FOR CONCRETE WALLS

Note—This flashing shall be installed before gravel, slag, tile or other surfacing material is applied to the roof surface.

APPLICATION OF FLASHING—First—Before applying flashing material, the flashing groove shall be thoroughly cleaned of mortar or other foreign materials.

Second—The Felt and Pitch roofing shall be extended up the face of the cant to the wall line and cut off evenly at that point. The plies of Felt shall be solidly cemented together with Pitch and be free from wrinkles or buckles.

Third—Over the roofing, covering the cant, and up into the full depth of the flashing groove, apply a heavy uniform layer of Barrett Plastic Elastigum, into which embed one (1) ply of flashing strip, cut the proper width from a roll of Barrett Specification Felt. The sheets of the flashing strips shall be lapped one (1) inch and the strips shall extend into the full depth of the flashing groove. This operation shall be repeated until four (4) layers of Plastic Elastigum and four (4) plies of flashing strip have been applied. The fourth flashing strip shall be nailed every twelve (12) inches, three (3) inches from the wall with one and one-half (1½) inch barbed roofing nails through flat tin discs. Each flashing strip shall be set in separately (not folded) and shall break joints with the underlying ply.

Fourth—Over the entire surface of the flashing strips thus laid, apply a uniform trowelled coating of Plastic Elastigum. Care shall be taken so that a liberal amount of Plastic Elastigum is placed along the opening of the flashing groove. Into the Plastic Elastigum embed immediately a layer of Barrett Everlastic Mineral Surfaced Roofing of the proper width, extending into the full depth of the groove and down to the roofing. The strips of Mineral Surfaced Roofing shall be cut from across the roll so that the end of each strip shall have a two (2) inch selvage. The two (2) inch selvage shall be coated with Plastic Elastigum and shall be over-lapped by the following sheet of Mineral Surfaced Roofing and thoroughly pressed down. The flashing groove shall then be pointed up with Plastic Elastigum.

Note No. 1—IMPORTANT—No projections such as vent pipes, conductor lines or braces shall be constructed through the flashing cant. All such projections shall be placed through roof deck at a point not less than ten (10) inches from the intersection of cant with roof deck.

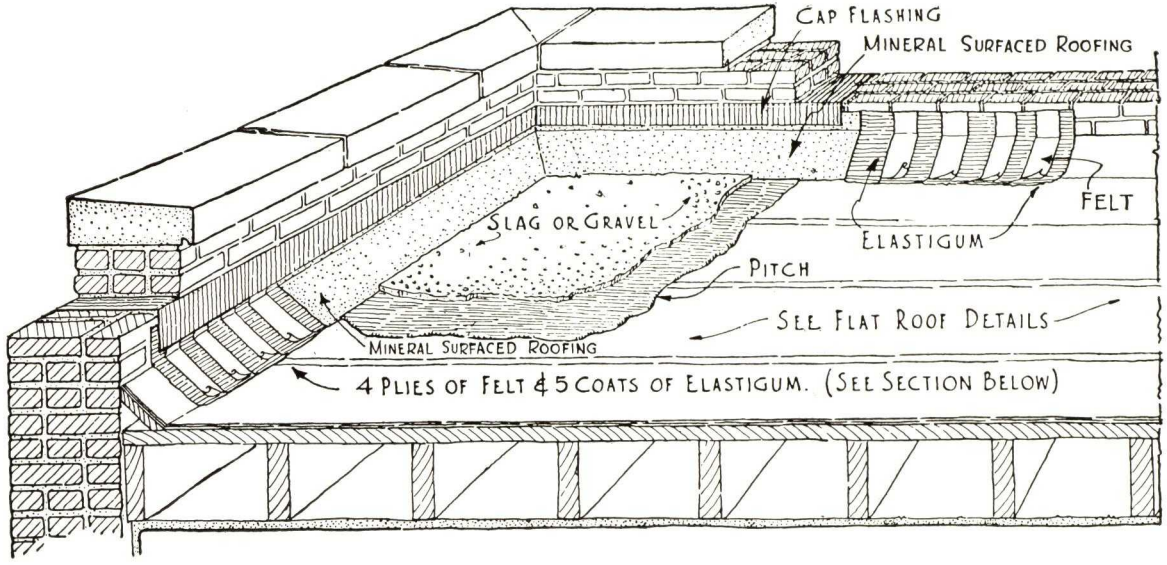
Note No. 2—THE BARRETT COMPANY will give its Guaranty Bond on jobs in the United States and Canada where its inspection service is available, provided the flashing is installed in strict accordance with the above specification and subject to Barrett inspection and approval under the following condition: That the flashing shall be installed during the application of a Barrett Bonded Roof.

15 YEAR BOND TYPE "A" BARRETT FLASHING FOR CONCRETE WALLS

Same as above, except change the last half of paragraph headed "Third" as follows:

This operation shall be repeated until three (3) layers of Plastic Elastigum and three (3) plies of flashing strip have been applied. The third flashing strip shall be nailed every twelve (12) inches, three (3) inches from the wall with one and one-half (1½) inch barbed roofing nails through flat tin discs. Each flashing strip shall be set in separately (not folded) and shall break joints with the underlying ply.

ALTERNATE TYPE "AA" FLASHINGS
Using Bituminous Base and Metal Counter Flashings



BARRETT SPECIFICATION, ALTERNATE TYPE "AA" FLASHINGS

SPECIFICATIONS

Note—Flashing shall be installed before gravel, slag, tile or other surfacing material is applied to the roof surface.

BASE FLASHING

The felt and pitch roofing shall be extended up the face of a cant, placed five (5) inches above roof line and extending to the roof deck on an angle of 45°, up to the wall line and cut off evenly at that point. The membrane shall be laid evenly and without wrinkles or buckles.

Over the roofing membrane covering the cant, apply a heavy uniform layer of Barrett Plastic Elastigum into which embed one (1) ply of flashing strips cut the proper width from Barrett Specification Felt. The sheets of the flashing strips shall be lapped one (1) inch and the strips shall extend on to the vertical wall for a distance of one (1) inch above the top of the cant.

This operation shall be repeated until four (4) layers of Plastic Elastigum and four (4) plies of flashing strips have been applied, each flashing strip stepped above the preceding strip, and on the wall, so that the last strip is immediately below the metal counter-flashing where it enters the wall. Each flashing strip shall be set in separately and shall break joints with the underlying strip.

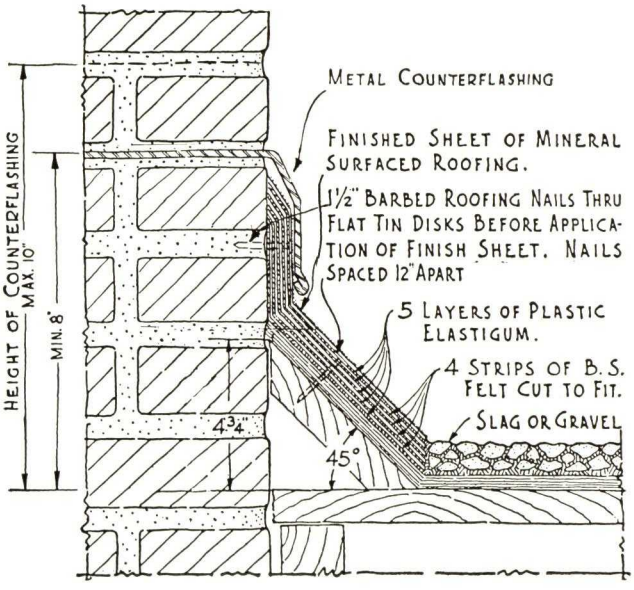
Over the entire surface of the flashing strip thus laid, apply a uniform trowel coat of Plastic Elastigum into which immediately embed a layer of Barrett Everlastic Mineral Surfaced Roofing of the proper width, extending from the base of the cant to immediately below the metal counter-flashing where it enters the wall. The Mineral Surfaced Roofing shall be set in place firmly so that there are no buckles or loose sections. The strips of Mineral Surfaced Roofing shall be cut from across the roll so that the end of each strip shall have a two (2) inch selvage. The two (2) inch selvage shall be coated with Plastic Elastigum and shall be overlapped by the following sheet of Mineral Surfaced Roofing and thoroughly pressed down.

The base flashing shall then be nailed on eight (8) inch to twelve (12) inch centers at a point approximately two (2) inches below the metal counter-flashing where it enters the wall, or in the mortar joints, immediately below the joint into which the counter-flashing is set.

METAL COUNTER-FLASHING

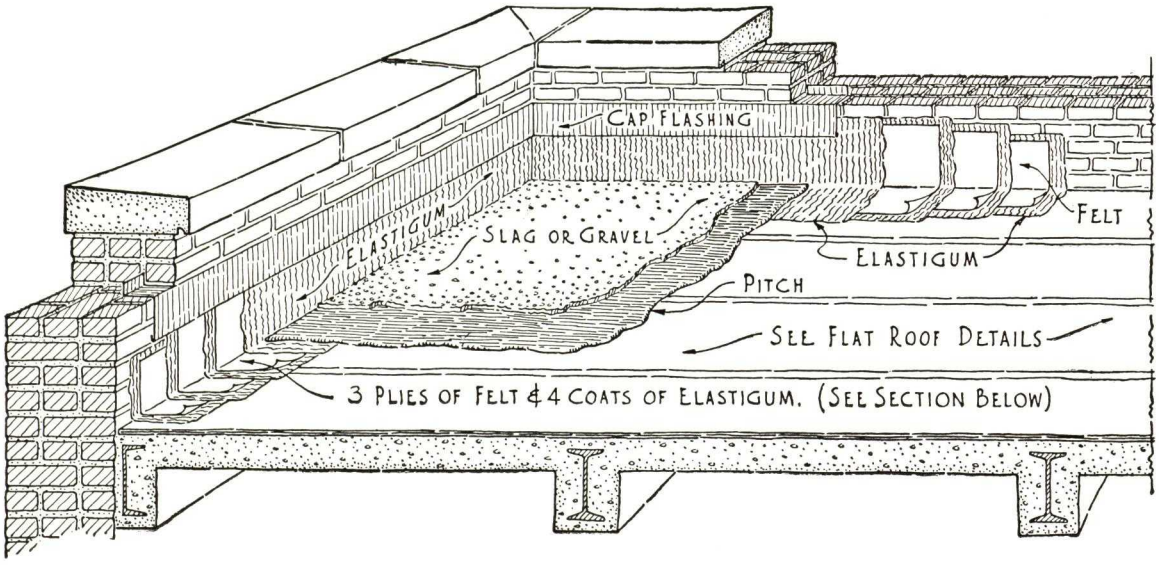
The metal counter-flashing shall overlap the bituminous base flashing to the junction of wall and cant surface, so that all flashing strips and nails are completely counter-flashed with the metal base.

Note—No projections such as vent pipes, conductor lines or braces shall be constructed to the flashing cant. All such projections shall be placed thru roof deck at a point not less than ten (10) inches from the intersection of cant with roof deck, and shall be properly flashed.



PLASTIC ELASTIGUM FLASHINGS FOR BRICK OR CONCRETE WALLS.
10 Year Guaranty.

Barrett SINCE 1854



10 YEAR BARRETT PLASTIC ELASTIGUM FLASHING FOR BRICK OR CONCRETE WALLS

Note—If the roofing is laid over a board deck, the first two (2) plies of Felt shall be turned up against perpendicular surfaces at least four (4) inches. If the roofing is laid over a concrete deck, all plies shall be cut off evenly at the angle of the roof deck and parapet walls.

APPLICATION OF FLASHING—First—After all plies of roofing have been laid and preceding the application of the slag or gravel surface, apply a uniform trowelled coating of Barrett Plastic Elastigum for a distance of ten (10) inches up the parapet wall and six (6) inches out on the roofing into which shall be immediaetly embedded a ten (10) inch strip of Barrett No. 15 Asphalt Felt extending up the wall six (6) inches and out on the roofing four (4) inches.

Second—This strip shall be coated with Barrett Plastic Elastigum. Then follow with a second strip of Barrett No. 15 Asphalt Felt thirteen (13) inches wide extending eight (8) inches up the wall and five (5) inches out on the roof.

Third—This strip shall be coated with Barrett Plastic Elastigum into which embed a third strip of Barrett No. 15 Asphalt Felt sixteen (16) inches wide, extending ten (10) inches up the wall and six (6) inches out on the roof.

Fourth—This strip shall be coated uniformly with Barrett Plastic Elastigum. Care shall be taken so that the top edge of the felt strips shall be pressed firmly against the masonry wall and the Plastic Elastigum feathered against it.

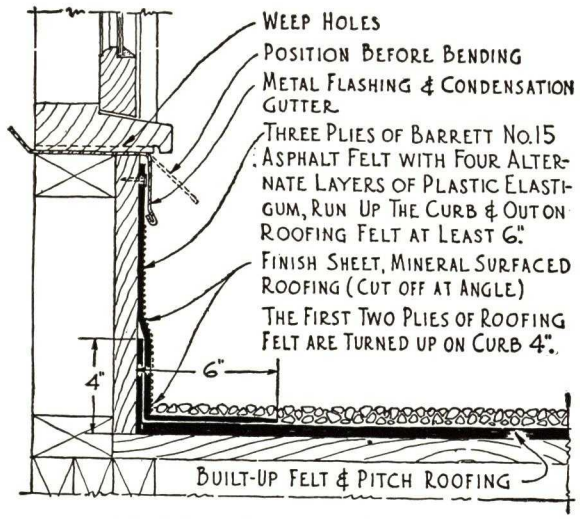
Felt strips shall not exceed ten (10) feet in length and shall be lapped at least one (1) inch and all joints broken so that each is covered by at least two (2) thicknesses of felt.

Where a cant is used, the width of the first sheet of felt installed shall be such that at least four (4) inches shall extend above top of the cant and four (4) inches out on the roof. Each succeeding strip shall follow the proportions, as specified above.

Note No. 1—The Barrett Company will give its ten (10) year guaranty on jobs in the United States and Canada where its inspection service is available, provided the flashing is installed in strict accordance with the above specification and subject to Barrett inspection and approval under the following condition: That the flashing shall be installed during the application of a Barrett Bonded Roof.

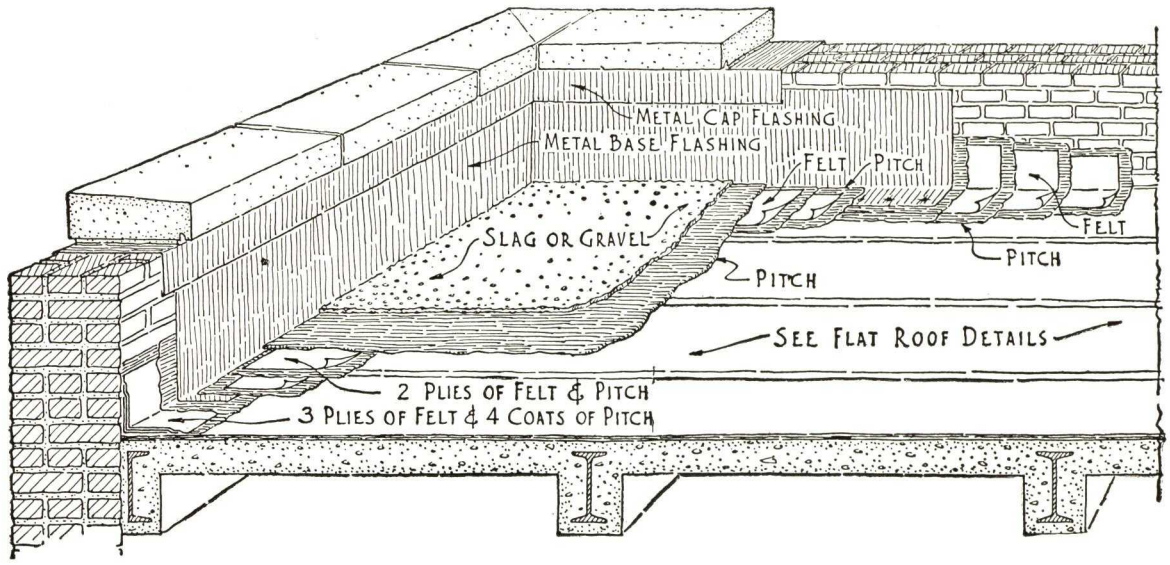
Architect's Note—The use of a metal counter flashing with this type of installation is optional with Architect, and if desired should be covered in specifications.

Where metal counter flashing is provided with this type of installation, and where specified, cap sheet of Barrett Everlastic Mineral Surfaced Roofing may be applied after Plastic Elastigum flashing has been installed in place. Cap sheet shall be cut off at roof line. End laps shall be at least two (2) inches, with under lap well fastened and coated with Plastic Elastigum.



DETAIL FOR CURB FLASHING

DETAILS FOR INSTALLING METAL CAP AND BASE FLASHING FOR MASONRY WALLS



SPECIFICATION

Note—Architect or engineer shall specify and describe kind of metal to be used for flashing.

Metal flashings shall be installed at all parapet walls, curbs, pent houses and other vertical surfaces as shown on plans.

CAP FLASHINGS—(1)—All cap flashings shall be set into brick walls for a distance of four (4) inches and turned up one (1) inch behind the first course of brick and down the face of the wall overlapping the base flashing at least two (2) inches. End laps shall be at least two (2) inches and soldered.

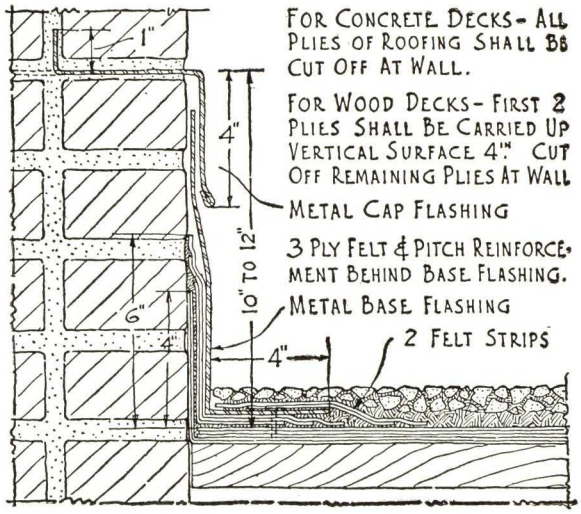
(2) Alternate Specification—Architect's Note—All cap flashings shall be set into brick walls and shall extend from inside face of wall to within one (1) inch of outside face, and down inside face of wall overlapping the base flashing at least two (2) inches. End laps shall be at least two (2) inches and soldered.

FELT AND PITCH REINFORCEMENT—After all plies of roofing have been laid, the roofing contractor shall set in separately, at the angle of the roof deck and vertical surface, three (3) plies of tarred felt cemented together with coal tar pitch. These plies shall extend out on the roofing at least four (4) inches and up the vertical surface six (6) inches. The last ply shall be coated with coal tar pitch. For roofing guaranteed for fifteen (15) years or less, a felt and pitch reinforcement of two (2) plies is sufficient.

BASE FLASHINGS—First—Over the felt and pitch reinforcement thus applied, the metal base flashing shall be set, extending out on the roof four (4) inches and up the vertical surface not less than ten (10) inches, nor more than twelve (12) inches. The base flashing shall be nailed to the roof deck with barbed roofing nails spaced not more than three (3) inches on centers on a line not exceeding three-quarters (¾) of an inch from the outer edge of the metal. If concrete roof deck does not permit of nailing, a creosoted wood nailing strip at least one (1) inch thick, with two (2) inch face and three (3) inch base, shall be installed, centered on a line three (3) inches from the vertical surface.

Second—End laps shall be locked and soldered unless otherwise specified.

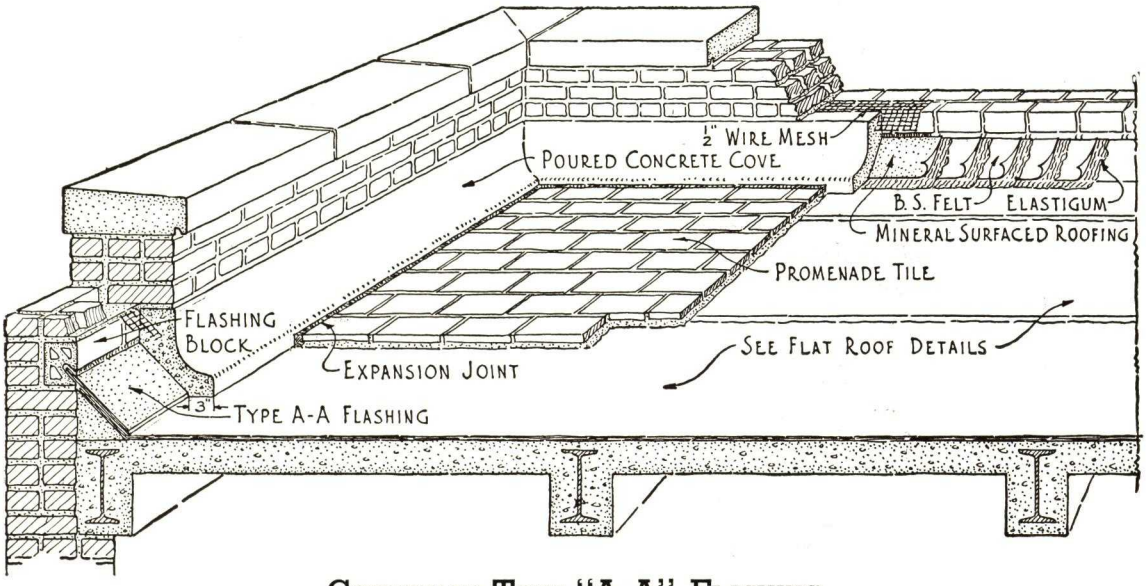
Third—The four (4) inches of metal on the roof shall be given a priming coat of Barrett Everjet paint. It shall then be coated with Coal Tar Pitch into which shall be immediately embedded a strip of tarred felt four (4) inches wide centered over the nailing course. The first strip shall be coated with Coal Tar Pitch into which shall be immediately embedded a second strip of tarred felt six (6) inches wide completely covering the first.



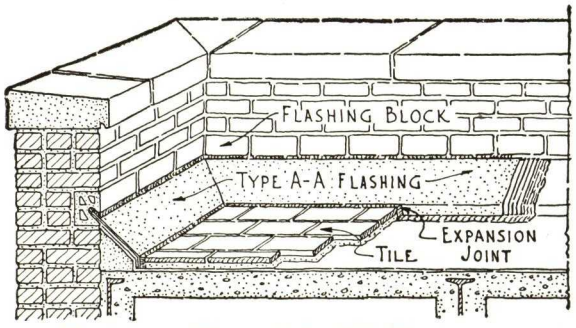
DETAIL FOR METAL CAP AND BASE FLASHING

DETAILS FOR INSTALLING FLASHING IN CONNECTION WITH PROMENADE TILE ROOFS

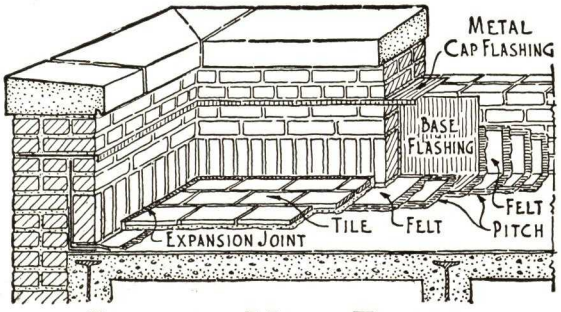
Barrett SINCE 1854



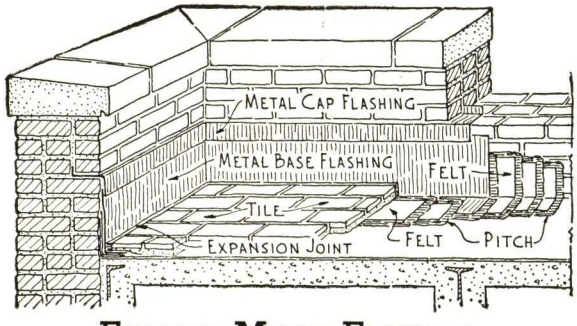
CONCEALED TYPE "A-A" FLASHING



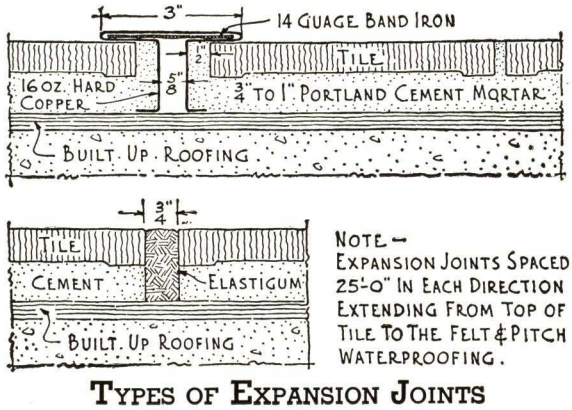
EXPOSED TYPE "A-A" FLASHING



CONCEALED METAL FLASHING



EXPOSED METAL FLASHING

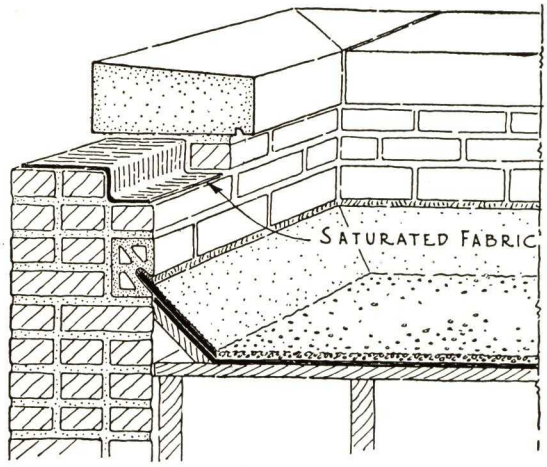


NOTE — EXPANSION JOINTS SPACED 25'-0" IN EACH DIRECTION EXTENDING FROM TOP OF TILE TO THE FELT & PITCH WATERPROOFING.

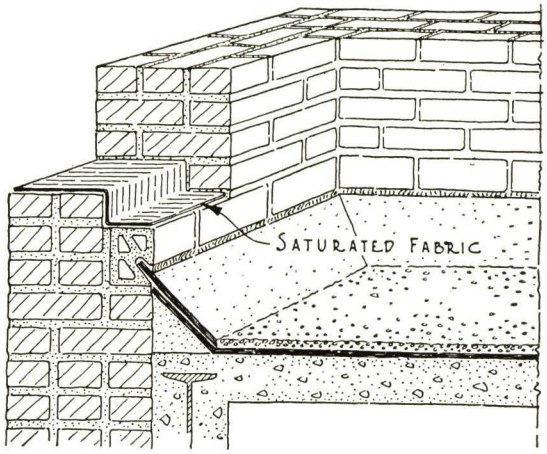
TYPES OF EXPANSION JOINTS

BARRETT ROOF FLASHING SYSTEM

DETAILS FOR FLASHING PARAPET WALLS, SPANDREL BEAMS, ETC.



THRU WALL FLASHING
LOW PARAPET



THRU WALL FLASHING
HIGH PARAPET

SPECIFICATIONS FOR PARAPET WALLS

On all parapet walls, as detailed, provide and install waterproofing course consisting of two (2) plies of Barrett Waterproofing Fabric and three (3) full trowel coatings of Barrett Plastic P B Cement, applied alternately. Waterproofing course shall be continuous and shall extend to within one-half (½) inch of outside edges of walls. All end laps shall be not less than three (3) inches, and each succeeding layer shall break joints with underlying layer.

The fabric shall be applied without wrinkles or buckles and all trowel coatings shall be smooth and full. Care shall be taken not to injure the waterproofing course either during application or after completion.

Note No. 1—All surfaces on which the waterproofing course is to be installed shall be smooth, dry and free from loose materials.

Note No. 2—On low parapets waterproofing course may be installed under copings. On high parapets or party walls waterproofing course shall be installed flush with top of counter flashing or raggle block.

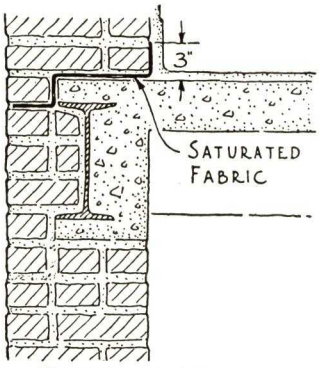
SPECIFICATIONS FOR SPANDREL BEAMS, ETC.

At all spandrels, as detailed, provide and install waterproofing course consisting of two (2) plies of Barrett Waterproofing Fabric, and three (3) full trowel coatings of Barrett Plastic P B Cement, applied alternately. Waterproofing course shall be continuous, shall extend to within one-half (½) inch of outside edge of wall, and shall be turned up and cemented to inside walls to a height of at least three (3) inches. All end laps shall be not less than three (3) inches, and each succeeding layer shall break joints with underlying layer.

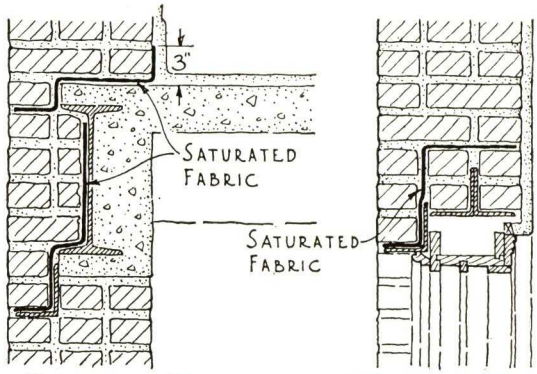
The fabric shall be applied without wrinkles or buckles and all trowel coatings shall be smooth and full. Care shall be taken not to injure the waterproofing course either during application or after completion.

Note No. 1—All surfaces on which the waterproofing course is to be installed shall be smooth, dry and free from loose materials.

Note No. 2—Method to be followed (whether counter or base and counter) shall be clearly indicated on plans and in specifications prepared by architect.

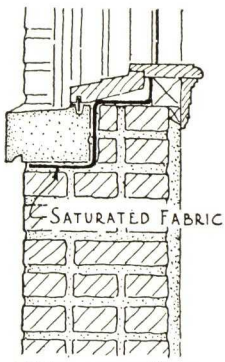


SPANDREL FLASHING
COUNTER TYPE



SPANDREL FLASHING
BASE & COUNTER TYPE

WINDOW HEAD
FLASHING



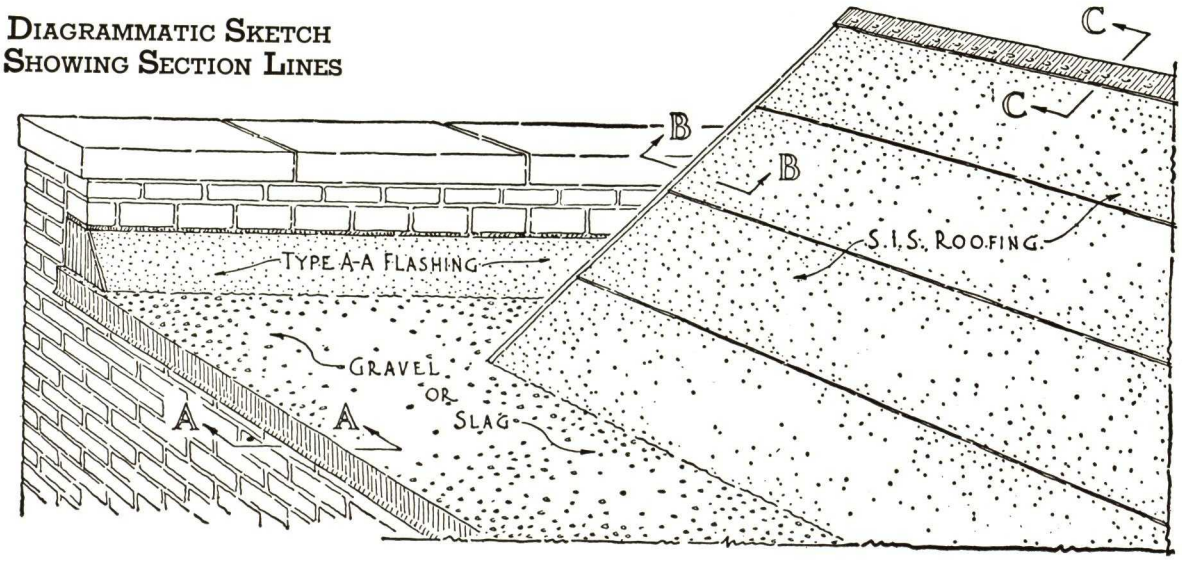
WINDOW SILL
FLASHING

DETAILS FOR FLAT AND STEEP ROOF CONSTRUCTION.

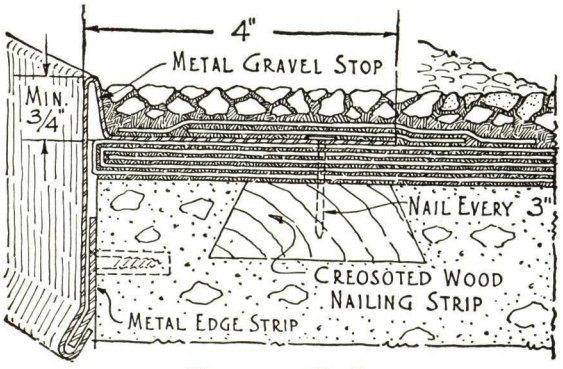
METHOD OF FINISHING EAVES AND EDGES.

Barrett SINCE 1854

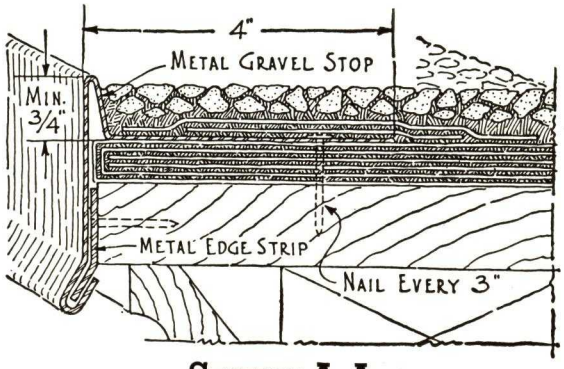
DIAGRAMMATIC SKETCH
SHOWING SECTION LINES



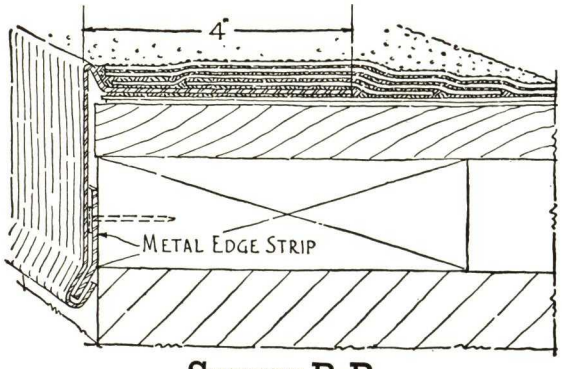
DETAILS FOR FINISHING EAVES AND EDGES



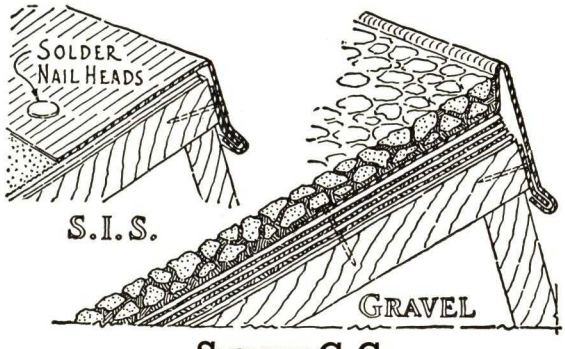
SECTION A-A
METAL EAVE FOR CONCRETE DECK



SECTION A-A
METAL EAVE FOR WOOD DECK



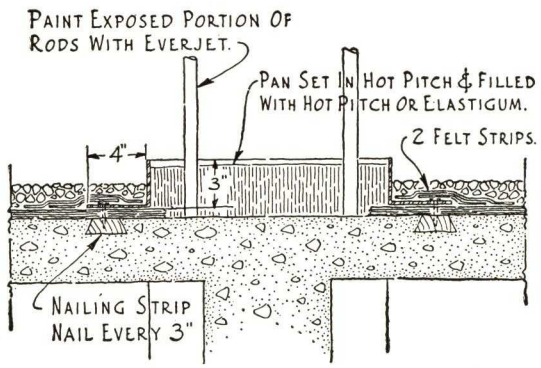
SECTION B-B
GABLE EDGE FOR STEEP ROOFS



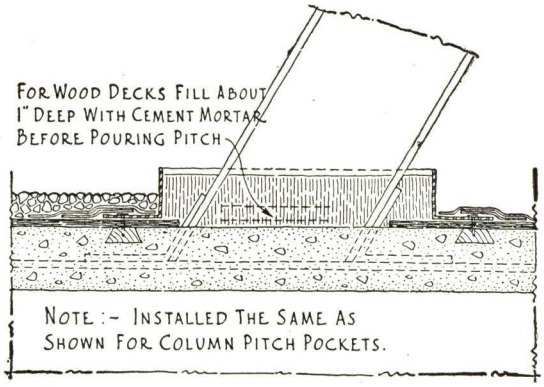
SECTION C-C
METAL RIDGE FOR SAWTOOTH SKYLIGHT

BARRETT ROOF FLASHING SYSTEM

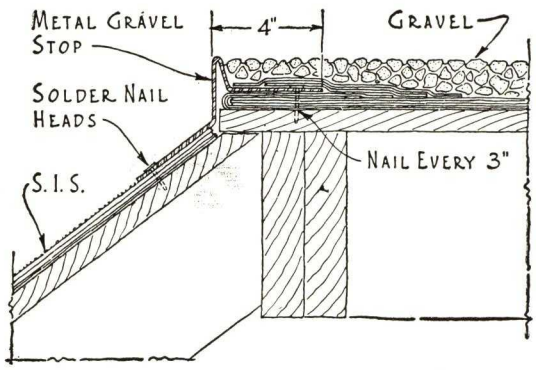
DETAILS FOR FLASHING SIGN SUPPORTS, STACKS, STUB COLUMNS, ETC.



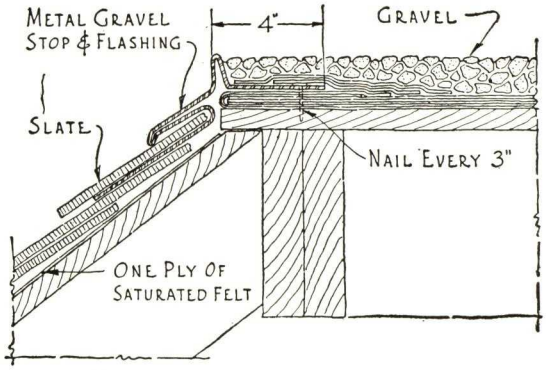
PITCH POCKETS FOR COLUMNS



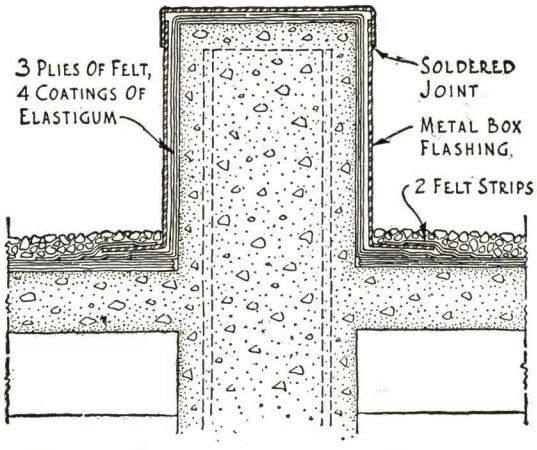
PITCH POCKETS FOR SIGN SUPPORTS



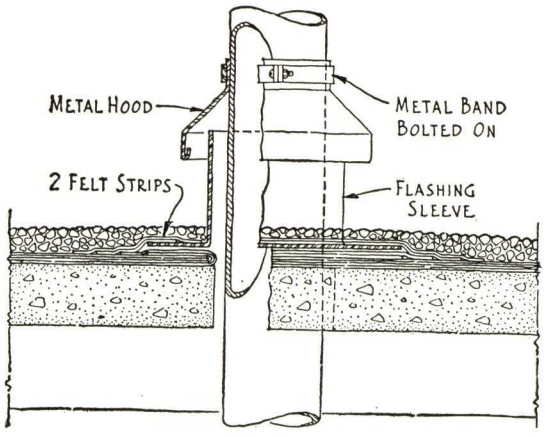
DETAIL FOR FLAT & STEEP ROOF CONNECTION



DETAIL FOR FLAT & STEEP SHINGLE TYPE ROOF CONNECTION



METAL CASING FOR STUB COLUMNS



FLASHING FOR STACKS

SECTION 4

ROOF DRAINAGE SYSTEMS

ROOF DRAINS SHOULD BE PERMANENT

In all types of roof construction, it is consistent that roof drains be at least as permanent as the roof coverings they serve. They should be easy to install, should effectively function under all prevailing conditions, and should provide against clogging of drainage outlets by leaves or debris deposited on the roof proper.

The Barrett-Holt Roof Connection

The Barrett-Holt Roof Connection* meets the demand for a completely assembled, long-lived and dependable roof drain fixture. The connection is made up in a variety of types to meet the particular conditions involved. It consists of a roof fitting with roof locking attachment; a component flashing flange; and an expansion joint. The types furnished for use in connection with inside leader lines are equipped with a cast metal tile or gravel stop; a strainer plate; and serviceable cast metal strainer.

The flashing flange furnished as a component part of the Barrett-Holt Roof Connection assures a dependable connection between the leader head unit and the roof covering. The expansion joint makes possible a flexible, yet water and gas-tight joint between the connection and the pipe or fixture joined to it. The changes resulting from shrinkage, settlement, and expansion or contraction are thereby properly provided for without danger of broken joints or troublesome leaks.

They are used: (1) As a roof leader connection where inside leader or conductor pipe is installed; (2) As a roof vent connection where soil or waste vent pipe is installed; (3) As a connection where any pipe, flag-pole, tank support or similar fixture is carried through the roof deck of a building.

Used More Than Twenty Years

More than twenty years of use under exacting conditions have proved the Barrett-Holt Roof Connection to be the most dependable device of its kind on the market. It simplifies specification procedure—a type to meet each need can be specified in a few words. It is easy to install, and allowances covering extra parts or assembly costs are not necessary.

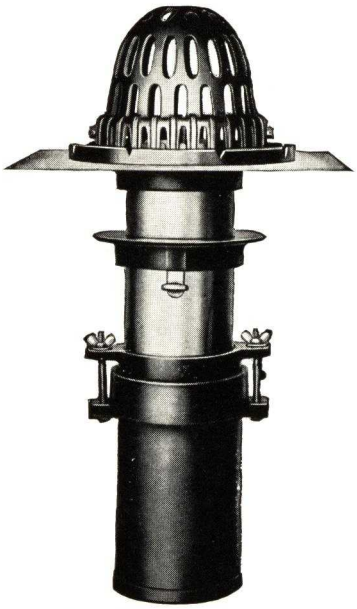
The Barrett-Holt Roof Connections described are standard, and are recommended for use on all types of flat and steep roof construction, in accordance with the specifications outlined.

*Patented

BARRETT-HOLT ROOF LEADER AND VENT CONNECTIONS

FOR SLAG OR SMOOTH SURFACED ROOFS

Type 6 Vent Connection



Type 1 Leader Connection

Type 5 Leader Connection

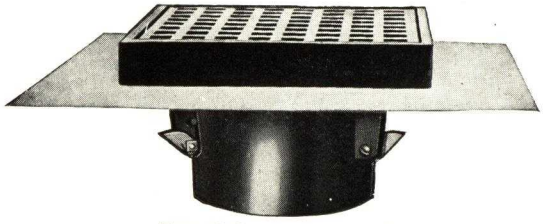
Type 6 Leader Connection

FOR INCLINED ROOFS

Type 2 Leader Connection

FOR TILE SURFACED ROOFS

Type 1 Leader Connection

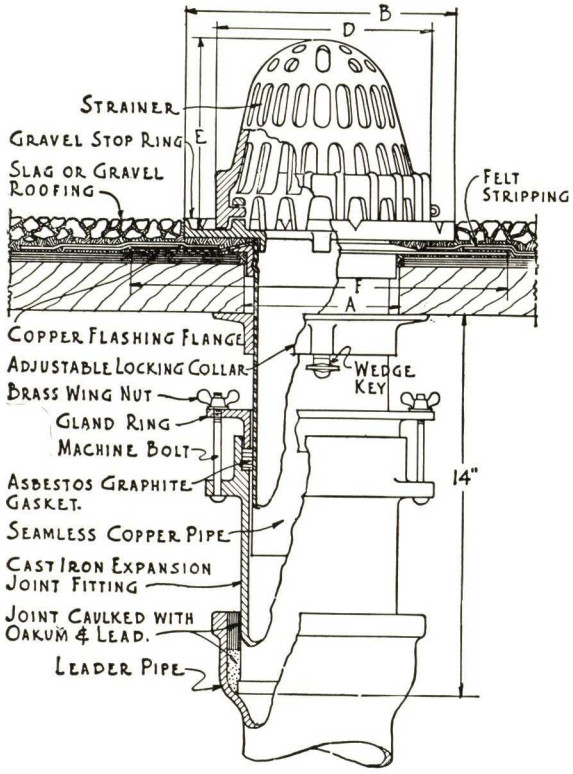


Type 6 Leader Connection

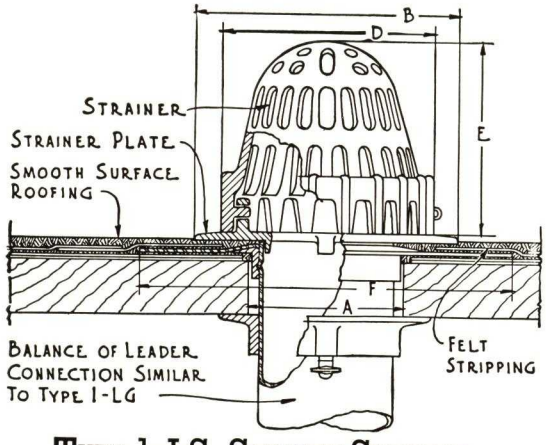
METHOD OF INSTALLING BARRETT-HOLT LEADER CONNECTIONS FOR TYPES 1-LG, 1-LS AND 1-LM

Barrett SINCE 1854

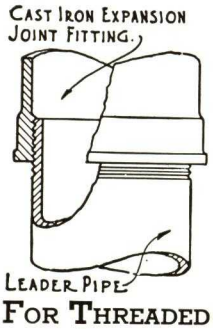
These types are used as leader connections on flat roofs having interior drainage, except roofs covered with tile or a similar material, and where ample working space is provided below the roof deck.



TYPE 1-LG, SLAG OR GRAVEL SURFACE



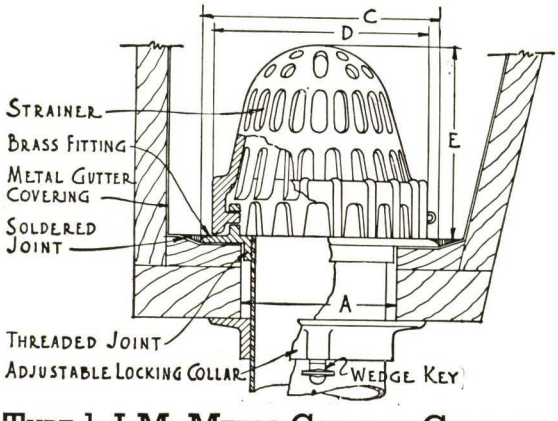
TYPE 1-LS, SMOOTH SURFACE



FOR THREADED PIPE

SIZE OF PIPE	A	B	C	D	E	F
3"	4"	8"	7"	6¾"	6⅛"	12"x12"
4"	5"	8"	7"	6¾"	6⅛"	12"x12"
5"	6"	10¾"	9¾"	9½"	8½"	14"x14"
6"	7"	10¾"	9¾"	9½"	8½"	16"x16"
8"	9"	11¾"	11"	10½"	9½"	18"x18"
10"	11"	14¼"	13½"	13"	11"	20"x20"

DIMENSION TABLE



TYPE 1-LM, METAL COVERED GUTTERS

TABLE SHOWING LENGTH OF CONNECTION REQUIRED FOR GIVEN THICKNESS OF ROOF DECK	
THICKNESS OF ROOF DECK.	LENGTH OF CONNECTION
1" MAX.	10"
3" "	12"
5" "	14"
7" "	16"
9" "	18"

NOTE.- WHEN SCREW THREAD PIPE IS TO BE USED IN BUILDINGS CONSTRUCTED OF STEEL, CONCRETE, BRICK, STONE OR SIMILAR NON-SHRINKABLE MATERIAL, AND THE EXPANSION AND CONTRACTION OF THE LEADER PIPE WILL NOT EXCEED 1", A CONNECTION 2" SHORTER MAY BE USED. THE MINIMUM LENGTH OF THE CONNECTION IS 10".

SPECIFICATION FOR INSTALLING BARRETT-HOLT LEADER CONNECTIONS, TYPES 1-LG, 1-LS AND 1-LM

PREPARATION OF DECK—The opening through the roof deck shall be of proper size to receive the Roof Leader Connection and shall be concentric with leader pipe.

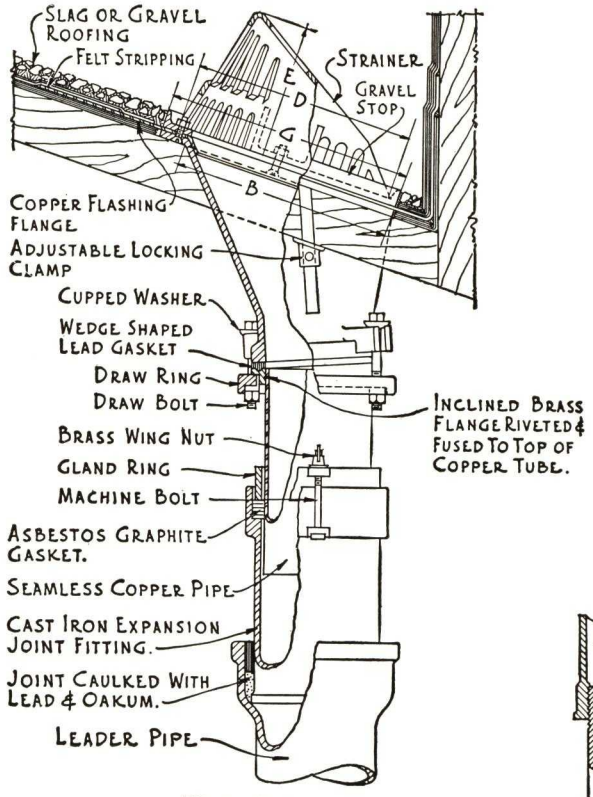
Barrett-Holt Roof Leader Connection, Type .... shall be installed at the drainage outlets and shall be of proper size and length to connect to .... inch leader pipe as shown on Drawing No. .....

Barrett-Holt Roof Leader Connections shall be installed and connected complete in strict accordance with directions of the manufacturer.

Note—Where built-up roofing is used as a roof covering, two plies of Felt thoroughly embedded in hot bitumen shall be applied over the entire copper flashing flange, the outer edge of the first ply to extend beyond the flange not less than three (3) inches and of the second ply not less than six (6) inches before application of finished roof surfacing.

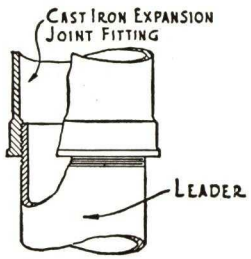
IMPORTANT—The copper flashing flange being an integral part of the Types 1-LG, 1-LS and 1-LM Connections, shall in no case be removed. If the flange is bent, it shall be straightened and made smooth before it is set in place. The flashing flange shall be secured to the roof deck with nails wherever possible.

METHOD OF INSTALLING BARRETT-HOLT LEADER CONNECTIONS FOR TYPES 2-LG AND 2-LS



SIDE VIEW

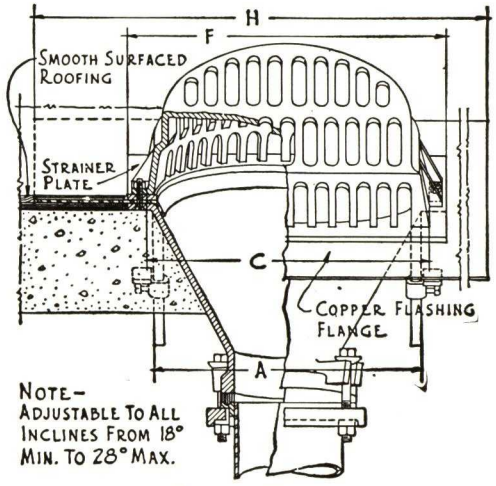
TYPE 2-LG, STEEP SLAG OR GRAVEL SURFACE



FOR THREADED PIPE

SIZE OF PIPE	A	B	C	D	E	F	G	H
3"	9⅛"	6¾"	10⅛"	7⅛"	4⅝"	10⅞"	7⅞"	18"x18"
4"	10⅜"	8⅜"	11⅜"	8⅝"	5⅜"	12¼"	9⅜"	20"x20"
5"	11⅜"	9⅛"	12½"	9⅛"	5½"	13⅛"	10½"	22"x22"
6"	12¾"	10⅜"	13¾"	10"	5⅞"	14¼"	11¾"	24"x24"
8"	THIS CONNECTION ON SPECIAL ORDER.							

DIMENSION TABLE



FRONT VIEW

TYPE 2-LS, STEEP SMOOTH SURFACE

This type is used as a leader connection on inclined roofs ranging from 12° to 42° and having interior drainage. The range of variation of the standard connection is from 18° to 28°. For lesser inclines ranging from 12° to 18° or greater inclines ranging from 28° to 42° special fittings are furnished.

SPECIFICATION FOR INSTALLING BARRETT-HOLT LEADER CONNECTIONS, TYPES 2-LG AND 2-LS

PREPARATION OF SURFACES—The opening through the roof deck shall be of proper size to receive the Roof Leader Connection, and shall be concentric with leader pipe.

INSTALLATION OF LEADER CONNECTIONS—First—Barrett-Holt Roof Leader Connection, Type ..... shall be installed at all drainage outlets and shall be of proper size and length to connect to ..... inch leader pipe as shown on Drawing No. .....

Second—Barrett-Holt Roof Leader Connection shall be adjusted to fit the roof incline and draw-bolts tightened to obtain a water-tight joint. The Connection shall be set in place so that the lower surface of the iron flange shall be flush with the finished surface of the roof deck. The adjustable locking clamps shall be brought up tightly against the under-side of the roof deck and firmly fastened with the set screws so that the Connection is made integral with the roof deck.

Third—At each drainage point a section of the valley roofing not less than three (3) feet wide shall be carried up the inclined surface of the roof deck not less than two (2) feet. Roofing shall terminate at the outer edge of the iron flange of the Connection.

Fourth—After all roofing Felt has been laid and before the finished wearing surface is applied, the surface of the iron flange of the Connection shall be thoroughly cleaned and the copper flashing flange embedded in Plastic Elastigum. If the flange is bent it shall be straightened and made smooth before being set in place. Flashing flange shall be nailed wherever possible. Iron gravel stop ring or strainer plate shall be set in Plastic Elastigum and firmly drawn down by brass nuts.

Fifth—The cast iron strainer shall be fastened in place (if a brass or aluminum strainer is desired, it shall be specified).

Sixth—The copper Flashing Flange shall be thoroughly mopped with hot bitumen into which, while hot, the steep roofing shall be applied and brought up to the gravel stop or strainer plate.

Seventh—The valley roofing shall be laid and brought up to the gravel stop or strainer plate.

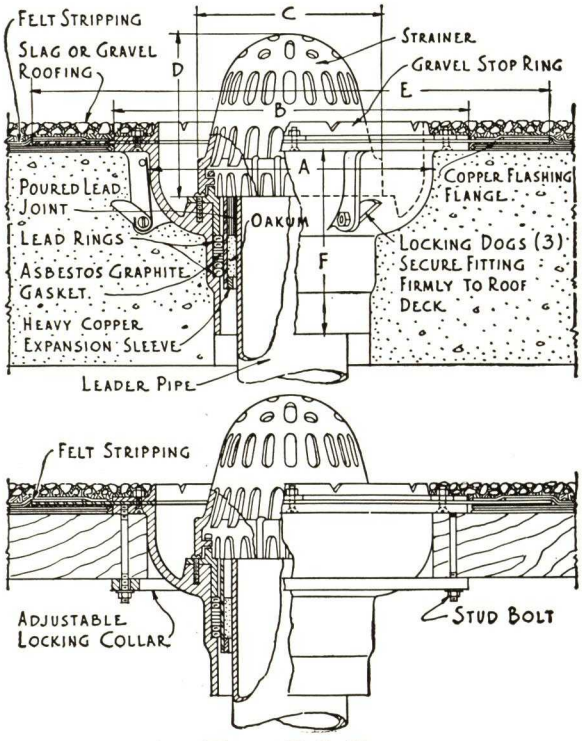
Eighth—The gland ring, gasket and expansion joint fitting shall be set in place and the last length of leader pipe cut to proper length and placed in position. The lower end of the expansion joint fitting shall be not less than fourteen (14) inches from the bottom of the veins on the side of the roof bowl.

Ninth—The gasket and gland ring shall be brought down into the expansion joint fitting, bolted and tightened sufficiently by the wing nuts to obtain a water-tight connection. The joint between the expansion joint and the leader pipe shall then be made.

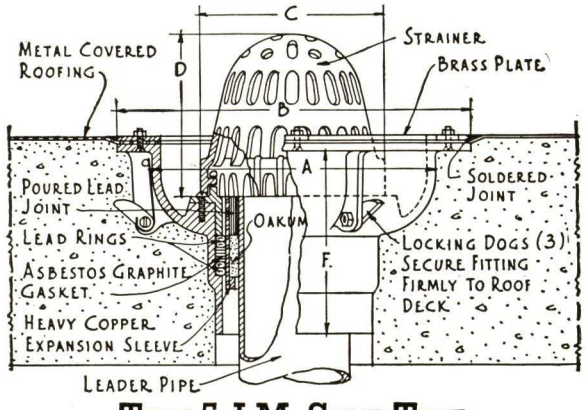
METHOD OF INSTALLING BARRETT-HOLT LEADER CONNECTIONS FOR TYPES 5-LG, 5-LS AND 5-LM

Barrett SINCE 1854

These types are used as leader connections on flat roofs having interior drainage, where a sump type of roof connection is desired.



TYPE 5-LG,
SUMP TYPE SLAG OR GRAVEL SURFACE



TYPE 5-LM, SUMP TYPE
METAL COVERED GUTTERS & ROOFS

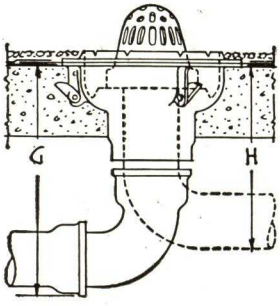
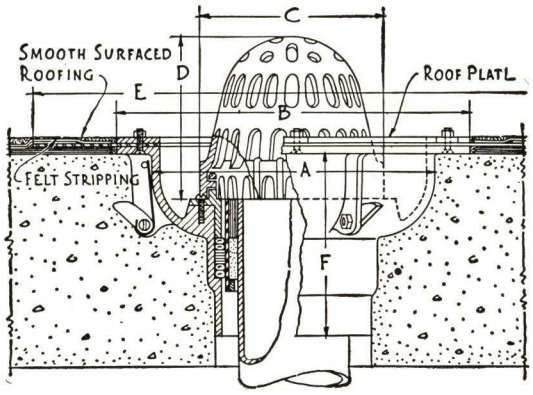


TABLE OF MIN. DIMENSIONS		
SIZE OF PIPE	G	H
3"	17¾"	11½"
4"	18¼"	12"
5"	18¾"	12½"
6"	19¼"	13"
8"	20"	13½"



TYPE 5-LS,
SUMP TYPE SMOOTH SURFACE

NOTE—
STUD BOLTS AND ADJUSTABLE LOCKING COLLAR USED ONLY FOR WOOD OR GYPSUM ROOF DECKS.

SIZE OF PIPE	A	B	C	D	E	F
3"	10¼"	12⅝"	6¾"	6⅛"	20"x20"	7"
4"	12¼"	14⅝"	9½"	8½"	24"x24"	7"
5"	12¼"	14⅝"	9½"	8½"	24"x24"	7"
6"	13¼"	15⅝"	10½"	9½"	24"x24"	7"
8"	15¼"	17⅝"	13"	11"	26"x26"	7"

DIMENSION TABLE

SPECIFICATION FOR INSTALLING BARRETT-HOLT LEADER CONNECTIONS, TYPES 5-LG, 5-LS AND 5-LM

PREPARATION OF SURFACES—The opening through the roof deck shall be of proper size to receive the Roof Leader Connection and shall be concentric with the leader pipe.

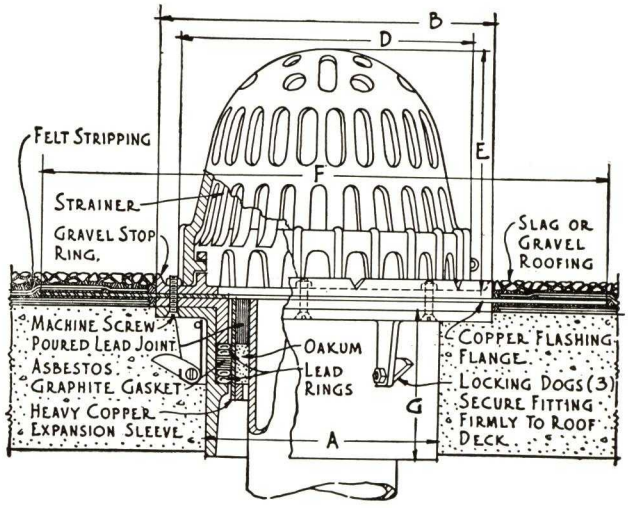
INSTALLATION OF LEADER CONNECTIONS—**First**—Barrett-Holt Roof Leader Connection Type ..... shall be installed at all drainage outlets and shall be of proper size and length to connect to ..... inch leader pipe as shown on Drawing No. .....

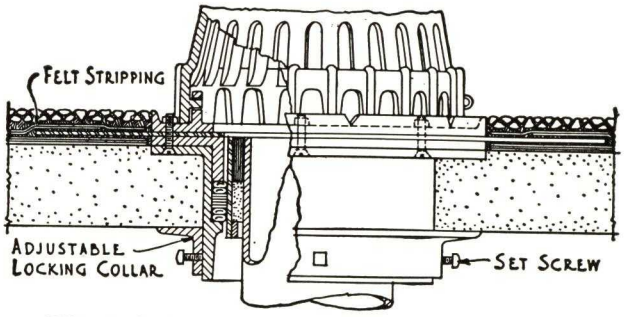
Second—Barrett-Holt Roof Leader Connections shall be installed and connected complete in strict accordance with directions of the manufacturer.

Note—Where built-up roofing is used as a roof covering, two (2) plies of felt thoroughly embedded in hot bitumen shall be applied over the entire copper flashing flange, the outer edge of the first ply to extend beyond the flange not less than three (3) inches and of the second ply not less than six (6) inches.

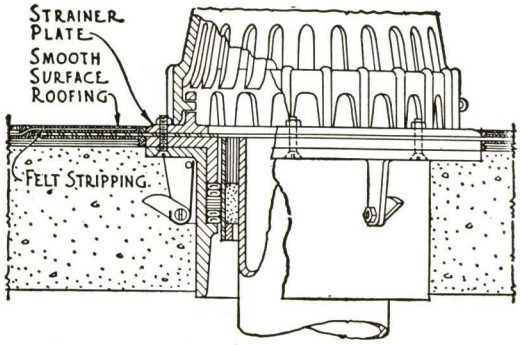
When used in connection with gypsum or wood roof decks, types 5-LG, 5-LS and 5-LM Connections are equipped with threaded stud bolts which hold the adjustable locking collar in place.

METHOD OF INSTALLING BARRETT-HOLT LEADER CONNECTIONS FOR TYPES 6-LG, 6-LS AND 6-LM





TYPE 6-LG, SLAG OR GRAVEL SURFACE

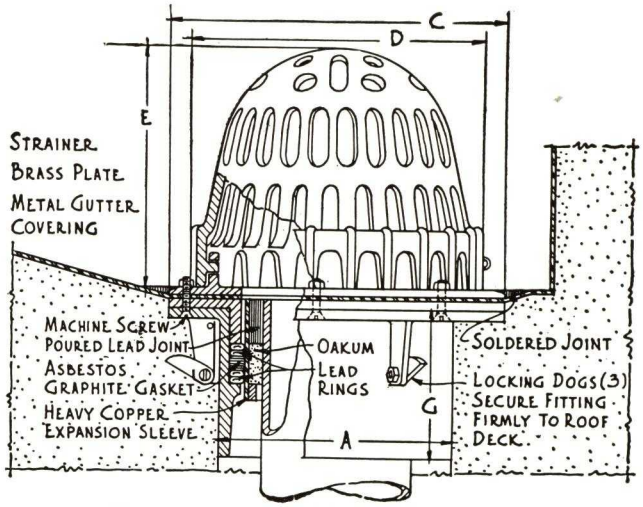


TYPE 6-LS, SMOOTH SURFACE

Size of Pipe	A	B & C	D	E	F	G
3"	6¼"	10¾"	9½"	8½"	16"x16"	4½"
4"	7¼"	10¾"	9½"	8½"	18"x18"	4½"
5"	8¼"	11¾"	10½"	9½"	20"x20"	4½"
6"	9¼"	11¾"	10½"	9½"	20"x20"	4½"
8"	11¼"	14¼"	13"	11"	24"x24"	4½"

DIMENSION TABLE

These types are used as leader connections on flat roofs having interior drainage, except roofs covered with tile or a similar material, and where working space below the roof deck is restricted.



TYPE 6-LM, METAL COVERED GUTTERS & ROOFS

SPECIFICATION FOR INSTALLING BARRETT-HOLT LEADER CONNECTIONS, TYPES 6-LG, 6-LS AND 6-LM

The opening through the roof deck shall be of proper size to receive the Roof Leader Connection and shall be concentric with the leader pipe.

Barrett-Holt Roof Leader Connection Type ..... shall be installed at all drainage outlets and shall be of proper size and length to connect to ..... inch leader pipe as shown on Drawing No. .....

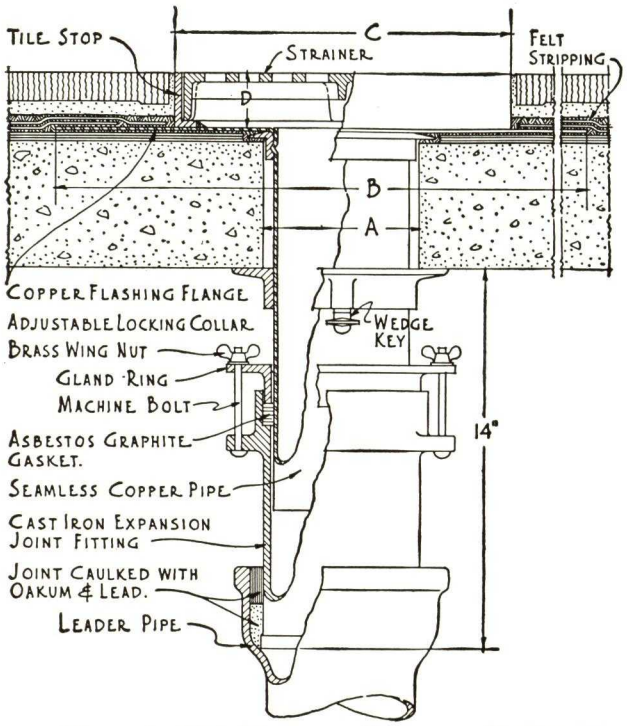
Barrett-Holt Roof Leader Connections shall be installed and connected complete in strict accordance with directions of the manufacturer.

Where built-up roofing is used as a roof covering, two (2) piles of Felt thoroughly embedded in hot bitumen shall be applied over the entire copper flashing flange, the outer edge of the first ply to extend beyond the flange not less than three (3) inches and of the second ply not less than six (6) inches before application of finished surfacing.

Note—Where gypsum or wood roof deck exceeds three and one-half (3½) inches in thickness, Types 6-LG, 6-LS and 6-LM Connections are equipped with threaded stud bolts which hold the adjustable locking collar in place.

METHOD OF INSTALLING BARRETT-HOLT LEADER CONNECTIONS TYPES 1-LT AND 6-LT FOR TILE SURFACED ROOFS

Barrett SINCE 1854



TYPE 1-LT, TILE OR SIMILAR SURFACE

SIZE OF PIPE	A	B	C	•D
3"	4"	18"x18"	$10\frac{3}{8}$"	$\frac{3}{4}$" TO $3\frac{1}{2}$" UNIT OF VARIATION •¼"
4"	5"	18"x18"	$10\frac{3}{8}$"	
5"	6"	18"x18"	$10\frac{3}{8}$"	
6"	7"	18"x18"	$10\frac{3}{8}$"	
8"	9"	ON SPECIAL ORDER ONLY		
10"	11"			

DIMENSION TABLE

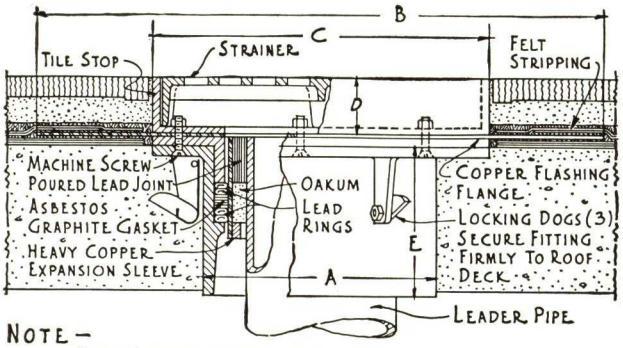
SPECIFICATION FOR INSTALLING BARRETT-HOLT LEADER CONNECTIONS TYPES 1-LT AND 6-LT

The opening through the roof deck shall be of proper size to receive the Roof Leader Connection and shall be concentric with leader pipe.

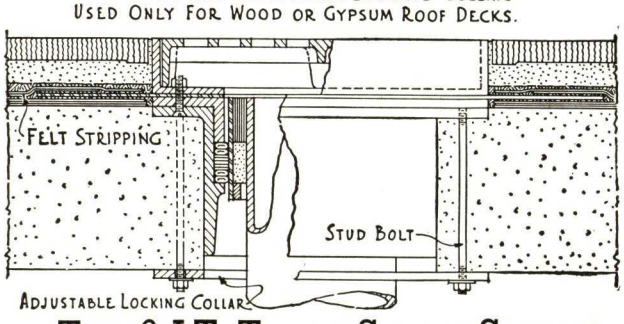
Barrett-Holt Roof Leader Connection Type ..... shall be installed at all drainage outlets and shall be of proper size and length to connect to ..... inch leader pipe as shown on Drawing No. .....

Barrett-Holt Roof Leader Connections shall be installed and connected complete in strict accordance with directions of the manufacturer.

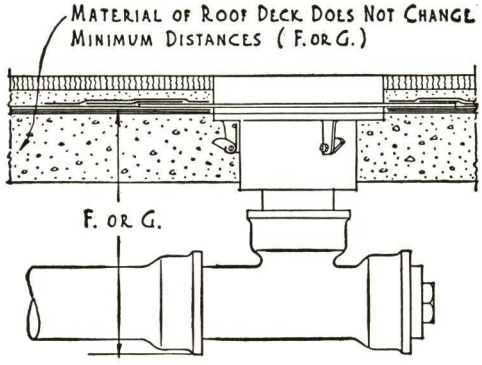
Before the application of the cement bed or the finished surfacing material, two (2) plies of Felt thoroughly embedded in hot bitumen shall be applied over the entire copper flashing flange, the outer edge of the first ply to extend beyond the flange not less than three (3) inches and of the second ply not less than six (6) inches.



NOTE—
STUD BOLTS AND ADJUSTABLE LOCKING COLLAR USED ONLY FOR WOOD OR GYPSUM ROOF DECKS.



TYPE 6-LT, TILE OR SIMILAR SURFACE



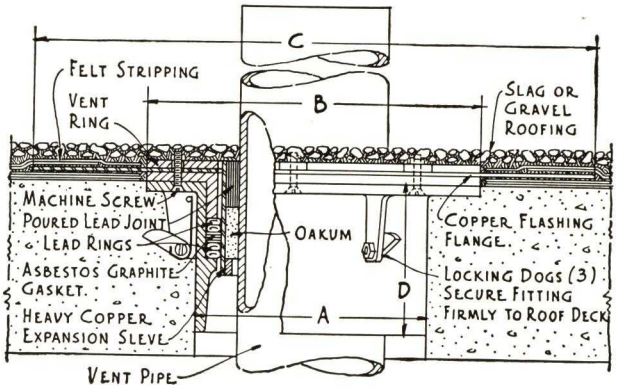
F— REFERS TO CAST IRON SOIL PIPE
G— REFERS TO WROUGHT IRON OR STEEL SCREW PIPE.

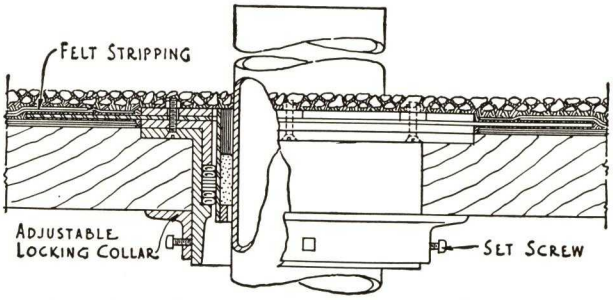
SIZE OF PIPE	A	B	C	D	E	F	G
3"	$6\frac{1}{4}$"	20"x20"	$10\frac{1}{2}$"	1" TO $3\frac{1}{2}$" UNIT OF VARIATION ¼"	$4\frac{1}{2}$"	$15\frac{1}{4}$"	$13\frac{1}{2}$"
4"	$7\frac{1}{4}$"	20"x20"	$10\frac{1}{2}$"		$4\frac{1}{2}$"	$15\frac{3}{4}$"	$14\frac{1}{4}$"
5"	$8\frac{1}{4}$"	20"x20"	$10\frac{1}{2}$"		$4\frac{1}{2}$"	$16\frac{1}{4}$"	$14\frac{3}{4}$"
6"	$9\frac{1}{4}$"	20"x20"	$10\frac{1}{2}$"		$4\frac{1}{2}$"	$16\frac{3}{4}$"	$15\frac{1}{4}$"
8"	$11\frac{1}{4}$"	24x24	SPEC.		$4\frac{1}{2}$"	$17\frac{3}{4}$"	$17\frac{3}{4}$"

DIMENSION TABLE

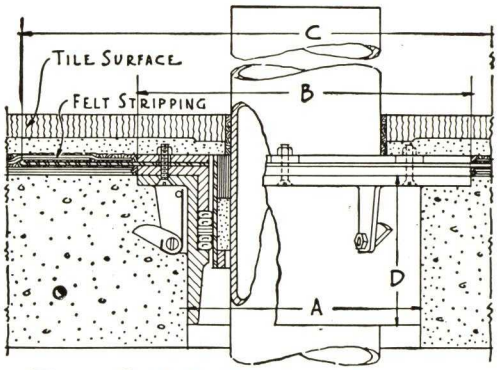
BARRETT ROOF DRAINAGE SYSTEM

METHOD OF INSTALLING BARRETT-HOLT VENT CONNECTIONS FOR TYPES 6-VG, 6-VS, 6-VT AND 6-VM

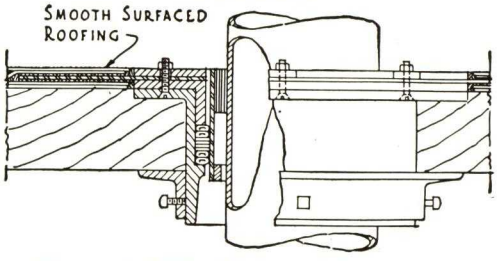




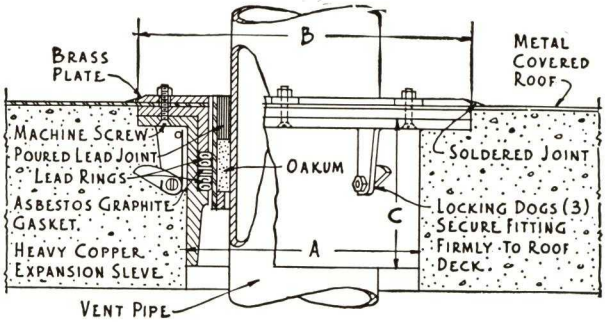
TYPE 6-VG, SLAG OR GRAVEL SURFACE



TYPE 6-VT, TILE OR SIMILAR SURFACE



TYPE 6-VS, SMOOTH SURFACE

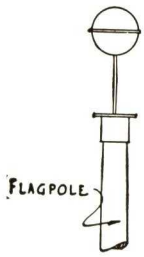


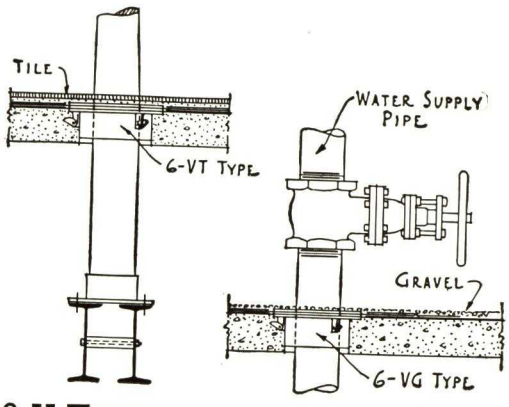
TYPE 6-VM, METAL COVERED ROOFS

These types used on flat roofs for soil and waste vent stacks, flag-poles, supply pipes or any similar fixture carried through the roof deck.

SIZE OF PIPE	A	B	C	D
3"	6¼"	8¾"	16"x16"	4½"
4"	7¼"	9¾"	18"x18"	4½"
5"	8¼"	10¾"	20"x20"	4½"
6"	9¼"	11¾"	20"x20"	4½"
8"	11¼"	14⅜"	24"x24"	4½"

DIMENSION TABLE





6-V TYPES CAN BE USED FOR WATER PIPES, FLAGPOLES, FIRE LINES, ETC.

SPECIFICATION FOR TYPES 6-VG, 6-VS, 6-VT AND 6-VM

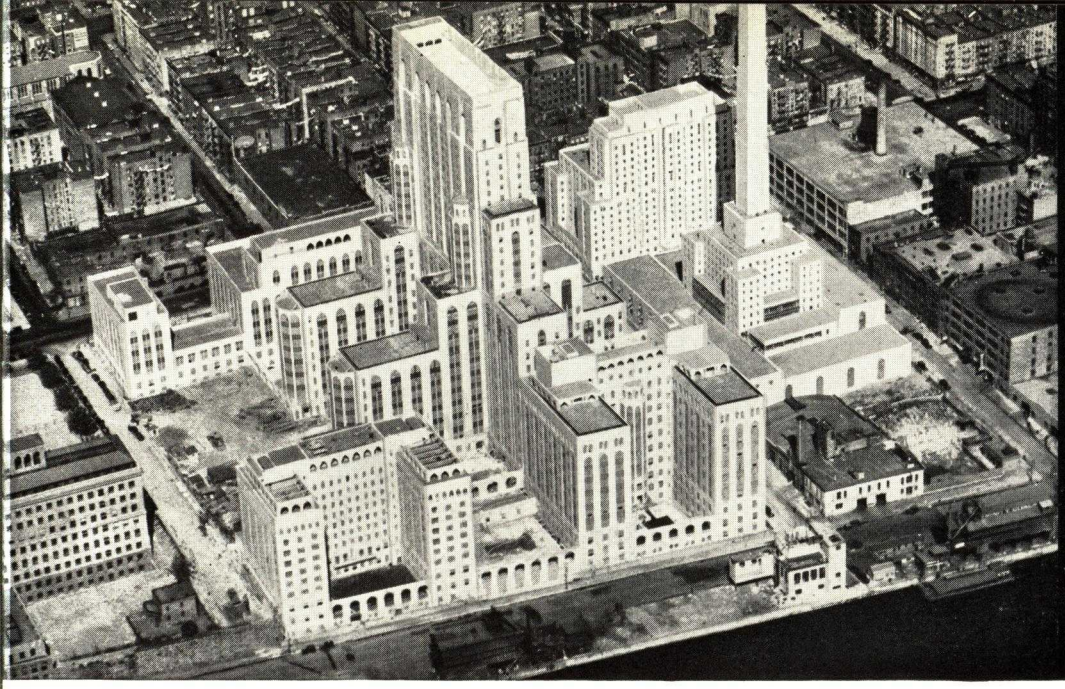
The opening through roof deck shall be of proper size to receive Roof Vent Connection and shall be concentric with vent pipe.

Barrett-Holt Roof Vent Connection Type ..... shall be installed at all vent openings and shall be of proper size to connect with .... inch vent pipe as shown on Drawing No. .....

Barrett-Holt Roof Vent Connections shall be installed and connected complete in strict accordance with directions of manufacturer.

Where built-up roofing is used as a roof covering, two (2) plies of Felt thoroughly embedded in hot bitumen shall be applied over the entire copper flashing flange, the outer edge of the first ply to extend beyond the flange not less than three (3) inches and of the second ply not less than six (6) inches before the application of finished surfacing.

Note: Where gypsum or wood roof decks exceed 3½ inches in thickness, connections are equipped with threaded stud bolts which hold adjustable locking collar in place.



SECTION 5

WATERPROOFING AGAINST HYDROSTATIC PRESSURE

MEMBRANE WATERPROOFING

A Vital Part of Building Construction

Waterproofing in some form is essential to the life and stability of many structures. Just what this form should be is a problem not exactly determinable by precise mathematical calculation. However, with a careful study of conditions, with the knowledge of definite factors and with the help of past experience, a form or method of waterproofing may be devised for the specific conditions encountered. Proper waterproofing materials, intelligently selected and skillfully applied, are vital factors in making engineering structures watertight.

A Blanket of Protection

For most satisfactory results the use of the membrane method of waterproofing is recommended. This method correctly followed not only protects but prolongs the life of any structure, and has been successfully used over a long period of years. It provides an elastic and continuous bituminous waterproofing blanket, composed of layers of waterproofing felt or fabric, homogeneously cemented with suitable waterproofing bitumen.

Water Pressure

The use of the membrane system applies generally to the waterproofing of structures exposed to hydrostatic pressure or conditions of dampness or moisture, particularly those below ground surface, such as foundations of buildings, tunnels, subways, or other forms of sub-construction. It is equally adaptable to the waterproofing of reservoirs, bridges, retaining walls, etc.

The following specifications treat with specific conditions. The materials specified are prepared expressly for the purposes intended, and are definitely suited to the conditions under which they are required to function. The application methods described are accepted as standard practice.

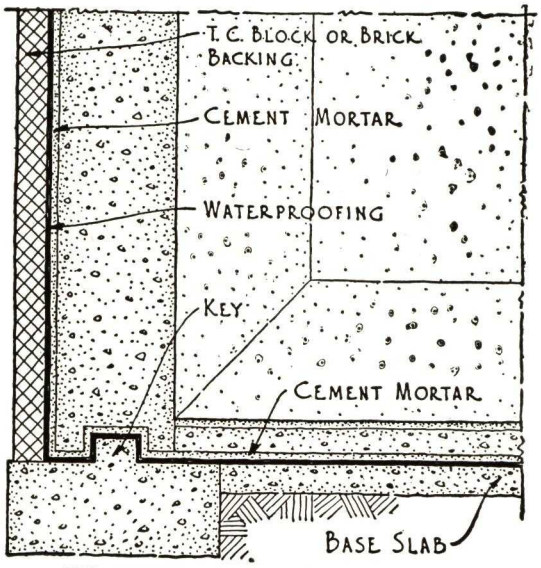
Workmanship

Barrett Approved Waterproofing Contractors are skilled in the art of waterproofing. Their employment on specific installations, in accordance with the specifications outlined, assures satisfactory results.

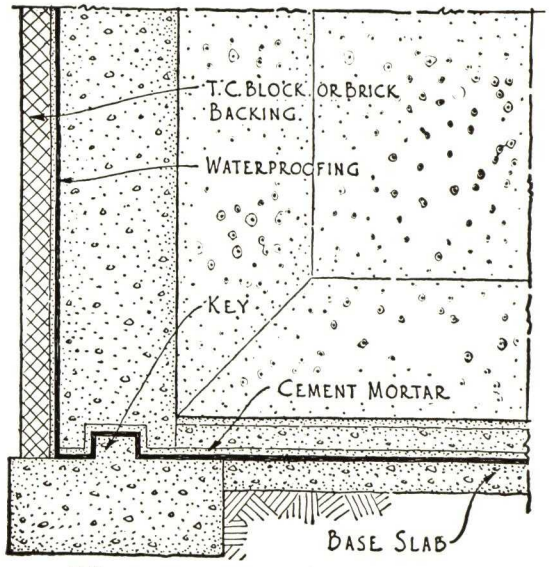
BARRETT ENGINEERING CONSULTING SERVICE

The services of our Construction Service Department are available for consultation or co-operation in the preparing of specifications or handling of unusual installations not incorporated in this section.

MEMBRANE METHOD OF SUBSTRUCTURE WATERPROOFING



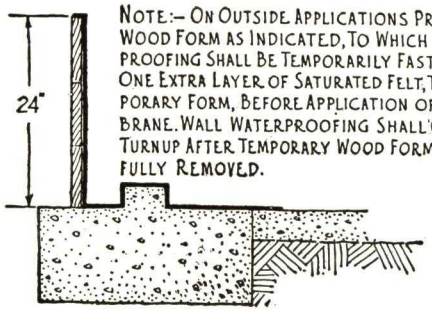
WATERPROOFING DETAIL FOR OUTSIDE WALLS, FOOTINGS, ETC. - INSIDE APPLICATION -



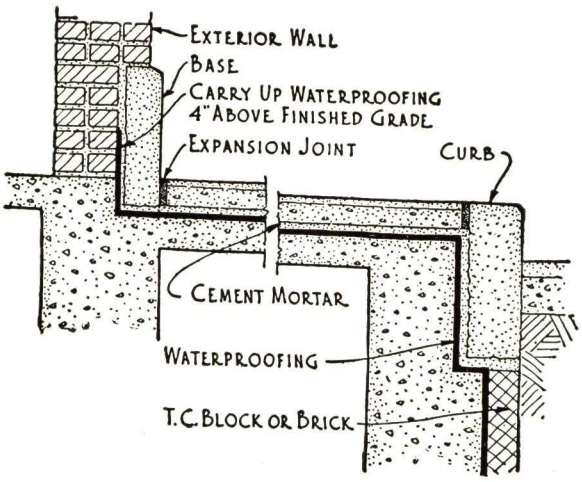
WATERPROOFING DETAIL FOR OUTSIDE WALLS, FOOTINGS, ETC. - OUTSIDE APPLICATION -

NOTE:-
ON INSIDE APPLICATIONS WATERPROOFING MEMBRANE, AS SPECIFIED, IS APPLIED DIRECTLY TO THE TILE OR BRICK BACKING AS INDICATED

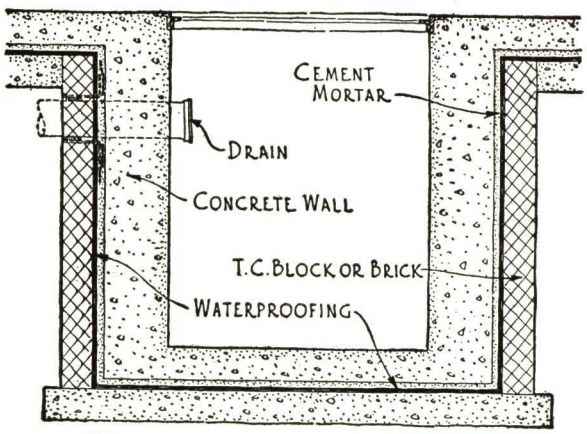
IMPORTANT -
ALL MASONRY SHALL BE DESIGNED TO WITHSTAND THE MAXIMUM HYDROSTATIC PRESSURE.
SEE PLATE 49 FOR WATERPROOFING SPECIFICATIONS.



NOTE:- ON OUTSIDE APPLICATIONS PROVIDE TEMPORARY WOOD FORM AS INDICATED, TO WHICH THE FLOOR WATERPROOFING SHALL BE TEMPORARILY FASTENED. PROVIDE ONE EXTRA LAYER OF SATURATED FELT, TACKED DRY TO TEMPORARY FORM, BEFORE APPLICATION OF SPECIFIED MEMBRANE. WALL WATERPROOFING SHALL OVERLAP MEMBRANE TURNUP AFTER TEMPORARY WOOD FORMS HAVE BEEN CAREFULLY REMOVED.



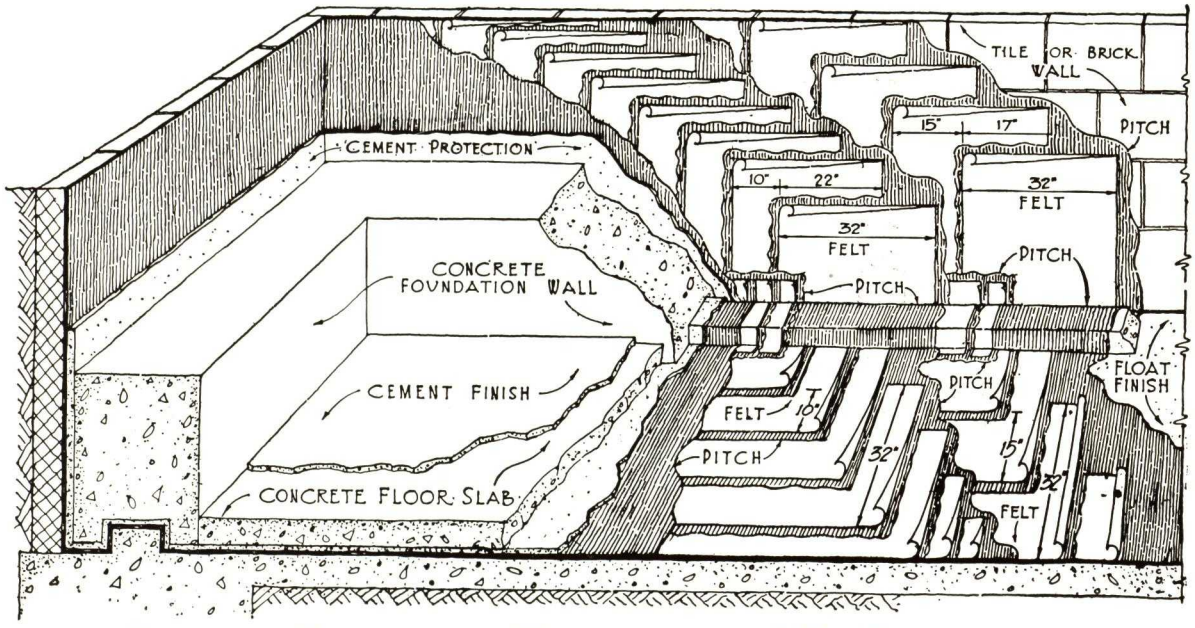
WATERPROOFING DETAIL FOR VAULTS & TUNNELS



WATERPROOFING DETAIL FOR SUMPS & PITS

MEMBRANE METHOD OF SUBSTRUCTURE WATERPROOFING

Barrett SINCE 1854



DETAIL FOR SUBSTRUCTURE WATERPROOFING — 5 PLY CONSTRUCTION

IMPORTANT—All Masonry Shall Be Designed to Withstand Maximum Hydrostatic Pressure

SPECIFICATION

Note—The waterproofing shall be applied by a waterproofing contractor approved by THE BARRETT COMPANY, who has had experience in successfully applying this type of built-up waterproofing on sub-grade construction, and who can refer to work of a similar nature that he has executed in a satisfactory manner.

PREPARATION OF SURFACES—All surfaces on which the waterproofing is to be applied shall be firm, smooth and dry, and free from loose materials, and shall be covered by a membrane of continuous waterproofing consisting of ..... plies of Barrett Tarred Felt and ..... moppings of Barrett Waterproofing Pitch.

APPLICATION OF WATERPROOFING—First—Coat the entire surface on which the waterproofing is to be applied with Barrett Waterproofing Pitch into which, while hot, embed a layer of Barrett Tarred Felt, as specified, following this with alternating moppings of Pitch and layers of Felt until ..... moppings of Pitch and ..... layers of Felt have been applied. Each layer of Felt shall be thoroughly rubbed into the hot Pitch, and the entire surface shall be immediately mopped with Pitch to insure thorough embedding of the Felt. The Felt shall be laid without wrinkles or buckles, and the finished membrane shall be free from pockets or blisters.

Second—Not less than .....* pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing, and the Pitch shall not be heated above three hundred and fifty (350) degrees Fahrenheit.

Third—At wall angles and footings and places where the waterproofing may be subjected to unusual strain, there shall be applied not less than two (2) extra reinforcing layers of Felt and alternating moppings of Pitch.

Fourth—Where laps are left to be connected, they shall be not less than ten (10) inches wide, and shall be temporarily protected by one-half (½) inch troweled course of Portland Cement Mortar. When connections with laps are made, laps shall be carefully cleaned, dry, and mopped with Pitch before proceeding with the work.

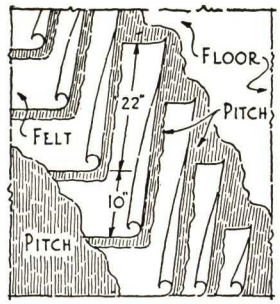
Fifth—Care shall be taken not to injure the waterproofing membrane either during application or after completion, and all finished work shall be approved before construction of permanent protective finish or wall.

Sixth—The waterproofing shall be immediately protected by tile, brick, concrete or similar material as specified.

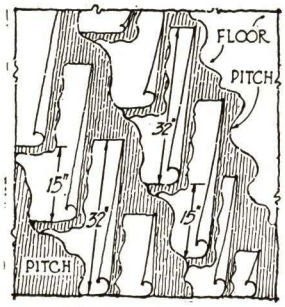
*** Architect's Note**—For five (5) ply construction six (6) alternating moppings of Pitch shall be required, and not less than two hundred and ten (210) pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing.

For four (4) ply construction five (5) alternating moppings of Pitch shall be required, and not less than one hundred and seventy-five (175) pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing.

For three (3) ply construction four (4) alternating moppings of Pitch shall be required, and not less than one hundred and forty (140) pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing.

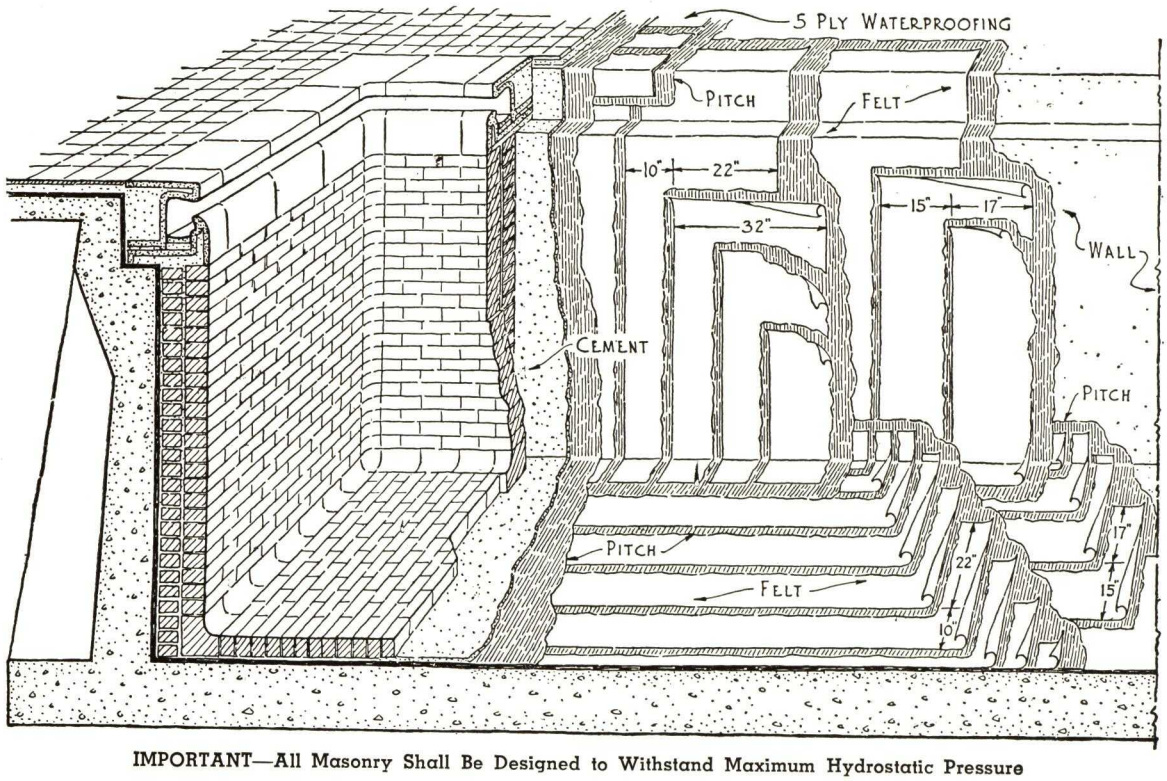


DETAIL FOR 3 PLY CONSTRUCTION



DETAIL FOR 4 PLY CONSTRUCTION

MEMBRANE METHOD FOR SWIMMING POOLS, SHOWER ROOMS, ETC.



IMPORTANT—All Masonry Shall Be Designed to Withstand Maximum Hydrostatic Pressure

SPECIFICATION

Note—The waterproofing shall be applied by a waterproofing contractor approved by THE BARRETT COMPANY, who has had experience in successfully applying this type of built-up waterproofing on swimming pool construction and who can refer to work of a similar nature that he has executed in a satisfactory manner.

PREPARATION OF SURFACES—All surfaces on which the waterproofing is to be applied shall be firm, smooth and dry, and free from loose materials, and shall be covered by a membrane of continuous waterproofing consisting of five (5) plies of Barrett Tarred Felt, as specified, and six (6) moppings of Barrett Waterproofing Pitch.

APPLICATION OF WATERPROOFING—First—Coat the entire surface on which the waterproofing is to be applied with Barrett Waterproofing Pitch into which, while hot, lay two (2) plies of Barrett Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Waterproofing Pitch the full seventeen (17) inch lap on each sheet, so that in no place shall Felt touch Felt.

Second—Coat the entire surface uniformly with Barrett Waterproofing Pitch into which, while hot, lay three (3) plies of Barrett Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Barrett Waterproofing Pitch the full twenty-two (22) inch lap on each sheet, so that in no place shall Felt touch Felt. All Felt shall be thoroughly and smoothly embedded into the hot Pitch, shall be laid without wrinkles or buckles, and the finished membrane shall be free from pockets or blisters.

Third—Coat the entire surface with a heavy, uniform mopping of Barrett Waterproofing Pitch.

Fourth—Not less than two hundred and ten (210) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

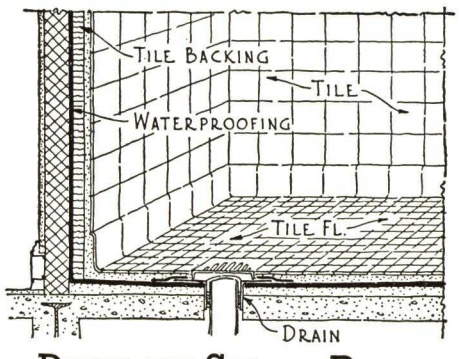
Fifth—At wall angles and footings and places where the waterproofing may be subjected to unusual strain, there shall be applied not less than two (2) extra reinforcing layers of Felt and alternating moppings of Pitch.

Sixth—Where laps are left to be connected, they shall be not less than ten (10) inches wide and shall be temporarily protected by one-half (½) inch troweled course of Portland Cement Mortar. When connections with laps are made, laps shall be carefully cleaned, dried, and mopped with Pitch before proceeding with the work.

Seventh—Care shall be taken not to injure the waterproofing membrane either during application or after completion, and all finished work shall be approved before construction of permanent protective finish.

Eighth—The waterproofing shall be immediately protected by tile, brick, concrete or similar material (as specified) and a continuous course of at least one-half (½) inch of Portland Cement Mortar, one (1) to two (2) mix, applied directly over the waterproofing membrane before such finished course is installed.

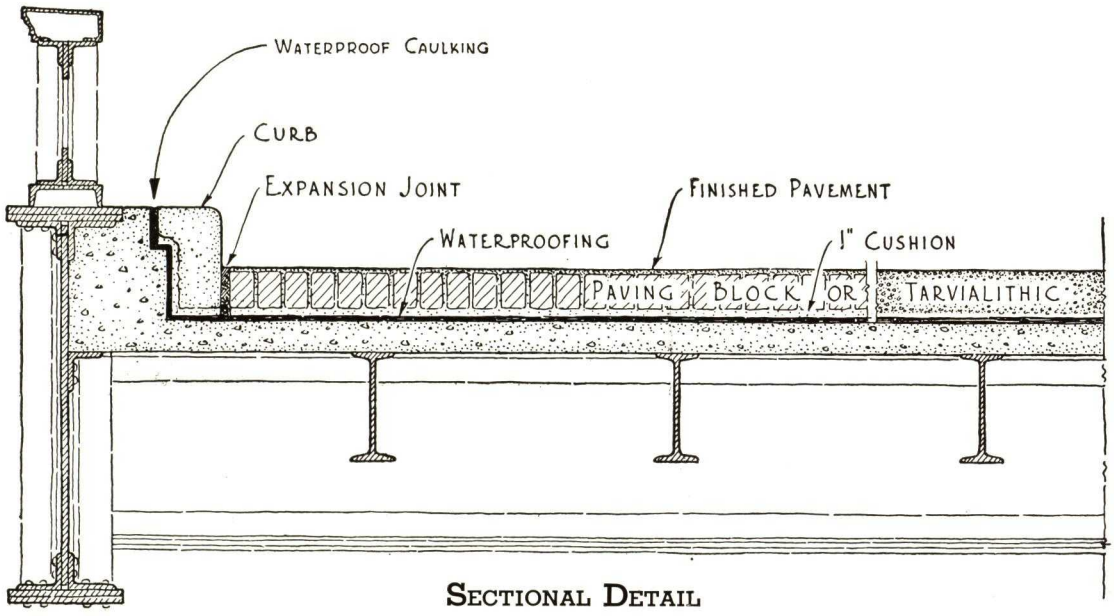
Note—Where swimming pool is provided with steam coil or hot water inlet, all such pipes shall be thoroughly insulated.



DETAIL FOR SHOWER ROOM

MEMBRANE METHOD FOR ELEVATED HIGHWAYS OR BRIDGES, RAMPS, ETC.

Barrett SINCE 1854



SECTIONAL DETAIL

This specification covers application for waterproofing membrane of pitch and felt. For alternate types and details, see page 52.

SPECIFICATION

Note—The waterproofing shall be applied by a Waterproofing Contractor approved by THE BARRETT COMPANY, who has had experience in successfully applying this type of Built-Up Waterproofing, and who can refer to work of a similar nature that he has executed in a satisfactory manner.

PREPARATION OF SURFACES—All surfaces on which the waterproofing is to be applied shall be firm, smooth, dry, and free from loose materials, and shall be covered by a membrane of continuous waterproofing consisting of ..... plies of Barrett Tarred Felt, as specified and ..... moppings of Barrett Waterproofing Pitch.

APPLICATION OF WATERPROOFING—First—Coat the entire surface on which the waterproofing is to be applied, with Barrett Waterproofing Pitch, into which, while hot, embed a layer of Barrett Tarred Felt, following this with alternating moppings of Pitch and layers of Felt until ..... moppings of Pitch and ..... layers of Felt have been applied. Each layer of Felt shall be thoroughly rubbed into the hot Pitch, and the entire surface shall be immediately mopped with Pitch to insure thorough embedment of the Felt. The Felt shall be laid without wrinkles or buckles, and the finished membrane shall be free from pockets or blisters.

Second—Spread over the entire surface a heavy, uniform coating of Barrett Waterproofing Pitch.

Third—Not less than .....* pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing, and the Pitch shall not be heated above three hundred and fifty (350) degrees Fahrenheit.

Fourth—At wall angles, curbs, deflection joints, and places where the waterproofing may be subjected to unusual strain, there shall be applied not less than two (2) extra reinforcing layers of Felt and alternating moppings of Pitch.

Fifth—Where laps are left to be connected, they shall be not less than ten (10) inches wide and shall be temporarily protected by one-half (½) inch troweled course of Portland Cement Mortar. When connections with laps are made, laps shall be carefully cleaned, dried, and mopped with Pitch before proceeding with the work.

Sixth—Felt and Pitch membrane shall be carried up curbs, walls, and areas around columns, pipes, etc., not less than four (4) inches above the finished wearing surface.

Seventh—Care shall be taken not to injure the waterproofing membrane either during application or after completion, and all finished work shall be approved before construction of permanent finished wearing surface.

Eighth—The finished wearing surface as specified shall be immediately installed over the waterproofing membrane.

Note No. 1—Expansion joints shall be provided throughout the finished wearing surface. All such expansion joints shall extend from the top of the finished wearing surface through to the waterproofing membrane.

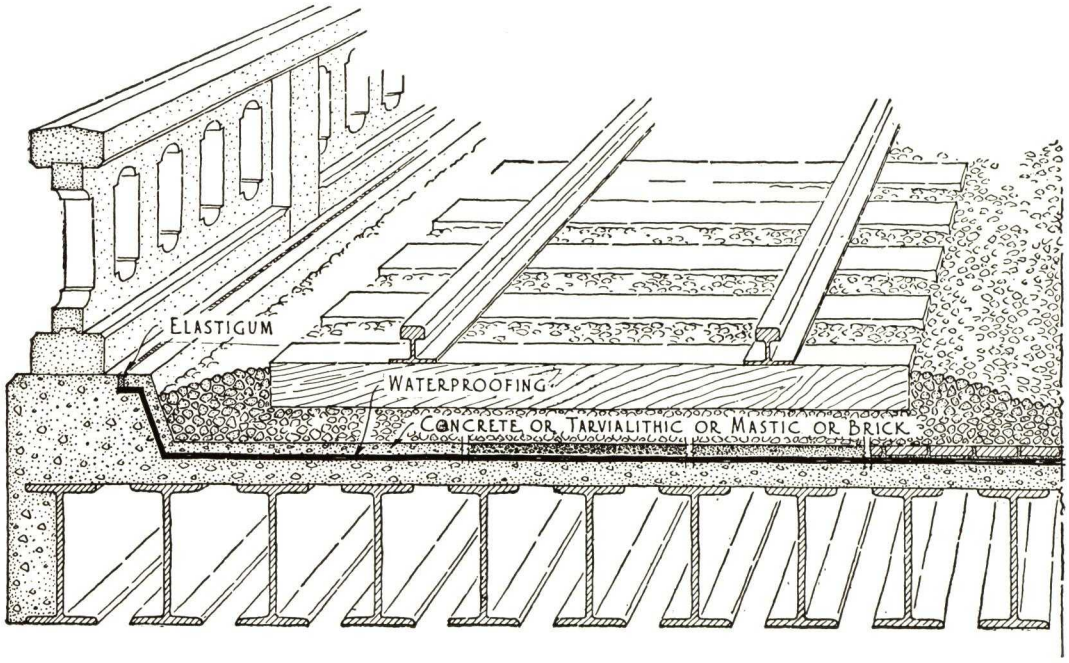
Note No. 2—Where outlets or scuppers are provided as indicated on drawings, they shall be placed level with the waterproofing course and properly Felt-stripped.

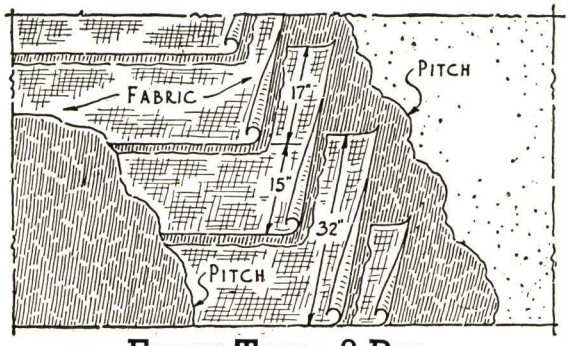
****Architect's Note***—For five (5) ply construction, Felt shall be laid after the two (2), two (2) and one (1) method, with alternating moppings of Waterproofing Pitch throughout. Not less than two hundred and ten (210) pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed Waterproofing.

For four (4) ply construction not less than one hundred and seventy-five (175) pounds of Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed Waterproofing.

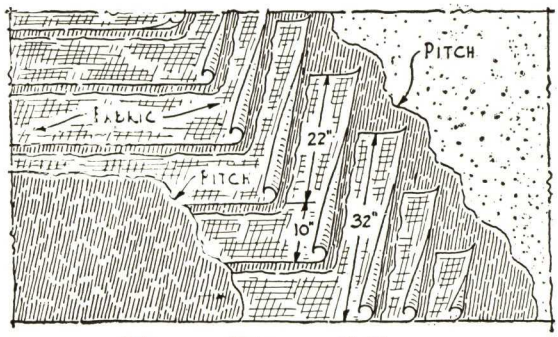
West Side Elevated Express Highway, New York, N. Y.
750,000 sq. ft. of Barrett waterproofing

MEMBRANE METHOD FOR SOLID DECK RAILROAD BRIDGES

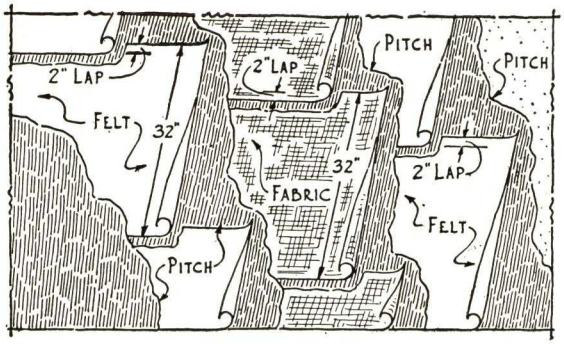




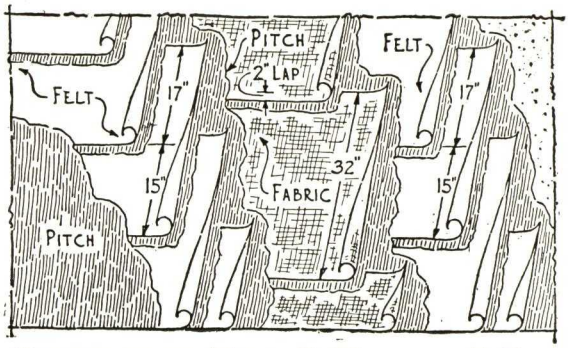
FABRIC TYPE—2 PLY



FABRIC TYPE—3 PLY



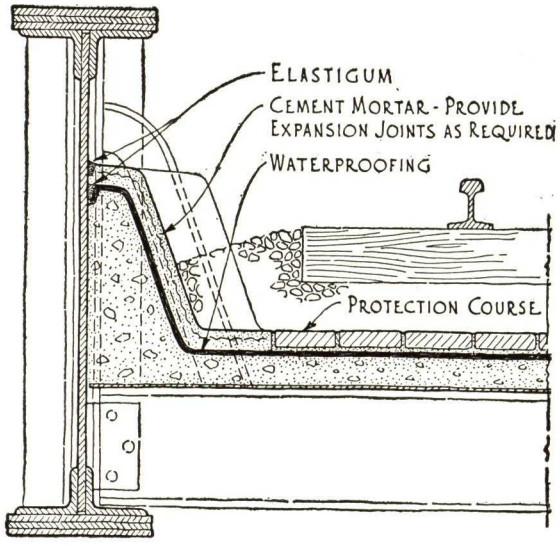
COMBINATION FELT & FABRIC—3 PLY



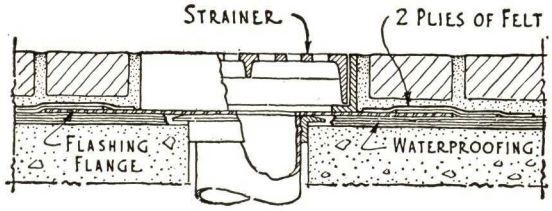
COMBINATION FELT & FABRIC—5 PLY

FLASHING DETAILS FOR SOLID DECK RAILROAD BRIDGES

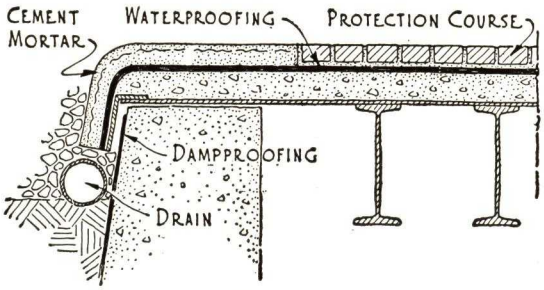
Barrett SINCE 1854



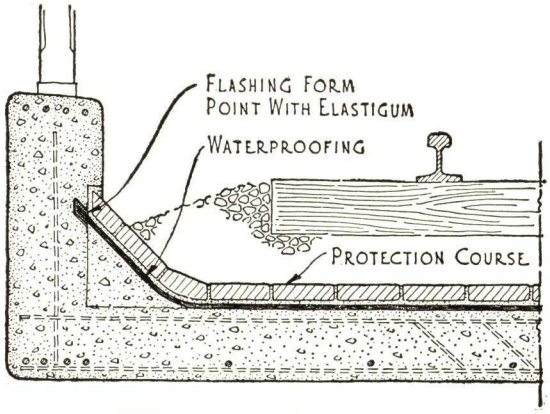
METHOD OF FLASHING AT STEEL GIRDERS



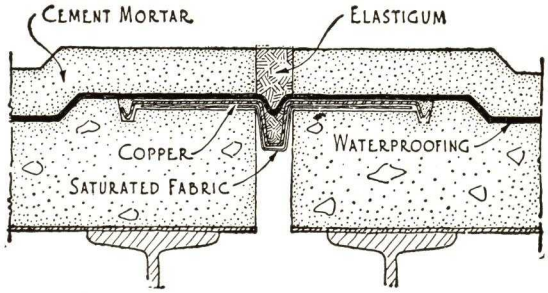
DETAIL OF DECK DRAIN



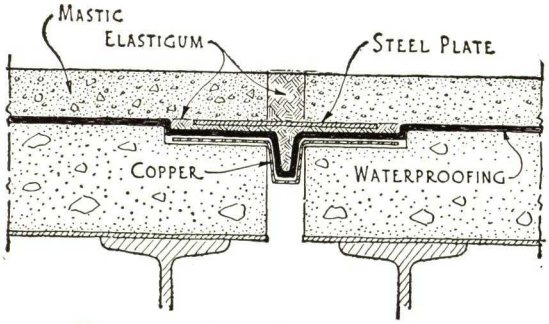
DETAIL OF WATERPROOFING AT EXPANSION END



METHOD OF FLASHING AT CONCRETE CURBS



DETAIL OF EXPANSION JOINT CONCRETE PROTECTION COURSE



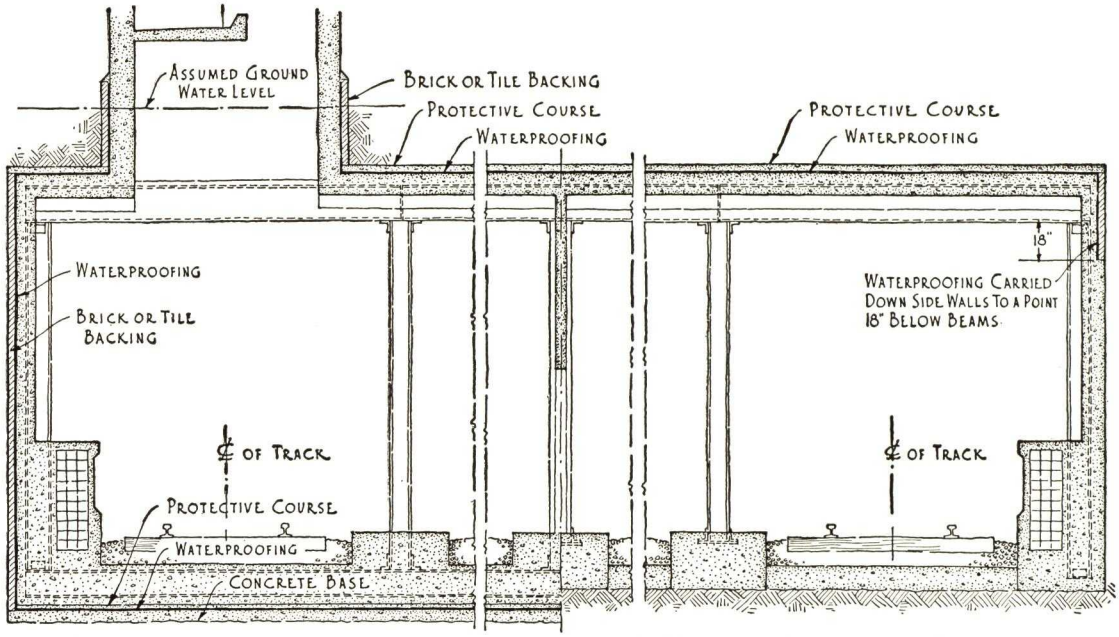
DETAIL OF EXPANSION JOINT MASTIC PROTECTION COURSE

The membrane method of waterproofing is recommended for use on solid deck railroad bridges or other bridges, ramps, highways, etc.

The types detailed conform to methods recommended by the American Railway Engineering Association, and incorporate the use of Barrett Waterproofing Pitch and/or Tarred Felt and/or Waterproofing Fabric.

Architect or Engineer shall clearly indicate type to be used and specifications shall follow A.R.E.A. standards or form as outlined on page 51.

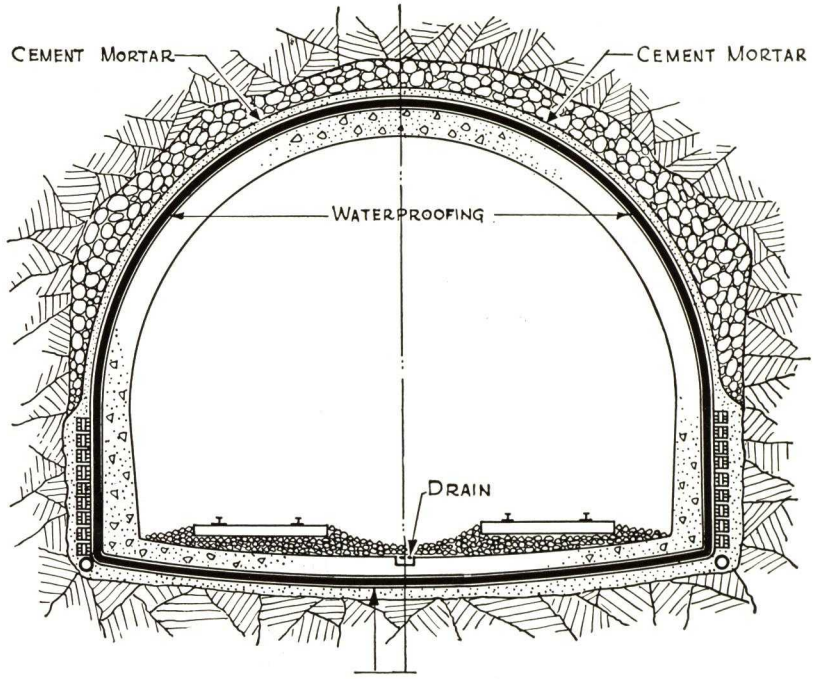
MEMBRANE METHOD FOR UNDERGROUND SUBWAYS, TUNNELS, ETC.



½ Section Showing Protection Against Water Pressure

½ Section Showing Protection Against Surface Water

TYPICAL SUBWAY SECTIONS

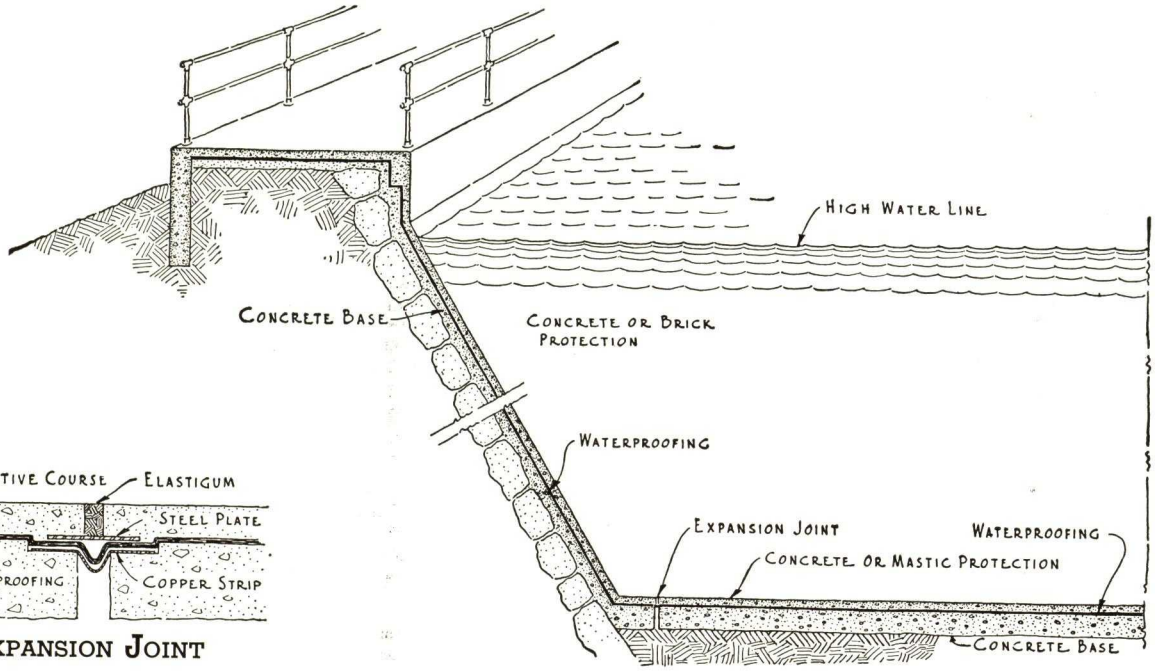


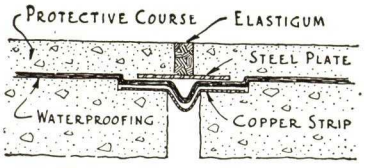
TYPICAL TUNNEL SECTION

Note—For types of membrane waterproofing and specification form, refer to pages 49 and 51.

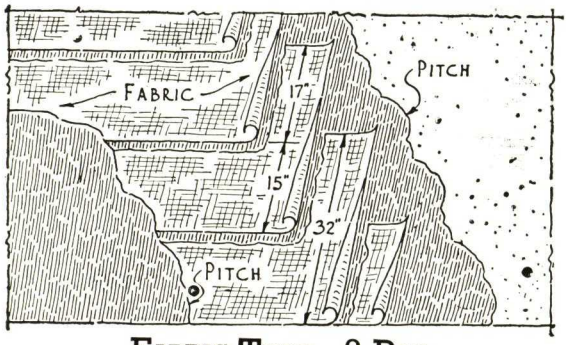
MEMBRANE METHOD FOR RESERVOIRS, BASINS, ETC.

Barrett SINCE 1854

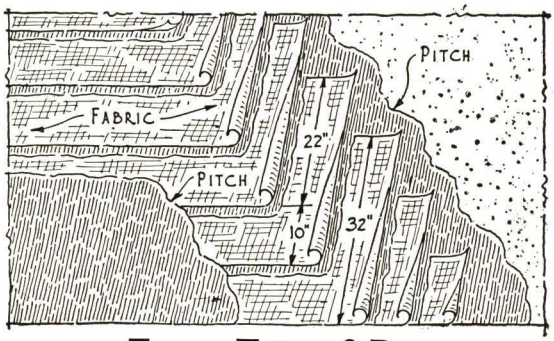




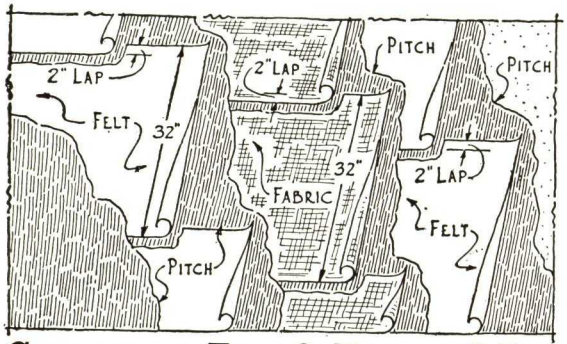
EXPANSION JOINT



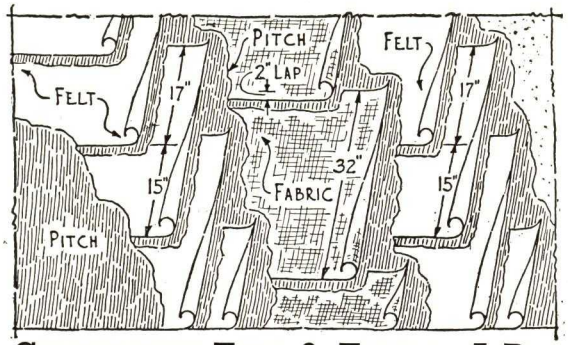
FABRIC TYPE—2 PLY



FABRIC TYPE—3 PLY



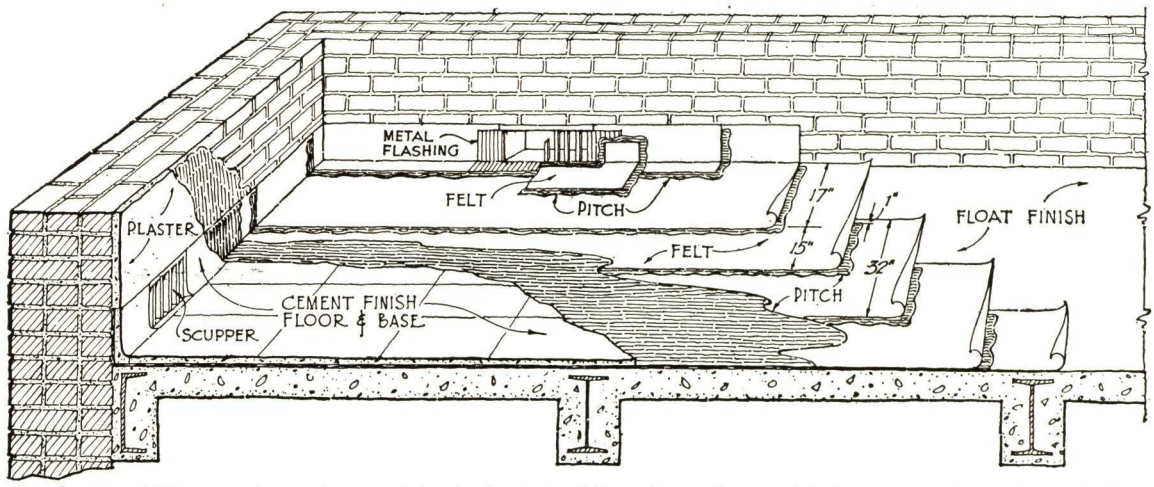
COMBINATION FELT & FABRIC—3 PLY



COMBINATION FELT & FABRIC—5 PLY

Note—For additional types of membrane waterproofing and specification form, refer to page 50.

MEMBRANE METHOD FOR SUPERSTRUCTURE, CONCRETE OR WOOD FLOORS



This System of Waterproofing is Designed for the Purpose of Providing a Factor of Safety Against Water Damage From Operation of Sprinkling System, or in Case of Fire, Washing of Floors, etc.

SPECIFICATION

First—Over the entire surface lay two (2) plies of Barrett Tarred Felt, as specified, lapping each sheet seventeen (17) inches over preceding one, mopping with Barrett Waterproofing Pitch to within one (1) inch of upper edge, after which spread over the entire surface a heavy, uniform coating of Specification Pitch.

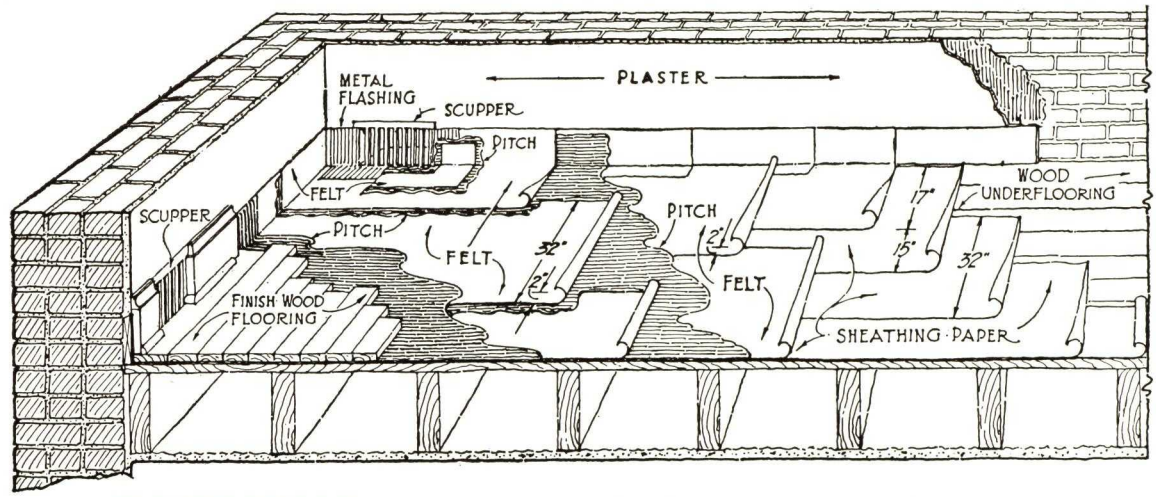
Second—Not less than sixty (60) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Third—At places where the waterproofing may be subjected to unusual strain, there shall be applied not less than two (2) extra reinforcing layers of Felt and alternating moppings of Pitch.

Fourth—Felt and Pitch membrane shall be carried up walls and areas around columns, pipes, etc., not less than three (3) inches above the finished flooring, and shall be properly fastened in place and protected.

Fifth—Care shall be taken not to injure the waterproofing membrane either during application or after completion, and all finished work shall be approved before construction of permanent finished flooring.

Sixth—The waterproofing shall be immediately protected by the application of the finished flooring as specified.



SPECIFICATION

First—Over the entire surface lay two (2) thicknesses of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet seventeen (17) inches over the preceding one, and nail as often as is necessary to hold in place.

Second—Over the entire surface lay one (1) ply of Barrett Tarred Felt as specified, lapping each sheet two (2) inches over preceding one and nail as often as is necessary to hold in place.

Third—Coat the entire surface uniformly with Barrett Waterproofing Pitch, after which over the entire surface lay one (1) ply of Barrett Tarred Felt, lapping each sheet two (2) inches over preceding one, and mopping the two (2) inch lap on each sheet with Barrett Waterproofing Pitch, so that at no place shall Felt touch Felt. Care shall be taken that all layers of Felt break joints with underlying layers.

Fourth—Over the entire surface spread a heavy, uniform coating of Barrett Waterproofing Pitch, into which, while hot, embed floor plank.

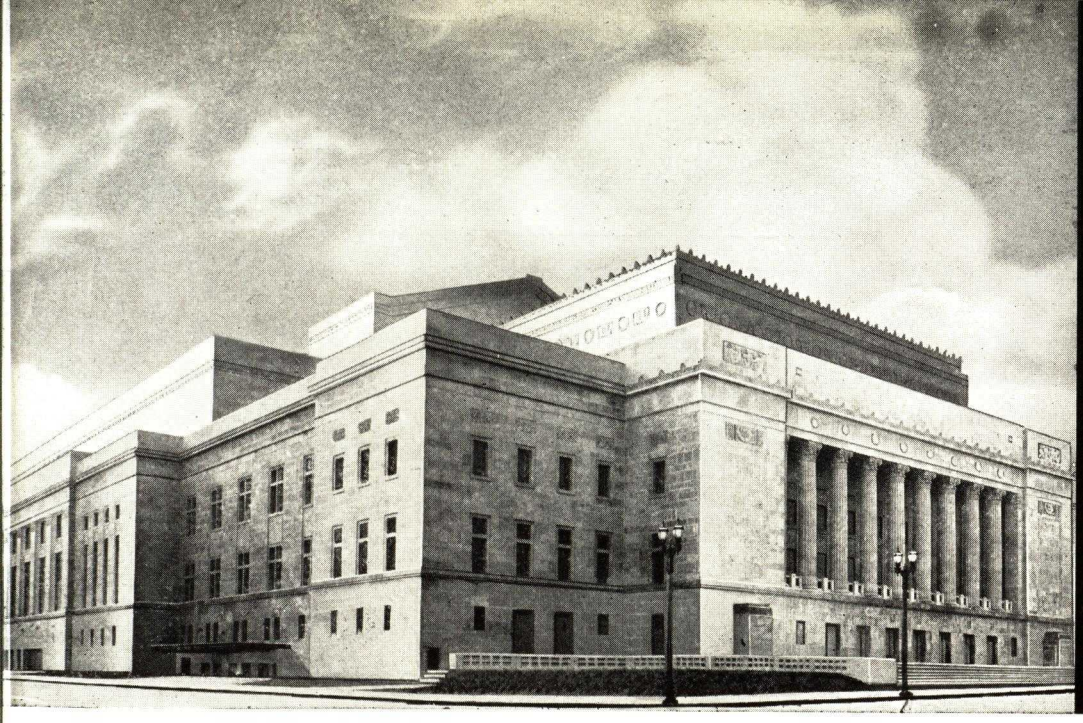
Fifth—Not less than sixty (60) pounds of Barrett Waterproofing Pitch shall be used for constructing each one hundred (100) square feet of completed waterproofing, and the pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Sixth—(Same as paragraph "Third" above).

Seventh—(Same as paragraph "Fourth" above).

Eighth—(Same as paragraph "Fifth" above).

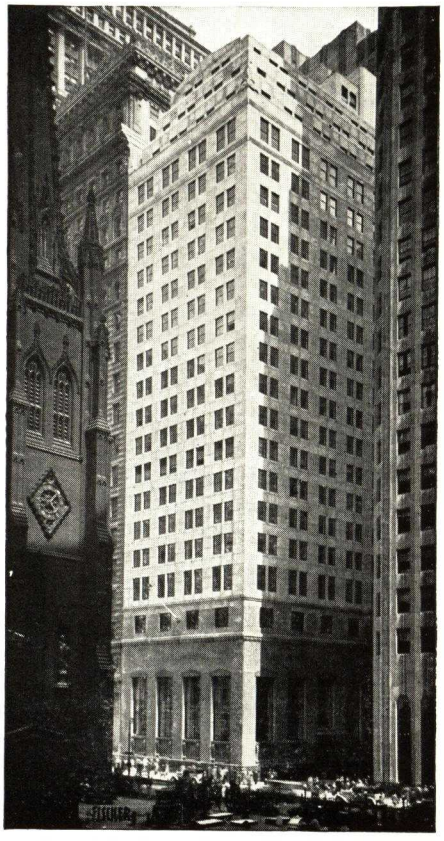
Ninth—The waterproofing shall be immediately protected by the application of the finished flooring as specified. Each plank shall be set in permanent position before nailing to prevent the nails from tearing the waterproofing membrane, and in no case shall the nails penetrate the flooring upon which the waterproofing rests.



SECTION 6

DAMPPROOFING AGAINST MOISTURE

DAMPPROOFING ABOVE OR BELOW GRADE



First National Bank, New York, N. Y.
Roofed, waterproofed and dampproofed with Barrett materials

Protecting Against Dampness

Dampproofing is designed to prevent the penetration of moisture or dampness, and may be distinguished from waterproofing in that constant "heads" or hydrostatic pressures are not involved.

Dampproofing may be generally visualized as applying to walls or surfaces exposed to moisture above grade, and to substructure surfaces where dampness—and not hydrostatic pressure—exists. The materials or methods employed should provide for the primary function of dampproofing systems, that of keeping walls dry, and should prevent discoloration.

Interior Coatings and Plaster Bond

Interior finishes should provide for the securing of a firm bond between the walls, to which the dampproofing is applied, and the succeeding coats of plaster or other interior wall finish.

Tested Methods

The dampproofing products and application methods referred to in these pages have been developed out of extensive research and experience. They provide for a continuity of covering, retard discoloration and assure a firm bond. The specifications outlined are accepted as standard practice—adaptable to structures during construction or after erection. Best results may be obtained by following the specification procedure outlined and by the employment of experienced applicators in the execution of the work.

FOR DAMPPROOFING FOUNDATION WALLS, RETAINING WALLS AND ABUTMENTS
Pitch Coating Method and Hydronon Method

SPECIFICATION FOR PITCH COATING METHOD

CONDENSED SPECIFICATION

All exterior surfaces and footings, of foundation walls, retaining walls and abutments shall be dampproofed by the application of one (1) priming coat of Carbosota and two (2) moppings of Waterproofing Pitch, both applied in strict accordance with the specifications published by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

PREPARATION OF SURFACES—All surfaces to be dampproofed shall be dry and clean and free from dirt, dust or foreign materials. All voids, cracks or open joints in the masonry shall be properly pointed up with Portland Cement Mortar before application of the dampproofing materials.

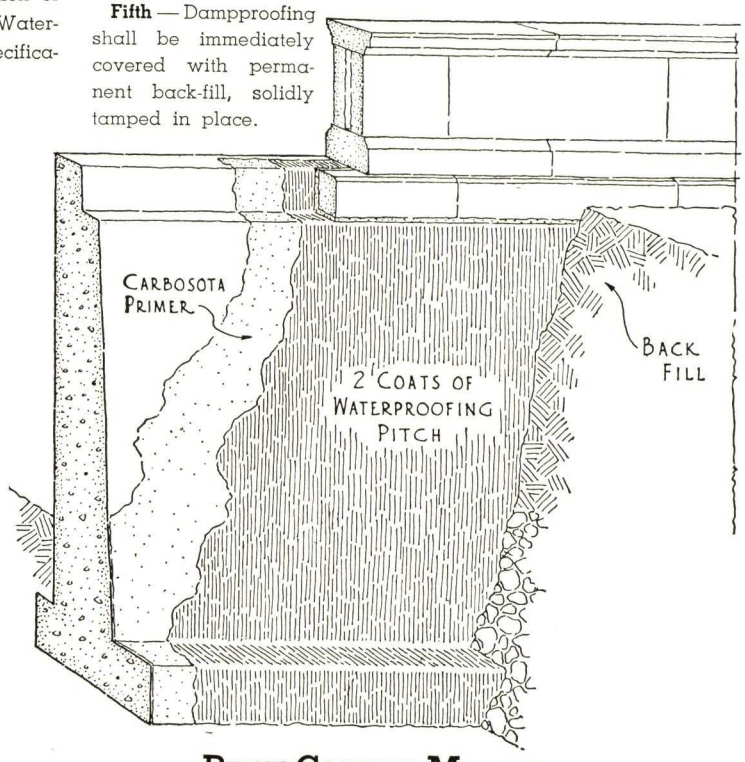
APPLICATION OF DAMPPROOFING—First—Apply over the entire surface to be dampproofed, a uniform priming coat of Barrett Carbosota, Grade 1, Creosote Oil.

Second—The priming coat of Carbosota shall be allowed to sufficiently penetrate the masonry, and before thoroughly dry, apply a uniform mop coating of Specification Waterproofing Pitch. The Pitch shall be applied in such manner as will obtain a heavy, continuous coating of Waterproofing Pitch over the entire surface, filling all cracks, voids and crevices and upon completion shall present a dry, glossy appearance.

Third—After the entire surface has been completely covered with the first mopping, follow immediately with second heavy, uniform mopping of Specification Waterproofing Pitch.

Fourth—Not less than one (1) gallon of Carbosota and eighty (80) pounds of Waterproofing Pitch shall be used for each one hundred (100) square feet of completed dampproofing and the Pitch shall not be heated above three hundred and fifty (350) degrees Fahrenheit.

Fifth — Dampproofing shall be immediately covered with permanent back-fill, solidly tamped in place.



PITCH COATING METHOD

SPECIFICATION FOR HYDRONON METHOD

CONDENSED SPECIFICATION

All exterior surfaces and footings of foundation walls, retaining walls and abutments shall be dampproofed by the application of two coats of Barrett Hydronon, applied in strict accordance with the specifications published by THE BARRETT COMPANY.

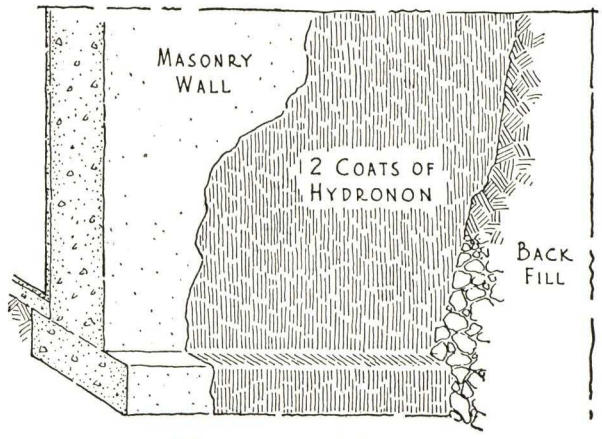
COMPLETE SPECIFICATION

PREPARATION OF SURFACES—All masonry surfaces to which Hydronon is to be applied shall be thoroughly dry and free of all dirt, grease, excess cement mortar or other foreign matter that might interfere with its adhesion and penetration. Any open areas in the concrete caused by segregation of coarse aggregates shall be filled in. Rubblestone construction shall be brought to an even surface with cement mortar. All holes and voids in masonry construction shall be carefully filled with Portland Cement Mortar, and all joints struck flush.

APPLICATION OF DAMPPROOFING—First—The exterior surfaces and footings of foundation walls, retaining walls and abutments, shall be dampproofed by the application of two (2) coats of Barrett Hydronon applied either by brush or by spray.

Second—The Hydronon shall be applied thoroughly and evenly from the footings to the soil or grade level so that all surfaces present a uniform black appearance. The second coat shall be brushed or sprayed at right-angles to the first coat so as to assure thorough coverage of the entire surface with a continuous impervious film without holidays, pinholes or spots.

Third—Twenty-four (24) hours shall elapse between the first and second coats. Back-filling of the soil, where required, shall be commenced not more than seven (7) days nor less than one (1) day after the final application of Hydronon.

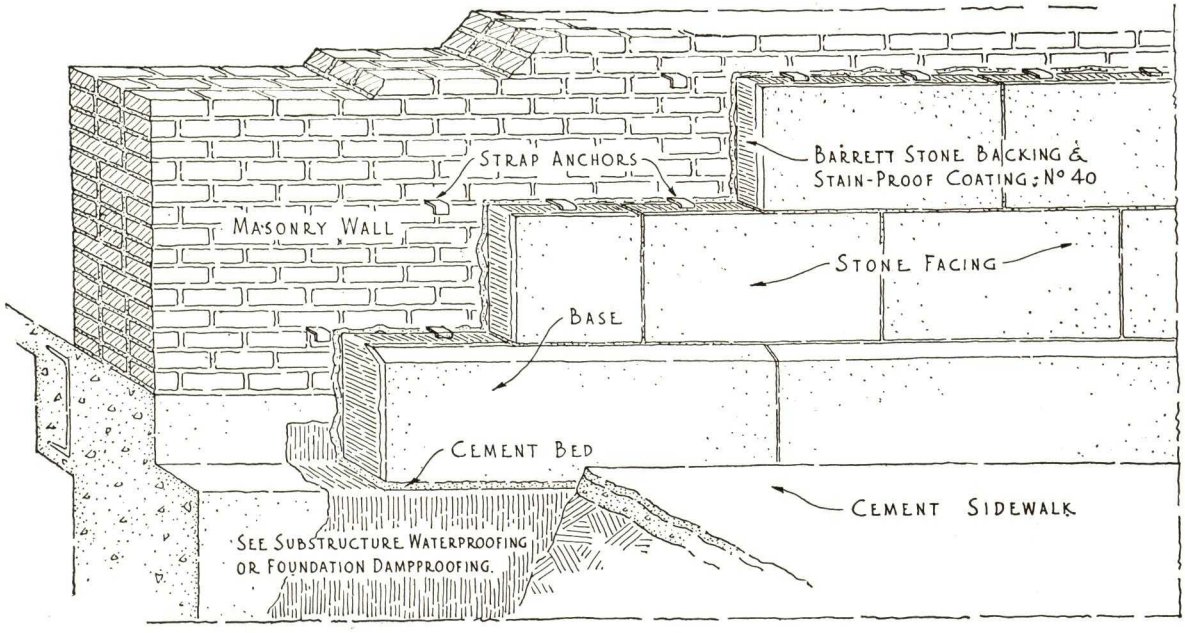


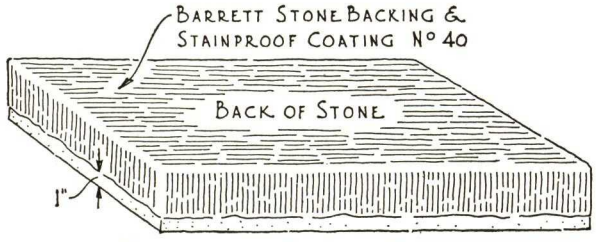
HYDRONON METHOD

STONE BACKING AND STAINPROOFING FOR EXTERIOR FACE STONE

Barrett Stone Backing & Stainproof Coating No. 40

Barrett SINCE 1854





DETAIL OF COATED STONE BEFORE SETTING

SPECIFICATION

CONDENSED SPECIFICATION

All exterior face stone shall be given one (1) thorough coat of Barrett Stone-Backing and Stainproof Coating No. 40, applied to the back and sides of each stone in strict accordance with the specifications published by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

First—All exterior face stone shall be given one (1) thorough coat of Barrett Stone-Backing and Stainproof Coating No. 40, applied either by brush or compressed air spray, to the top, bedding, back and sides of each stone to within one (1) inch of its outer edge. All Lewis holes and anchor recesses shall be thoroughly coated before setting the stones in place.

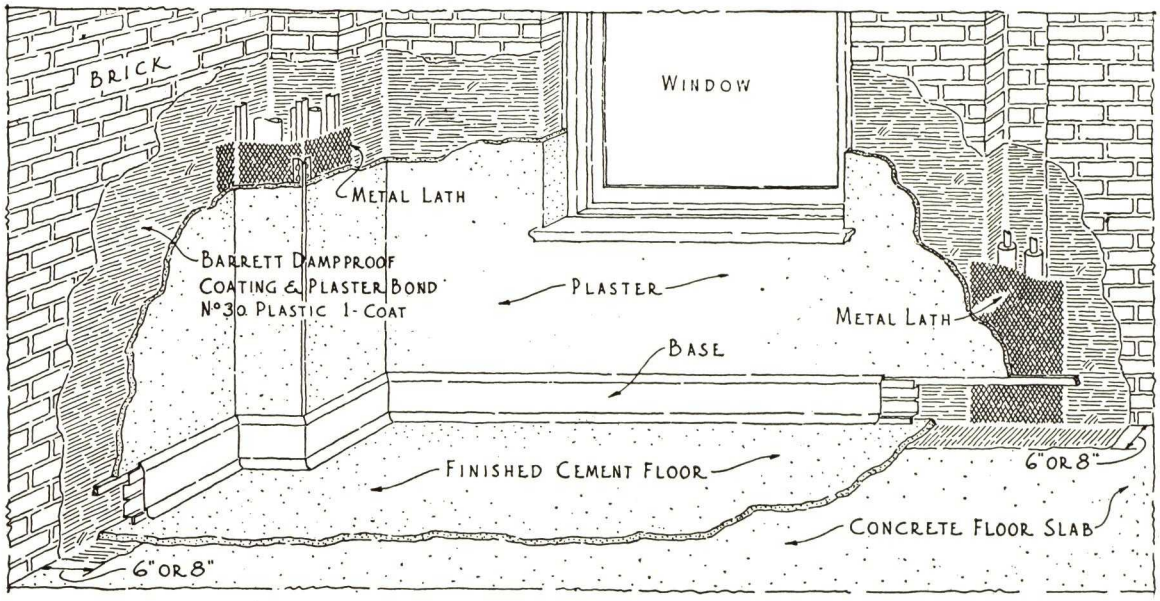
Second—The surfaces of the stone to be stainproofed shall be dry, and free from any oil, grease, or other foreign matter that might interfere with the proper adhesion and penetration of the coating.

Third—Where the stones are treated at the quarry, each unit before being set in place on the job, shall be examined for breaks in the coating and touched-up where required.

Fourth—At least twelve (12) hours shall elapse between the application of the Stainproof Coating and the setting of the stone.

Architect's Note—Barrett Stone-Backing and Stainproof Coating is a dampproofing and protective coating whose use is defined in its name. It is applied to the back and four sides of stone and cast stone used for the facing of buildings, such as marble, limestone, Bedford stone, etc. It effectively prevents the staining and discoloration of the stone frequently caused by the chemical reaction set up by the lime present in cement mortar.

DAMPPROOF COATING AND PLASTER BOND FOR MASONRY WALLS ABOVE GRADE. PLASTIC TYPE.



CONDENSED SPECIFICATION

The interior surfaces of all exterior walls of brick (or hollow tile), above grade, shall be dampproofed with Barrett Dampproof Coating and Plaster Bond No. 30 Plastic, applied in one trowel coat, in strict accordance with the specifications published by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

MASONRY—All holes and voids in the wall surfaces to be dampproofed shall be carefully filled with Portland Cement Mortar and all joints struck flush. The walls shall be thoroughly dry, and free from oil, grease, excess cement mortar or other foreign matter that might interfere with the bonding and penetrating properties of the dampproof coating.

APPLICATION OF DAMPPROOFING—First—The interior surfaces of all exterior brick (or hollow tile) walls, including reveals of doors and windows, column coverings and pipe chases, shall be dampproofed with one (1) thorough and uniform trowel coat, of an average thickness of one-sixteenth (1/16) inch, using Barrett Dampproof Coating and Plaster Bond No. 30 Plastic.

Second—The single coat of Plastic Dampproofing shall be applied evenly and carefully, being thoroughly worked into all joints, crevices, cracks between mortar and brick, cut-outs, wall chases and recesses, so as to form a continuous, impervious coating without holidays, pinholes or brown spots.

Third—The Dampproof Coating shall be applied before any pipes or metal work are installed; and it shall completely cover the inside surfaces of all walls, as above, being carried out six (6) to eight (8) inches on rough floor slabs.

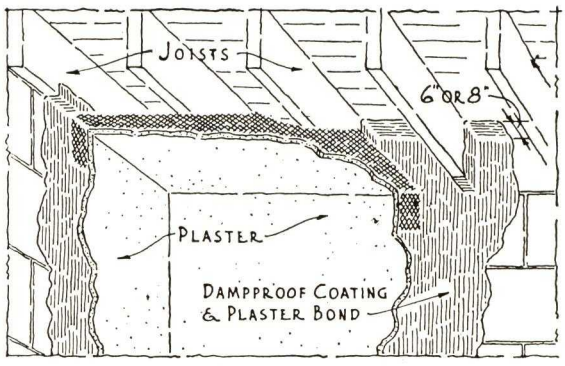
PLASTERING—The rough or scratch coat of wall plaster shall be applied directly to the dampproofing material not less than twenty-four (24) hours nor more than seven (7) days after the latter has been applied to the walls.

Note: Do not use Barrett Dampproof Coatings on ceilings. Where these materials are to be used in conjunction with stucco or Portland Cement Mortar wall finishes, special application instructions shall be obtained either from the Architect or from THE BARRETT COMPANY.

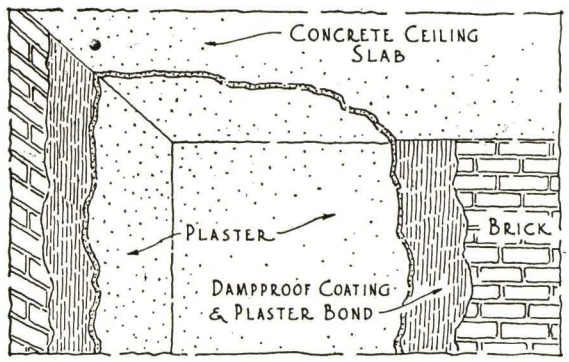
DAMPPROOF COATING & PLASTER BOND METHOD ABOVE GRADE

CONDENSED SPECIFICATION FOR EXTERIOR BRICK WALLS—The interior surfaces of all exterior brick walls, above grade, shall be dampproofed with Barrett Dampproof Coating and Plaster Bond No. 10 Liquid (or No. 20 Semi-Mastic), applied strictly in accordance with the specifications published by THE BARRETT COMPANY.

CONDENSED SPECIFICATION FOR HOLLOW TILE WALLS—The interior surfaces of all exterior walls of hollow tile, above grade, shall be dampproofed with one (1) coat of Barrett Dampproof Coating and Plaster Bond (No. 10 Liquid, No. 20 Semi-Mastic, or No. 30 Plastic) applied strictly in accordance with the specifications published by THE BARRETT COMPANY.



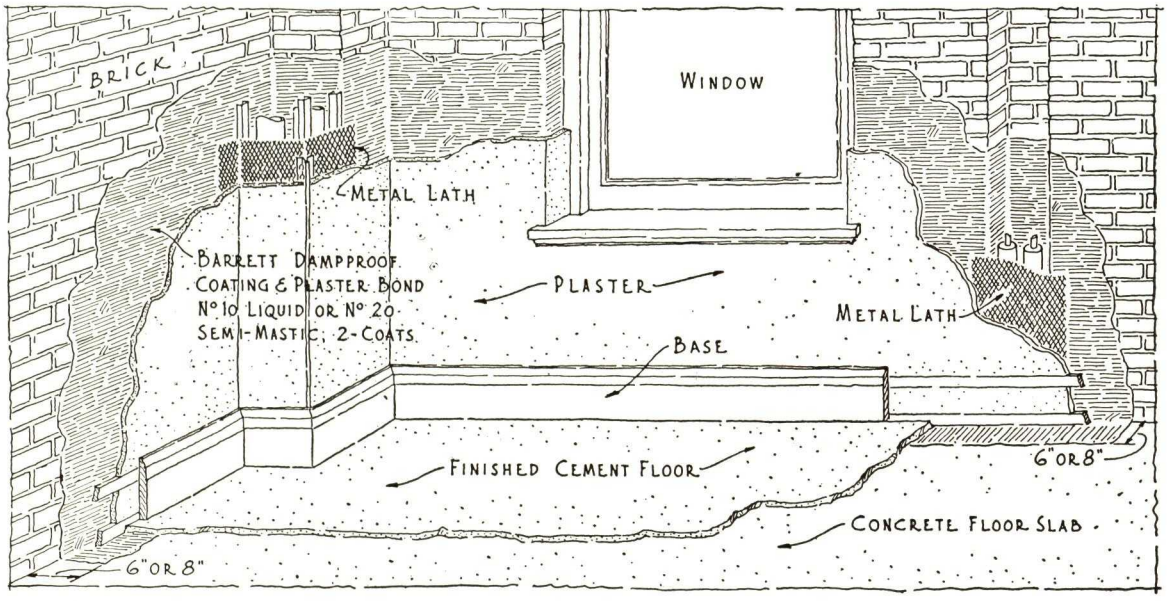
SHOWING DAMPPROOF COATING CARRIED OUT ON WOOD JOIST CEILING



SHOWING DAMPPROOF COATING CARRIED UP TO CEILING

DAMPPROOF COATING AND PLASTER BOND FOR MASONRY WALLS ABOVE GRADE. LIQUID COATING and SEMI-MASTIC TYPES.

Barrett SINCE 1854



PLASTER BOND METHOD FOR BRICK WALLS

Barrett Dampproof Coating and Plaster Bond No. 10 Liquid or No. 20 Semi-Mastic

CONDENSED SPECIFICATION

The interior surfaces of all exterior brick walls, above grade, shall be dampproofed with Barrett Dampproof Coating and Plaster Bond No. 10 Liquid (or No. 20 Semi-Mastic), applied strictly in accordance with the specifications published by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

MASONRY—All holes and voids in the wall surfaces to be dampproofed shall be carefully filled with Portland Cement Mortar and all joints struck flush. The walls shall be thoroughly dry, and free from oil, grease, excess cement mortar or other foreign matter that might interfere with the bonding and penetrating properties of the dampproof coating.

APPLICATION ON DAMPPROOFING—First—The interior surfaces of all exterior walls of brick, including reveals of doors and windows, column coverings and pipe chases, shall be dampproofed with two (2) thorough applications of Barrett Dampproof Coating and Plaster Bond No. 10 Liquid, applied by brush or by compressed air spray (or with two (2) thorough applications of Barrett Dampproof Coating and Plaster Bond No. 20 Semi-Mastic, applied by heavy brush, mop or squeegee).

Second—The first coat shall be applied thoroughly and evenly until the surface presents a uniform black appearance, care being taken to completely coat all joints, crevices, cut-outs, wall chases and recesses, so as to form a continuous, impervious film without holidays, pinholes or brown spots.

Third—After the first coat of dampproofing has been applied, at least twelve (12) hours shall elapse before application of the final coat.

Fourth—The dampproofing shall be applied before any pipes or metal work are installed, and both coats shall completely cover the inside surfaces of all walls, as above, being carried out six (6) to eight (8) inches on rough floor slabs.

PLASTERING—The rough or scratch coat of wall plaster shall be applied directly to the final coat of dampproofing material, but not less than twenty-four (24) hours nor more than seven (7) days after the latter has been applied.

Note: Do not use Barrett Dampproof Coatings on ceilings. Where these materials are to be used in conjunction with stucco or Portland Cement Mortar wall finishes, special application instructions shall be obtained either from the Architect or from THE BARRETT COMPANY.

PLASTER BOND METHOD FOR HOLLOW TILE WALLS

Barrett Dampproof Coating and Plaster Bond No. 10 Liquid or No. 20 Semi-Mastic

CONDENSED SPECIFICATION

The interior surfaces of all exterior walls of hollow tile, above grade, shall be dampproofed with one (1) coat of Barrett Dampproof Coating and Plaster Bond (No. 10 Liquid, No. 20 Semi-Mastic, or No. 30 Plastic) applied strictly in accordance with the specifications published by THE BARRETT COMPANY.

COMPLETE SPECIFICATION

MASONRY—Same as for specification at top of page.

APPLICATION OF DAMPPROOFING—First—The interior surfaces of all exterior walls of hollow tile, including reveals of doors and windows, column coverings and pipe chases, shall be dampproofed with one (1) thorough application of Barrett Dampproof Coating and Plaster Bond (No. 10 Liquid, No. 20 Semi-Mastic or No. 30 Plastic).

Second—No. 10 Liquid shall be applied by brush or by compressed air spray. No. 20 Semi-Mastic shall be applied by heavy brush, mop or squeegee. No. 30 Plastic shall be applied by trowel to an average thickness of one-sixteenth (1/16) inch.

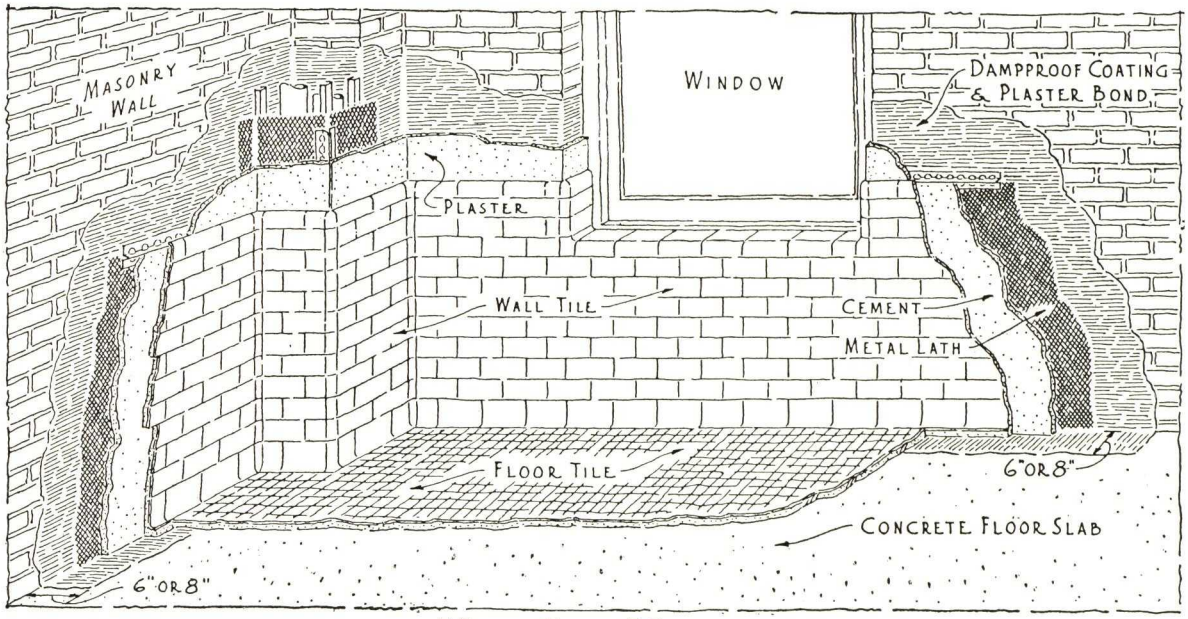
Third—The coating shall be applied thoroughly and evenly until the surface presents a uniform black appearance, care being taken to completely coat all joints, crevices, cut-outs, wall chases and recesses, so as to form a continuous, impervious film without holidays, pinholes or brown spots.

Fourth—Same as "Fourth" at top of page.

PLASTERING—Same as at top of page.

Note— Same as at top of page.

DAMPPROOF COATING AND PLASTER BOND FOR MASONRY WALLS ABOVE GRADE— TILE FINISH.



METAL LATH METHOD

SPECIFICATION

CONDENSED SPECIFICATION

The interior surfaces of all exterior walls of brick or hollow tile, which are to be finished in tile, shall be dampproofed with Barrett Dampproof Coating and Plaster Bond No. 10 Liquid, No. 20 Semi-Mastic or No. 30 Plastic, applied strictly in accordance with the specifications published by THE BARRETT COMPANY, metal lath, or metal clips being provided, as specified, as additional support for the finished tile walls.

COMPLETE SPECIFICATION

MASONRY—All holes and voids in the wall surfaces to be dampproofed shall be carefully filled with Portland Cement Mortar and all joints struck flush. The walls shall be thoroughly dry and free from oil, grease, excess cement mortar or other foreign matter that might interfere with the bonding and penetrating properties of the dampproof coating.

APPLICATION OF DAMPPROOFING—First—The interior surfaces of all exterior walls of brick, including reveals of doors and windows, column coverings and pipe chases, shall be dampproofed with two (2) thorough applications of Barrett Dampproof Coating and Plaster Bond No. 10 Liquid applied by brush or by compressed air spray; or with two (2) thorough applications of Barrett Dampproof Coating and Plaster Bond No. 20 Semi-Mastic applied by heavy brush, mop or squeegee; or by one (1) thorough trowel coat of Barrett Dampproof Coating and Plaster Bond No. 30 Plastic applied to an average thickness of one-sixteenth (1/16) inch.

Note: Where walls are of hollow tile, only one (1) coat of No. 10 Liquid or No. 20 Semi-Mastic shall be required.

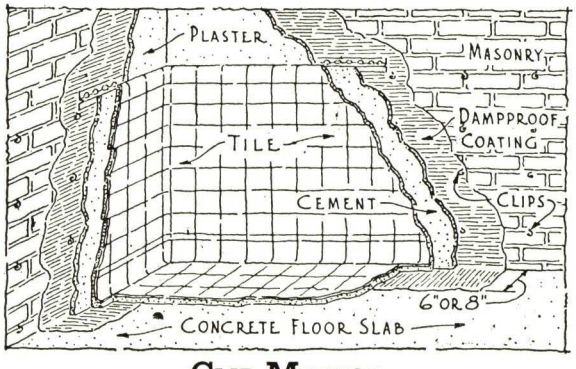
Second—The dampproofing shall be applied thoroughly and evenly until the surface presents a uniform black appearance, care being taken to completely coat all joints, crevices, cut-outs, wall chases, recesses, etc., so as to form a continuous, impervious film without holidays, pinholes or brown spots. The dampproof coating shall be applied before any pipes or metal work are installed and shall completely cover the inside surfaces of all walls, as above, being carried out six (6) to eight (8) inches on rough floor slabs.

Third—Where two (2) coats are required, at least twelve (12) hours shall elapse between the first and second applications.

METAL LATH—Metal lath, as specified by the Architect, shall be applied to all wall surfaces which have been dampproofed as above and which are to be finished with tile. In the case of pipe chases and cut-outs in which piping, conduits, or metal work have been installed, the metal lath shall be placed on the outside of and around such piping, conduits or metal work so that the lath will provide a backing for the reception of the wall tile and will partially support its weight.

APPLICATION OF TILE—The tile shall be applied to the metal lath, as above, by means of Portland Cement Mortar.

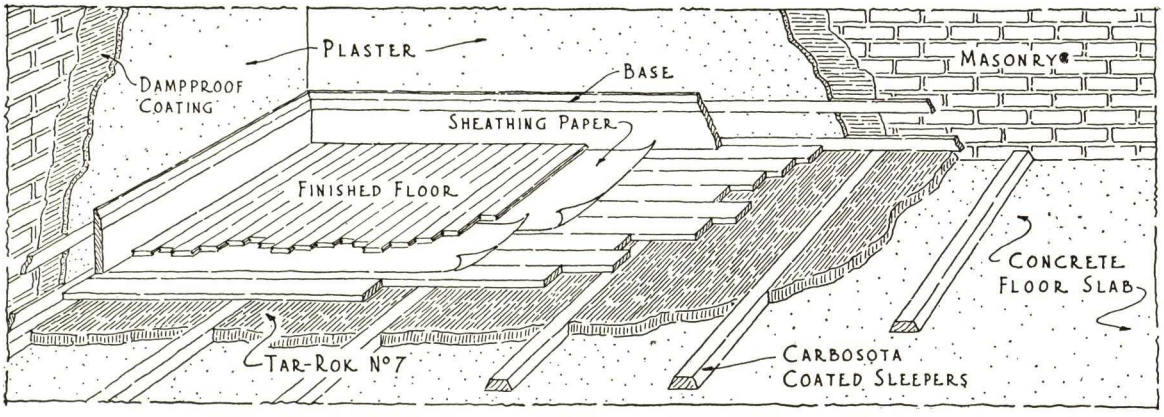
ALTERNATE OR CLIP METHOD—In this method, metal clips of a size, shape and spacing as may be specified by the Architect, are inserted into the brick or hollow tile wall as it is constructed. The dampproof coating is applied, as below, to the interior surfaces of the walls; and the tile set in cement mortar placed directly over the dampproof coating, the metal clips serving, in addition to the natural bonding properties of the dampproof coating, to partially support the tile.



CLIP METHOD

DAMPPROOFING AND WOOD PRESERVATIVE METHOD FOR FLOORS

Barrett SINCE 1854



TAR-ROK & CARBOSOTA METHOD FOR WOOD FLOORS

SPECIFICATION FOR TAR-ROK METHOD

CONCRETE FLOOR BASE—The concrete floor base shall be dry and leveled off to the proper grade.

WOOD SLEEPERS—All wood sleepers used in floor construction shall be given one preservative coating of Carbosota applied either by brush or by immersion, to permit thorough penetration into the wood. The wood sleepers shall then be fastened to the concrete floor base or slabs in the manner prescribed by the Architect.

DAMPPROOFING COURSE—First—A Tar-Rok dampproofing course shall be laid directly on the concrete floor base or slab to a thickness sufficient to bring it flush with the top edge of the sleepers after leveling with a straightedge.

Second—The dampproofing course shall consist of fine dry sand, thoroughly mixed with Barrett Sub-Floor Tar No. 7 in the proportion of not less than twenty-five (25) nor more than thirty (30) gallons of Tar to each cubic yard of sand. The sand shall be thoroughly dried before mixing; and both sand and Sub-Floor Tar shall be heated sufficiently to permit their mixing freely. Neither the sand nor the Tar shall be more than two hundred and twenty-five (225) degrees Fahrenheit when mixed together. If a thick white smoke arises from the mixture indicating that it is overheated, five (5) gallons more of the Tar shall be added to each cubic yard of sand.

Third—This mixture shall then be spread evenly to a thickness one-quarter (¼) to one-half (½) inch higher than the top level of the wood sleepers so that it will compact to a dampproofing layer exactly flush with the tops of the sleepers.

Fourth—The wood floor base or the finished cement floor shall then be laid directly on the dampproofing course and the flooring operation completed as prescribed by the Architect.

SPECIFICATION FOR HYDRONON METHOD

CONCRETE FLOOR BASE—First—The concrete floor base shall be dry and leveled off to the proper grade.

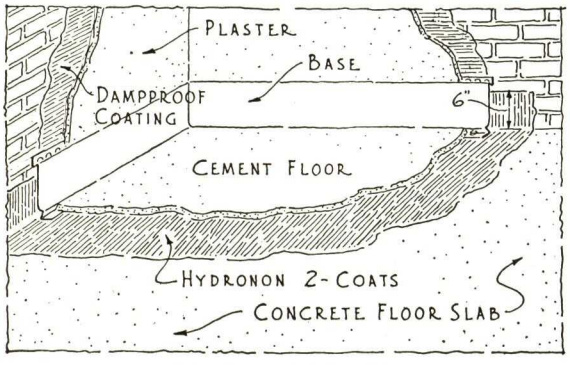
Second—Concrete shall be allowed to set for at least three (3) days before the dampproof coating is applied. Where high, early strength cements are used for floors which are to be loaded within twenty-four (24) to forty-eight (48) hours, the dampproof coating may be applied after the concrete has set for at least twenty-four (24) hours.

DAMPPROOFING—First—All floors shall be dampproofed by the application of two (2) coats of Barrett Hydronon to the concrete floor base; and the finished cement floor or wood sub-floor laid therein.

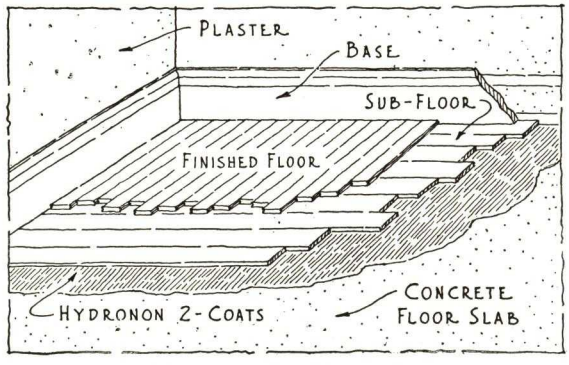
Second—The Hydronon shall be applied by brush in two (2) thorough and even coats directly over the concrete floor base until the entire surface presents a uniform black appearance. The second coat shall be brushed at right angles to the first coat so as to insure thorough coverage of the entire surface with a continuous, impervious film without breaks. Both coats shall be carried up on the surrounding walls, columns, etc., for a distance of at least six (6) inches.

Third—Twenty-four (24) hours shall elapse between the application of the first and second coats.

Fourth—Within twelve (12) hours after the application of the final coat of Hydronon, the finished cement floor or the wood sub-floor shall be laid as prescribed by the Architect.

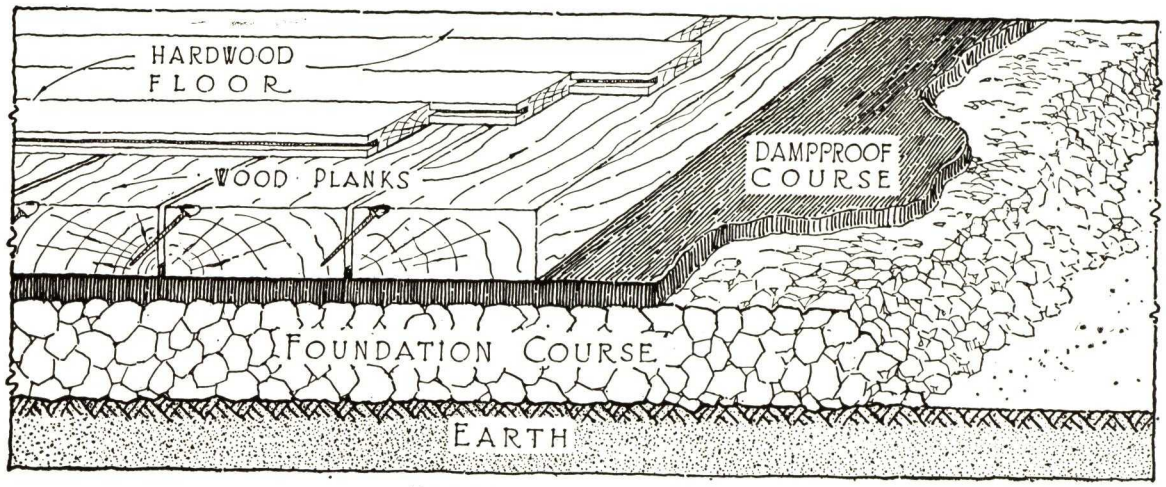


HYDRONON METHOD FOR CEMENT FLOORS



HYDRONON METHOD FOR WOOD FLOORS

DAMPPROOFING FOR USE UNDER WOOD FLOORS OVER EARTH OR OVER CONCRETE BASE.
Barrett Tar-Rok Method.



APPLICATION OVER EARTH

SPECIFICATION FOR APPLICATION OVER EARTH

GRADING—The general contractor for the building shall level off the earth to proper grade to receive the Tar-Rok, and if any filling is necessary it shall be properly puddled and rammed.

FOUNDATION COURSE—The foundation course shall consist of four (4) inch thickness of screened gravel or crushed stone, not any of which shall exceed two and one-half (2½) inches in longest dimension or be less than one-quarter (¼) inch in size, mixed with sufficient Barrett Sub-Floor Tar No. 5 (as specified) so that it will compact under a roller after being spread evenly in place. It shall then be rolled until the stones do not creep under the roller. The Tar for this course may be heated to not more than two hundred (200) degrees Fahrenheit, and in cold weather the stone shall be slightly warmed if necessary, so that the Tar will mix with the stone and the stone spread evenly. The roller used for this work shall weigh not less than three hundred (300) pounds to each foot in length. Sub-Floor Tar used in foundation course shall be approximately (See Note No. 1):

Six (6) gallons for each cubic yard of two and one-half (2½) inches to one (1) inch crushed stone;

Nine (9) gallons for each cubic yard of two and one-half (2½) inches to one-quarter (¼) inch crushed stone;

Seven (7) gallons for each cubic yard of coarse-screened gravel;

Ten (10) gallons for each cubic yard of fine-screened gravel.

Note No. 1—Only sufficient Tar should be used so that the stone or gravel will properly compact and provide a suitable surface for spreading the dampproof course.

DAMPPROOF COURSE—The dampproof course shall consist of a fine sand and thoroughly mixed with Barrett Sub-Floor Tar No. 7 in the proportion of not less than twenty-five (25) nor more than thirty (30) gallons of Tar to each cubic yard of sand. The sand shall be thoroughly dry before mixing, and both sand and Tar shall be heated sufficiently to make them mix freely, but neither sand nor Tar shall be hotter than two hundred and twenty-five (225) degrees Fahrenheit when being mixed together. If a thick, white smoke arises from the mixture, indicating it is overheated, five (5) gallons more Tar to each yard of sand shall be required. This mixture shall be spread evenly one and one-quarter (1¼) to one and one-half (1½) inches thick (so it will compact to one (1) inch) over the foundation, leveled with straight-edge, and followed closely with plank.

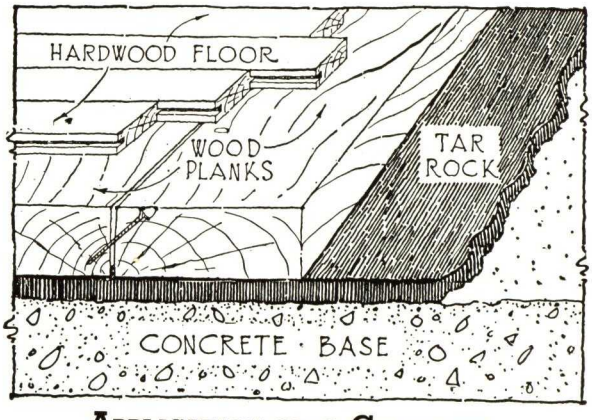
The plank shall be laid on this soft mixture, and bedded on it by hammering until the proper stability is obtained and the plank brought to a proper level and toe-nailed. If after hammering, any plank is below the proper level, the plank shall be taken up and more of the mixture spread on. (The plank and finished flooring shall be furnished and laid by other contractors.)

SPECIFICATION FOR APPLICATION OVER CONCRETE

GRADING—The general contractor for the building shall level off the concrete to proper grade to receive the Tar-Rok Dampproof course.

DAMPPROOF COURSE—The dampproof course shall consist of a fine sand thoroughly mixed with Barrett Sub-Floor Tar No. 7 in the proportion of not less than twenty-five (25) nor more than thirty (30) gallons of Tar to each cubic yard of sand. The sand shall be thoroughly dry before mixing, and both sand and Tar shall be heated sufficiently to make them mix freely, but neither sand nor Tar shall be hotter than two hundred and twenty-five (225) degrees Fahrenheit when being mixed together. If a thick, white smoke arises from the mixture, indicating it is overheated, five (5) gallons more Tar to each yard of sand shall be required. This mixture shall be spread evenly one and one-quarter (1¼) inches to one and one-half (1½) inches thick (so it will compact to one (1) inch) over the foundation, leveled with a straight-edge, and followed closely with dry, well-seasoned plank.

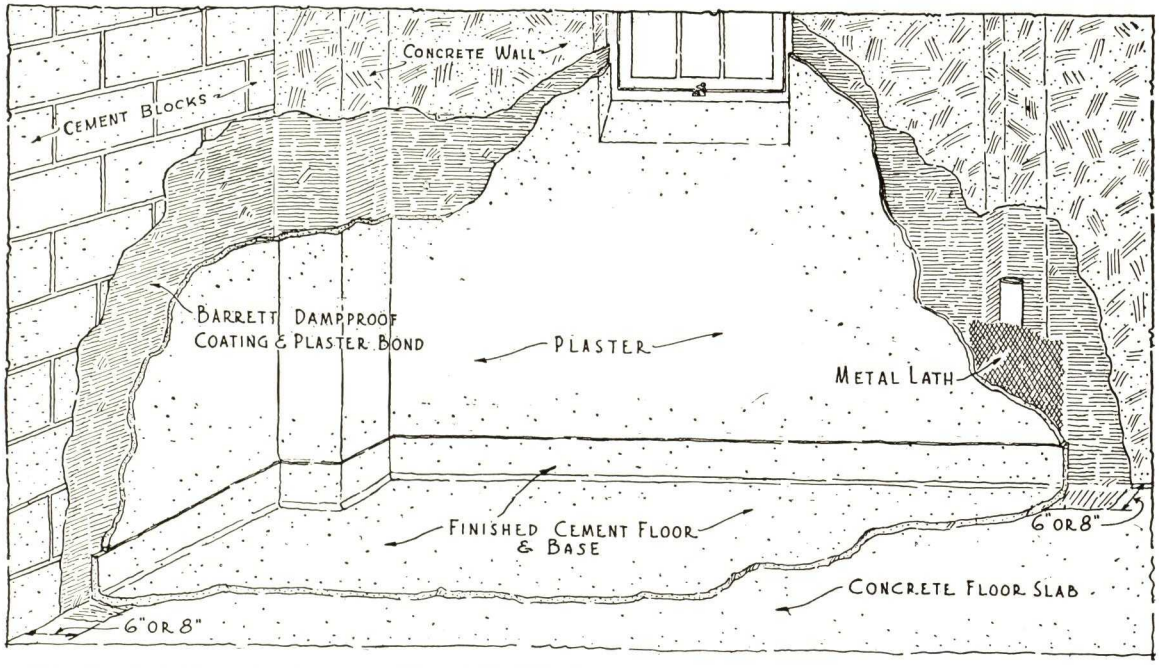
The plank shall be laid on this soft mixture, and bedded on it by hammering until the proper stability is obtained and the plank brought to a proper level and toe-nailed. If after hammering, any plank is below the proper level, the plank shall be taken up and more of the mixture spread on. (The plank and finished flooring shall be furnished and laid by other contractors.)



APPLICATION OVER CONCRETE

DAMPPROOF PLASTER BONDS FOR BASEMENTS.

Barrett SINCE 1854



***Note*—The materials and methods referred to here provide for remedial treatment of damp basements and for a plaster bonding agent where plaster finish is desired. Where water seepage is involved, indicating the presence of water under pressure, outside waterproofing treatment, as referred to on pages 48 and 49, is recommended.**

SPECIFICATION

Masonry—All holes and voids in the wall surfaces to be dampproofed shall be carefully filled with Portland Cement Mortar and all joints struck flush. The walls shall be thoroughly dry and free from oil, grease, excess cement mortar or other foreign matter that might interfere with the bonding and penetrating properties of the dampproof coating.

Application of Dampproofing—The interior surfaces of all exterior walls, including reveals of doors and windows, column coverings and pipe chases, shall be dampproofed with two thorough applications of Barrett Dampproof Coating and Plaster Bond (No. 10 Liquid, No. 20 Semi-Mastic or No. 30 Plastic).

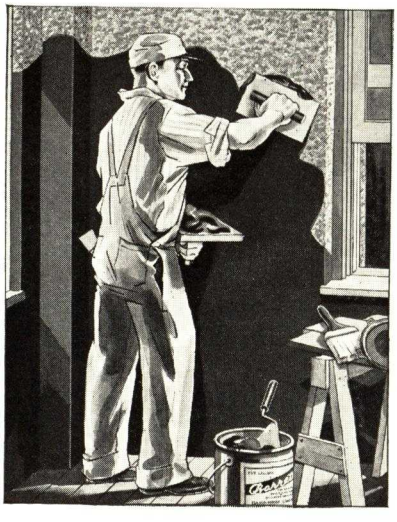
No. 10 Liquid shall be applied by brush or by compressed air spray. No. 20 Semi-Mastic shall be applied by heavy brush, mop or squeegee. No. 30 Plastic shall be applied by trowel to an average thickness of one-sixteenth ($\frac{1}{16}$) inch.

The coating shall be applied thoroughly and evenly until the surface presents a uniform black appearance, care being taken to completely coat all joints, crevices, cut-outs, wall chases and recesses, so as to form a continuous impervious film without holidays, pinholes or brown spots.

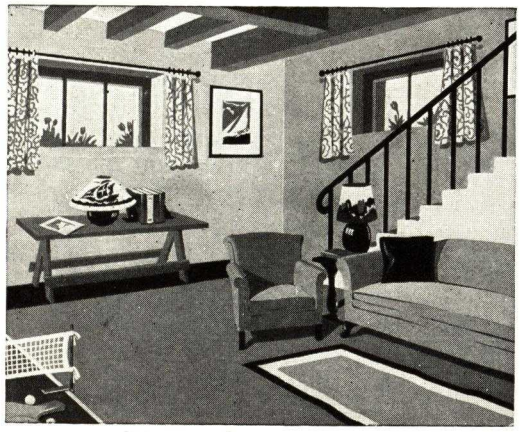
The dampproofing shall be applied before any pipes or metal work are installed and shall completely cover the inside surfaces of all walls, as above being carried out six (6) to eight (8) inches on rough floor slabs.

Plastering—The rough or scratch coat of wall plaster shall be applied directly to the dampproofing, but not less than twenty-four (24) hours nor more than seven (7) days after the latter has been applied.

***Note*—Do not use Barrett Dampproof Coatings on ceilings. Where these materials are to be used in conjunction with stucco or Portland Cement Mortar wall finishes, special application instructions shall be obtained either from the Architect or from THE BARRETT COMPANY.**



Left: **Plastic Method**



Above: **Finished Basement**

Right: **Paint Method**

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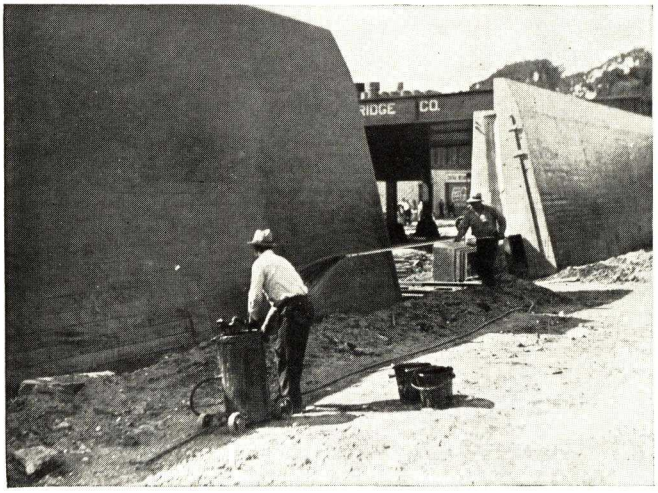
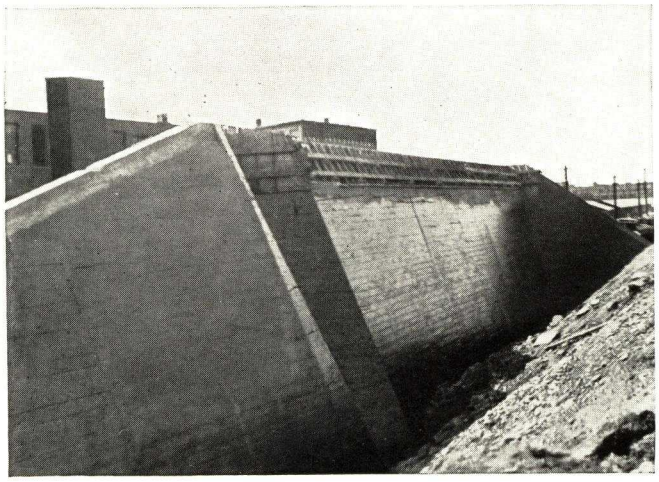
COAL TAR EMULSION
As Dampproofing and Curing Compound for Concrete



Small Hand Pump Used for Spraying

Spray Coat Being Applied



Finished Dampproofing Job at Oswego Blvd. Grade Crossing, New York Central Railroad, Syracuse, N. Y.

Greater Ultimate Strength for Masonry

A problem which confronts the builder of concrete construction is adequate curing. An agent is needed that will retard the evaporation of water and permit proper hydration of cement, thus providing conditions favorable to a minimum of shrinkage, internal stresses, surface cracking, crazing or disintegration of properly proportioned concrete.

COAL TAR EMULSION

Such an agent is Barrett Coal Tar Emulsion. Barrett Coal Tar Emulsion consists, essentially, of a soft coal tar pitch, minutely dispersed and suspended in water. The water content is used to reduce the pitch to a consistency suitable for application. After application, the water separates, leaving a uniform coating of pitch. This protective coating of **coal tar pitch** represents **plus** value and makes Barrett Coal Tar Emulsion unique among curing emulsions.

Coal tar pitch has proved itself to be one of nature's greatest waterproofing agents, and its scientific adaptation as an emulsion for curing of concrete masonry represents a genuine advancement in the field of heavy construction.

Barrett Coal Tar Emulsion, applied after the initial set, adheres firmly to damp concrete surfaces, in such a way as to seal all chinks and pores, thus preventing the concrete from drying too rapidly and promoting greater ultimate strength to the masonry mass.

Damp-proofing

In addition, Barrett Coal Tar Emulsion, after its function of curing is completed, serves as a damp-proof coating which resists the entrance of disintegrating agents. This dual function of Barrett Coal Tar Emulsion makes it exceptionally suited for use on retaining walls, highway bridges, abutments, grade crossing elimination projects, etc.

APPLICATION SPECIFICATIONS

Surfaces upon which the Coal Tar Emulsion is to be applied shall be free from dirt, dust or other loose particles. Oils or grease, when present, shall be removed by proper solvents and the surface washed with clean water. Old walls should be scrubbed with a wire brush and all scale, chinks, etc., removed. Existing cracks shall be properly repaired and the entire surface made smooth, before the Coal Tar Emulsion is applied.

First—A uniform coat of Coal Tar Emulsion shall be applied either by means of spray, hard bristle brush, or mop.

Second—Each coat shall be allowed to dry before application of the succeeding coat.

Third—The Coal Tar Emulsion shall be applied in not less than two (2) coats, the first coat to be applied at the rate of one and one-half (1½) to two (2) gallons per square, and the second coat at the rate of approximately two (2) gallons per square, so that a total of approximately four (4) gallons per square, for two (2) coats, shall be applied.

Notes—No. 1—When used on concrete, the Coal Tar Emulsion may be applied immediately after the forms have been removed and to a damp masonry surface.

No. 2—The Coal Tar Emulsion shall not be applied to frozen surfaces nor at temperatures below forty-five (45) deg. Fahrenheit and sufficient time should be allowed for the Emulsion to set before temperature drops below forty-five (45) deg. Fahrenheit.

No. 3—The Coal Tar Emulsion shall be used as received and shall be thoroughly stirred before being applied. If necessary to thin the Emulsion, this shall be done by the addition of water only.

Barrett SINCE 1854

THE BARRETT APPROVED ROOFER

When you study the outstanding acceptance and performance of Barrett Roofs you must ultimately come to the conclusion that Barrett's success has been based on a well-known axiom of the construction industry—that good roof service depends on the use of the proper materials . . . applied to a proved standard . . . by competent workmen.

The materials that go into Barrett Roofs are the finest that can be made, but this is to no avail if they are not properly applied.

Accordingly in its earliest days, Barrett formulated certain exacting standards for the application of its roofs. These standards are now known as the "Barrett Specification Roof."

The next step was to build a roofing organization that could be depended upon to apply Barrett materials honestly and with the greatest possible skill. The extent to which it succeeded in this undertaking is represented by the Barrett Approved Roofer Organization.

Barrett is justifiably proud of its Approved Roofers. The building industry knows no finer or more experienced group of men. They represent the utmost in ability and reliability. Their employment is recommended . . . on new work, repair or maintenance . . . for complete and satisfactory results.

THE Barrett Company manufactures, in addition to the Built-Up Roofing and Waterproofing Materials mentioned in this manual, an extensive line of prepared roofing products, such as mineral-surfaced asphalt shingles, roll roofings, sheathings, building papers, roof preservatives and repair materials, protective paints, wood preservatives, etc., constituting a comprehensive service for the building industry. Particulars concerning any materials in these classifications will be furnished upon request.

Barrett
SINCE
1854

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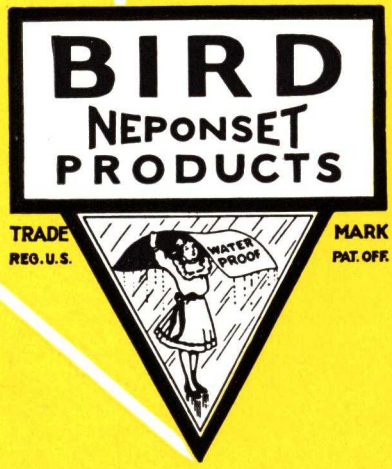
6
3

BIRD

BUILT-UP ROOFING



1938

INDEX TO SPECIFICATIONS
BIRD BUILT-UP ROOFS

TERMS OF BOND	SPECIFICATION NUMBER	TYPE	PAGE NUMBER	ROOF DECK CONSTRUCTION	LIMITATIONS OF ROOF DECK SLOPE	TYPE OF SURFACE	Underwriter's Classification	MAKE-UP OF ROOF	NO. OF MOPPINGS	WEIGHT OF MATERIALS POUNDS PER SQUARE: BASE SHEET	FELT	SHEATHING PAPER	ASPHALT OR PITCH	PRIMER	GRAVEL	SLAG	CAP SHEET	TOTAL WEIGHT PER SQUARE: WITH CAP SHEET	GRAVEL SURFACED	SLAG SURFACED
GRAVEL OR SLAG SURFACE—FOR FLAT DECKS																				
20	**101**	515 AW	6	Wood or Precast Gypsum	¼-3	Gravel or Slag	A	5-15 lb. Asphalt Felts	4		78		150		400	300			628	528
20	**102**	415 AC	7	Concrete	¼-2		A	4-15 lb. Asphalt Felts	5		62		180	10	400	300			652	552
15	**103**	415 AW	8	Wood or Precast Gypsum	¼-3		A	4-15 lb. Asphalt Felts	3		62		120		400	300			582	482
15	**104**	315 AC	9	Concrete	¼-2		A	3-15 lb. Asphalt Felts	4		46		150	10	400	300			606	506
20	**601**	515 TW	6	Wood or Precast Gypsum	0-2		A	Sheathing and 5-15 lb. Tarred Felts	4		78	6	150		400	300			634	534
20	**602**	415 TC	7	Concrete	0-2		A	4-15 lb. Tarred Felts	5		62		180		400	300			642	542
15	**603**	415 TW	8	Wood or Precast Gypsum	0-2		A	Sheathing and 4-15 lb. Tarred Felts	3		62	6	120		400	300			588	488
15	**604**	315 TC	9	Concrete	0-2		A	3-15 lb. Tarred Felts	4		46		150		400	300			596	496
CRUSHED MINERAL SURFACE—FOR SLOPING AND STEEP DECKS																				
20	**201**	B 215 ANW	10	Wood or Precast Gypsum	1-6	White Mineral Granules	C	55 lb. Base; 2-15 lb. Asphalt Felts; Neponset (Selvage) Cap Sheet	4	55	31		120				88	294		
20	**202**	B 215 ANC	11	Concrete	1-6		C	45 lb. Base; 2-15 lb. Asphalt Felts; Neponset (Selvage) Cap Sheet	5	45	31		150	10			88	324		
15	**203**	B 15 ANW	12	Wood or Precast Gypsum	1-6		C	55 lb. Base; 1-15 lb. Asphalt Felt; Neponset (Selvage) Cap Sheet	3	55	15		90				88	248		
15	**204**	B 15 ANC	13	Concrete	1-6		C	45 lb. Base; 1-15 lb. Asphalt Felt; Neponset (Selvage) Cap Sheet	4	45	15		120	10			88	278		
10	**205**	215 ANW	14	Wood or Precast Gypsum	1-6		C	2-15 lb. Asphalt Felts; Neponset (Selvage) Cap Sheet	3		31		90				88	209		
10	**206**	215 ANC	15	Concrete	1-6		C	2-15 lb. Asphalt Felts; Neponset (Selvage) Cap Sheet	4		31		120	10			88	249		
10	**207**	BNW	16	Wood or Precast Gypsum	4-up		C	55 lb. Base; Neponset (Selvage) Cap Sheet	2	55			60				88	203		
10	**208**	BNC	17	Concrete	4-up		C	45 lb. Base; Neponset (Selvage) Cap Sheet	3	45			90	10			88	233		
ASBESTINE TALC SURFACE—FOR SLOPING AND STEEP DECKS																				
10	**303**	215 APW	14	Wood or Precast Gypsum	1-6	Asbestine Talc	C	2-15 lb. Asphalt Felts; Paroid (Selvage) Cap Sheet	3		31		90				55	176		
10	**304**	215 APC	15	Concrete	1-6		C	2-15 lb. Asphalt Felts; Paroid (Selvage) Cap Sheet	4		31		120	10			55	216		
10	**301**	BPW	16	Wood or Precast Gypsum	4-up		C	55 lb. Base; Paroid (Selvage) Cap Sheet	2	55			60				55	170		
10	**302**	BPC	17	Concrete	4-up		C	45 lb. Base; Paroid (Selvage) Cap Sheet	3	45			90	10			55	200		

ROOF INSULATION

			18	Wood or Precast Gypsum	Application of Roof Insulation for High and Low Humidity Conditions
			18	Concrete	Application of Roof Insulation for High and Low Humidity Conditions
			18	Steel	Application of Roof Insulation for High and Low Humidity Conditions

FLASHINGS

	1		20	Base: Felts & Mineral Surface Roofing	Cap: Three Course Plastic
	2		20	Base: Felts & Mineral Surface Roofing	Cap: Cover Inside Face and Top of Wall
	3		21	Base: Felts & Mineral Surface Roofing	Cap: Three Course Through Wall
	4		22	5 Course Plastic	
	5		19	Metal Base and Cap	
	6		19	Raggle Block Type	

NOTE: Specifications for Flashings and Edgings to meet special conditions will be furnished when requested.

Specifications covering application of roofs over insulation are combined with specifications for application over concrete.

ROOFING MANUAL

ON BIRD BUILT-UP ROOFINGS AND FLASHINGS

Complete Specifications for **BIRD BUILT-UP**

. . . . . *Bonded Roofs for all types of service*

BIRD BUILT-UP ROOFINGS *for all purposes*

There is a Bird Built-Up Roof for every type of flat roof construction. In the data and specifications given on the following pages you will find the answer to positive roof protection. The mineral surfacing protecting the waterproofing elements is one of the many specific features of Bird Built-Up Roofs that provide longer life.

ASPHALT *and* TAR ROOF TYPES

Bird Built-Up Roofing Specifications are designed to use either Bird Roofing Pitch or Bird Roofing Asphalt as desired by the Architect to meet particular conditions or preferences. Either pitch or asphalt may be used as the waterproofing element for flat roofs. For steep roofs, or those having a slope of over two inches to the foot, asphalt should be used on account of its high melting point and stability. Special high melting type asphalts are produced by Bird to be used on steep roofs. These are of the very highest quality and assure long life for the roof.

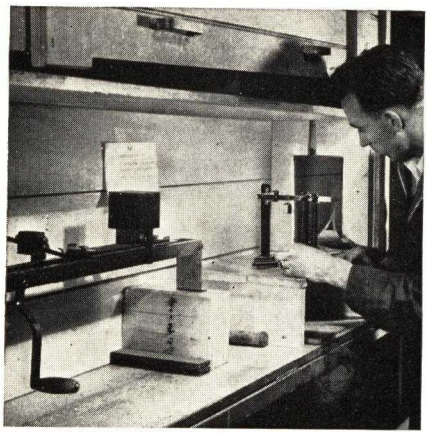
BONDED ROOFS

The satisfaction that any roof will give depends upon two important factors: First, the materials must be suitable for the service to be rendered. Second, and equally important, these materials must be correctly applied. When both these conditions are met, satisfactory results are assured. Because Bird & Son, inc., has carefully covered these conditions, they are prepared to offer bonded roofs for ten, fifteen or twenty years' service.

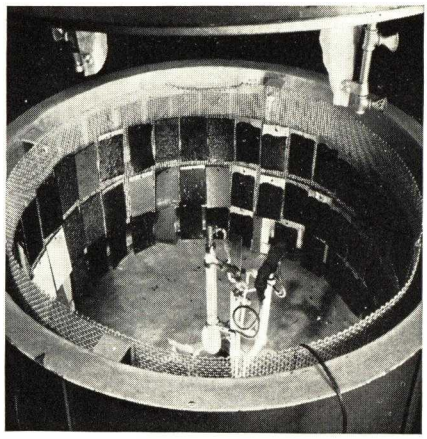
BIRD BONDED ROOFS

Installed only by accredited Roofers

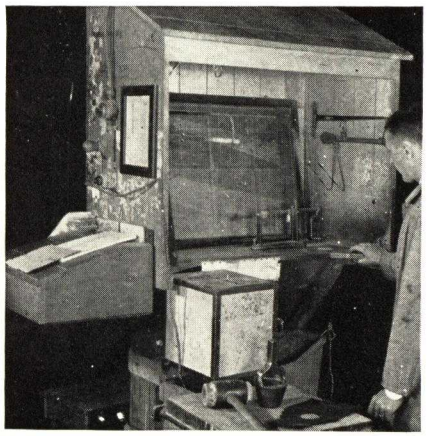
A properly applied roof is one in which all of the elements entering into its make-up are bonded together into one solid mass. This perfect application results only through experienced workmanship. Such workmanship is made possible on Bird Bonded Roofs because of the careful selection of only accredited roofers of unquestioned dependability applying Bird Roofs.



GRANULE EMBEDDING CONTROL



ACCELERATED WEATHERING TESTER



FELT SATURATION CONTROL

Along the Production Line—Scientific Control

MATERIALS

Manufacturing Control

The quality of Bird Built-Up Roof Materials is under Bird control throughout every phase of manufacture.

Rag felt base for the production of cap sheets, base sheets and saturated felts is made by Bird to rigid specifications and will be found exceptionally uniform in strength and texture.

Asphalt for saturating and coating is refined by Bird to characteristics best suited for roofing use. Saturants and coatings refined from the same basic materials combine in a roof to the best advantage because they are compatible.

Surfacing granules are quarried and crushed by Bird. They are carefully graded as to size, thoroughly cleaned by an oil treating process and perfectly embedded to produce a more permanent and better weathering surface.

Cap Sheet Roofs

For more than a quarter of a century Bird has recommended Built-Up Roofs with mineral surfacings to protect the waterproofing elements from the sun and to provide a longer life. Though materials and methods constantly have been improved, it neither has been necessary nor advisable to make any change in the basic principles.

Neponset Cap Sheet

Designed as a weathering and wearing surface for Built-Up Roofs, this Surfaced Cap Sheet is made to lay up in two ply construction. Built 36 ins. wide, 17 ins. are coated with asphalt and surfaced with protecting mineral granules. Nineteen inches are left as bare saturated felt selvage. The asphalt coating is applied in the factory under ideal conditions and in a layer of uniform thickness.

Neponset Cap Sheet is furnished in rolls 71¼ ft. long, weighing 88 lbs. and containing enough material to cover 100 sq. ft. of surface when laid two ply. Standard surfacings are either Bird White Quartzite or Black Slate.

Paroid Cap Sheet

Similar in design and use to Neponset Cap Sheet and having the same bare felt selvage, Paroid Cap Sheet is surfaced with White Asbestine Talc. Paroid surfacing is lighter in weight and provides a smoother surface than Quartzite or Slate granules. Paroid Cap Sheet is furnished in rolls 71¼ ft. long, weighing 55 lbs. and containing enough material to cover 100 sq. ft. of surface when laid two ply.

Bird Base Sheets

Saturated and coated rag felts having both sides lightly sanded to provide surfaces to which saturated felts and cap sheets can be bonded with Roofing Asphalt. Bird Base Sheets are furnished in two weights, 45 lbs. and 55 lbs. per square and in rolls containing 108 sq. ft. of material.

Bird Asphalt Felt

Rag felt thoroughly saturated with pure, non-volatile asphalt. Bird asphalt felts are made in several weights, standard for Built-Up Roof work being 15 lbs. per 100 sq. ft. and 30 lbs. per 100 sq. ft. Both weights are made 36 ins. wide and are furnished in rolls containing 432 sq. ft. and 216 sq. ft., respectively.

Bird Tarred Felt

Rag felt thoroughly saturated with pure tar. Made 32 ins. wide, weighing 15 lbs. per 100 sq. ft. and is furnished in rolls containing 432 sq. ft.

Bird Roofing Asphalt

A special solid asphalt in two grades, No. 16 and No. 18, for flat and steep work, respectively. Furnished in drums weighing approximately 400 lbs. each.

Bird Roofing Pitch

A straight run coal tar pitch. Furnished in wood and metal barrels weighing from 350 lbs. to 500 lbs. each.

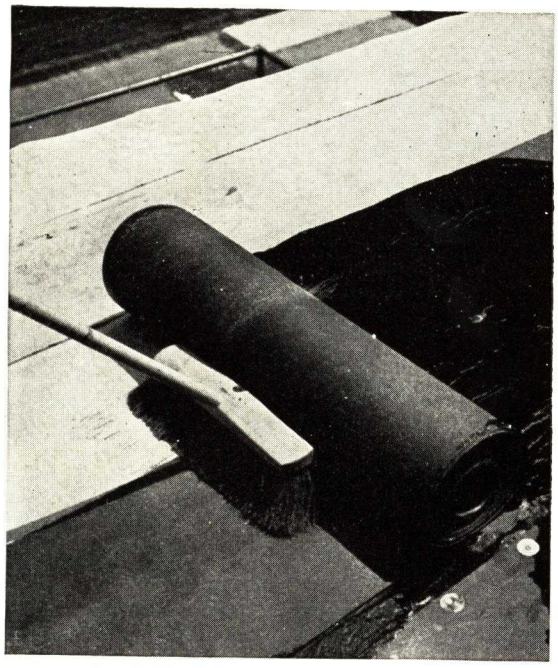
Bird Flashing Cement

An asphalt and asbestos cement of troweling consistency especially developed for the construction of plastic flashings.

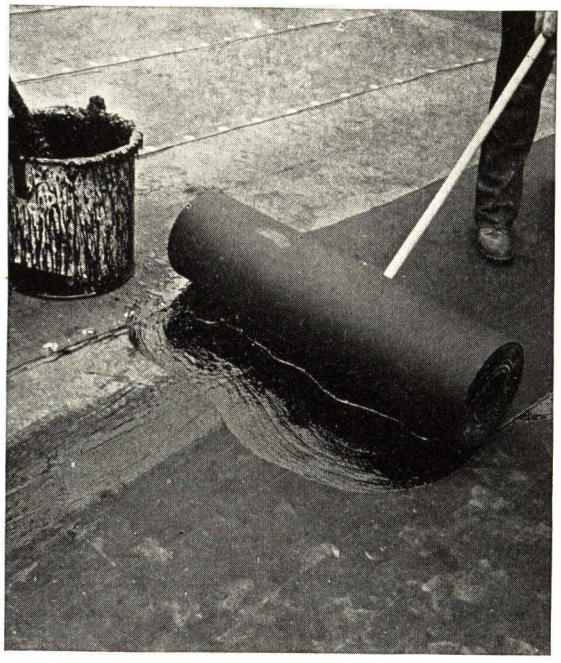
Standard Specifications

All Bird Standard Built-Up Roof Materials carry Underwriters' labels. Bird Asphalt, Pitch, Asphalt Felt, Tarred Felt, Flashing Cement and Primer meet all standard Federal, State, City and A. S. T. M. specifications.

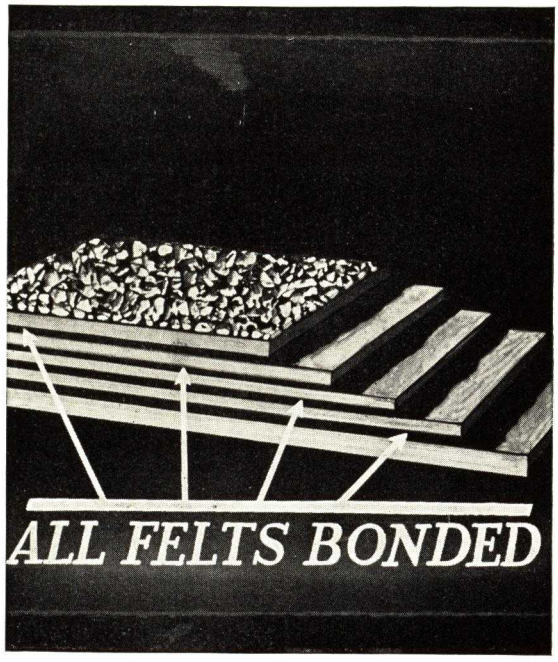
AN EFFICIENT MOP



BROOMING THE FELT



ENOUGH BITUMEN TO FORM A FILLET



A PROPERLY BONDED ROOF

Steps in the Production of a Good Built-up Roof

DESIGN AND WORKMANSHIP

Selecting the Proper Roof

Bird standard specifications include the following types as tabulated in the Index on page 2:

Group 1—Gravel or Slag Surfaced Asphalt Roofs.
Group 2—Gravel or Slag Surfaced Pitch Roofs.
Group 3—Neponset Cap Sheet Roofs.
Group 4—Paroid Cap Sheet Roofs.

Selection of the correct specification to meet any given set of conditions is simplified by the use of the tabulation referred to. The following general recommendations can be made:

Dead Level Roofs.....Use Group 2
Slope ¼" to 1" per foot.....Use Group 1 or 2
Slope 1" to 2" per foot.....Use Group 1, 2, 3 or 4
Slope over 2" per foot.....Use Group 3 or 4

Roof Traffic

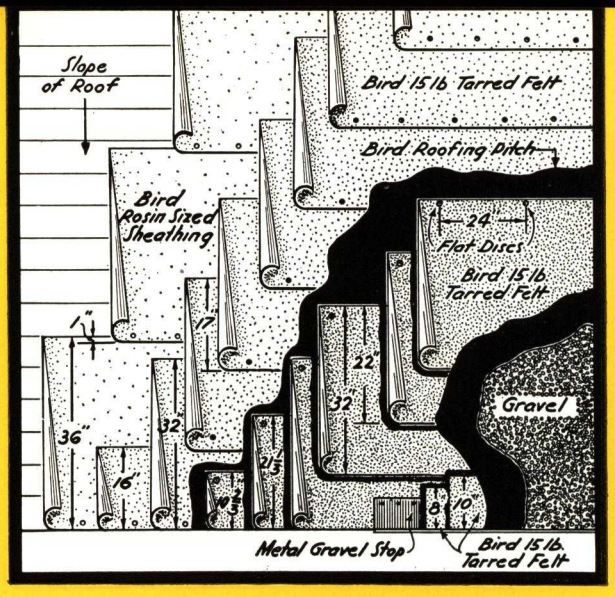
Where roof traffic is to be encountered, the use of a roof from Group 3 or 4 will prove more satisfactory than a gravel or slag surfaced type.

Workmanship

The satisfaction that any roof will give depends upon the suitability and quality of the materials and upon the care with which these materials are combined.

A properly applied roof is one in which all of the elements entering into its make-up are bonded together into one solid mass. In no case can such proper application result from inexperienced or careless workmanship.

The use of a heavy mopping of roofing asphalt and the thorough brooming of felts and cap sheets into this mopping to exclude all entrapped air are necessary for best results.



BIRD 20 YEAR BUILT-UP ROOF, PITCH AND GRAVEL OR SLAG

Over Wood or Precast Gypsum Decks Slope 0" to 2" in 1'-0"

SPECIFICATION NO. 601—TYPE 515-TW

BILL OF MATERIALS PER 100 SQUARE FEET

Rosin Sized Paper—1 layer Bird Rosin Sized Paper ..... 6 lbs.
Tarred Felt—5 layers Bird 15 lb. Tarred Felt ..... 78 lbs.
Pitch—Bird Roofing Pitch ..... 150 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.
Surfacing—Gravel ..... 400 lbs.
Slag ..... 300 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 601—Type 515-TW, Built-up Roof and Bird Flashing (state type) to (State in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Rosin Sized Sheathing Paper—Shall be Bird Rosin Sized Sheathing Paper, thirty-six (36) ins. wide, weighing not less than six (6) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Tarred Felt thirty-two (32) ins. wide weighing approximately 15 lbs. per one hundred (100) sq. ft.

Pitch—Shall be Bird Roofing Pitch and shall not be heated above three hundred seventy-five (375) degrees Fahrenheit.

Gravel or Slag—Shall be dry and free from dirt and range from one-quarter (¼) to five-eighths (⅝) in. in size.

Nails—For wood or wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be covered with one (1) layer of Sheathing Paper, lapping sheets not less than one (1) in.

(2) Two (2) plies of Bird 15 lb. Tarred Felt shall be laid dry over the Sheathing Paper, lapped seventeen (17) ins. and nailed often enough to hold sheets in place.

(3) Three (3) additional plies of Bird 15 lb. Tarred Felt shall be laid over entire surface, lapped twenty-two (22) ins. and each sheet shall be laid without wrinkles or buckles, and be embedded its full width in Bird Roofing Pitch. Each sheet shall be nailed along upper edge with barbed nails driven through flat tinned discs spaced not more than two (2) ft. on centers.

(4) A uniform coating of Bird Roofing Pitch shall be poured over the entire surface, using not less than sixty (60) lbs. per 100 sq. ft., into which, while hot, shall be embedded not less than four hundred (400) lbs. of gravel or three hundred (300) lbs. of slag per 100 sq. ft.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Twenty Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 20 YEAR BUILT-UP ROOF, ASPHALT AND GRAVEL (SLAG)

Over Wood or Precast Gypsum Decks, Slope ¼" to 3" in 1'-0"

Bird Specification No. 101—Type 515-AW

The construction for this roof is identical with Specification No. 601, with changes under "Installation" as follows:

(1) Omit item No. 1 entirely.

(2) Two (2) plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid dry over entire roof deck, lapped nineteen (19) ins. and nailed in two (2) staggered parallel rows, three-quarters (¾) in. and eight and one-half (8½) ins. above the lower edge, and spaced nine (9) ins. center to center.

(3) Three (3) additional plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid over entire surface, lapped twenty-five (25) ins. and each sheet embedded its full width in Bird Roofing Asphalt No. 16.

(4) Substitute Bird Roofing Asphalt No. 16 for Bird Roofing Pitch.

(Balance of specification remains the same.)

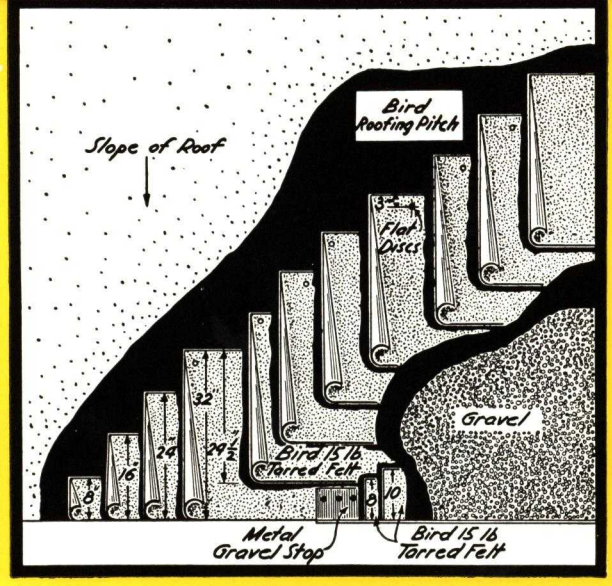
BIRD 20 YEAR BUILT-UP ROOF, PITCH AND GRAVEL OR SLAG

Over Poured Concrete or Gypsum Decks Slope 0" to 2" in 1'-0" Over Insulation—Max. Slope 1" in 1'-0"

SPECIFICATION NO. 602—TYPE 415-TC

BILL OF MATERIALS PER 100 SQUARE FEET

Tarred Felt—4 layers Bird 15 lb. Tarred Felt ..... 62 lbs.
Pitch—Bird Roofing Pitch ..... 180 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.
Surfacing—Gravel ..... 400 lbs.
Slag ..... 300 lbs.



Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 602—Type 415-TC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Felt—Shall be Bird 15 lb. Tarred Felt thirty-two (32) ins. wide weighing approximately 15 lbs. per one hundred (100) sq. ft.

Pitch—Shall be Bird Roofing Pitch and shall not be heated above three hundred seventy-five (375) degrees Fahrenheit.

Gravel or Slag—Shall be dry and free from dirt and range from one-quarter (¼) to five-eighths (⅝) in. in size.

Nails—For wood or wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be coated with Bird Roofing Pitch.

(2) Four (4) plies of Bird 15 lb. Tarred Felt shall be laid over entire roof surface, each sheet lapped twenty-four and one-half (24½) ins., shall be laid without wrinkles or buckles, and be embedded in Bird Roofing Pitch. Each sheet shall be nailed along upper edge with barbed nails driven through flat tinned discs spaced not more than two (2) ft. on centers.

(3) A uniform coating of Bird Roofing Pitch shall be poured over the entire surface, using not less than sixty (60) lbs. per 100 sq. ft., into which, while hot, shall be embedded not less than four hundred (400) lbs. of gravel or three hundred (300) lbs. of slag per 100 sq. ft.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Twenty Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 20 YEAR BUILT-UP ROOF, ASPHALT AND GRAVEL (SLAG)

Over Concrete Decks, Slope ¼" to 2" in 1'-0"

Where slope is over 2", nailing strip shall be provided for in the roof deck

When Used Over Insulated Decks, No Primer Is Required

Bird Specification No. 102—Type 415-AC

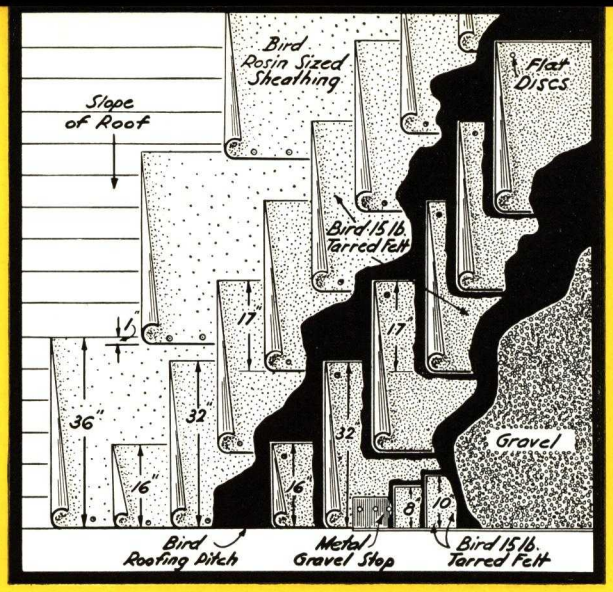
The construction for this roof is identical with Specification No. 602, with the following changes under "Installation":

(1) Entire roof surface shall first be primed with Bird Asphalt Primer.

(2) Four (4) plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid over entire roof surface, each sheet lapped twenty-seven and one-half (27½) ins. and embedded in Bird Roofing Asphalt. Each sheet shall be nailed three (3) ins. from upper edge with barbed nails driven through flat tinned discs spaced not more than twelve (12) ins. on centers.

(3) Substitute Bird Roofing Asphalt No. 16 for Bird Roofing Pitch.

(Balance of specification remains the same.)



BIRD 15 YEAR BUILT-UP ROOF, PITCH AND GRAVEL OR SLAG

Over Wood or Precast Gypsum Decks Slope 0" to 2" in 1'-0"

SPECIFICATION NO. 603—TYPE 415-TW

BILL OF MATERIALS PER 100 SQUARE FEET

Rosin Sized Paper—Bird Rosin Sized Paper ..... 6 lbs.
Tarred Felt—4 layers Bird 15 lb. Tarred Felt ..... 62 lbs.
Pitch—Bird Roofing Pitch ..... 120 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.
Surfacing—Gravel ..... 400 lbs.
Slag ..... 300 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 603—Type 415-TW, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Rosin Sized Sheathing Paper—Shall be Bird Rosin Sized Sheathing Paper, thirty-six (36) ins. wide, weighing not less than six (6) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Tarred Felt thirty-two (32) ins. wide weighing approximately 15 lbs. per one hundred (100) sq. ft.

Pitch—Shall be Bird Roofing Pitch and shall not be heated above three hundred seventy-five (375) degrees Fahrenheit.

Gravel or Slag—Shall be dry and free from dirt and range from one-quarter (¼) to five-eighths (⅝) in. in size.

Nails—For wood or wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be covered with one (1) layer of Sheathing Paper, lapping sheets not less than one (1) in.

(2) Two (2) plies of Bird 15 lb. Tarred Felt shall be laid dry over the Sheathing Paper, lapped seventeen (17) ins. and nailed often enough to hold sheets in place.

(3) Two (2) additional plies of Bird 15 lb. Tarred Felt shall be laid over entire surface, lapped seventeen (17) ins. and each sheet shall be laid without wrinkles or buckles, and be embedded its full width in Bird Roofing Pitch. Each sheet shall be nailed along upper edge with barbed nails driven through flat tinned discs spaced not more than two (2) ft. on centers.

(4) A uniform coating of Bird Roofing Pitch shall be poured over the entire surface, using not less than sixty (60) lbs. per 100 sq. ft., into which, while hot, shall be embedded not less than four hundred (400) lbs. of gravel or three hundred (300) lbs. of slag per 100 sq. ft.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Fifteen Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 15 YEAR BUILT-UP ROOF, ASPHALT AND GRAVEL (SLAG)

Over Wood or Precast Gypsum Decks, Slope ¼" to 3" in 1'-0"

Bird Specification No. 103—Type 415-AW

The construction for this roof is identical with Specification No. 603, with changes under "Installation" as follows:

(1) Omit item No. 1 entirely.

(2) Two (2) plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid dry over entire roof deck, lapped nineteen (19) ins. and nailed in two (2) staggered parallel rows, three-quarters (¾) in. and eight and one-half (8½) ins. above the lower edge, and spaced nine (9) ins. center to center.

(3) Two (2) additional plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid over entire surface, lapped nineteen (19) ins. and each sheet embedded its full width in Bird Roofing Asphalt No. 16.

(4) Substitute Bird Roofing Asphalt No. 16 for Bird Roofing Pitch.

(Balance of specification remains the same.)

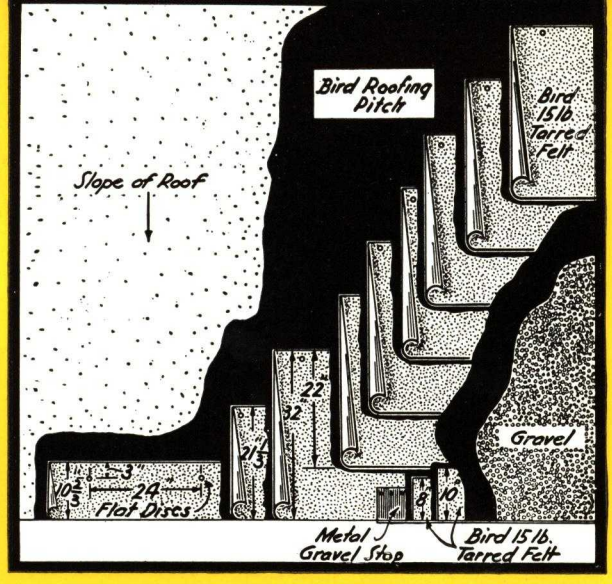
BIRD 15 YEAR BUILT-UP ROOF, PITCH AND GRAVEL OR SLAG

Over Poured Concrete or Gypsum Decks Slope 0" to 2" in 1'-0" Over Insulation—Max. Slope 1" in 1'-0"

SPECIFICATION No. 604—TYPE 315-TC

BILL OF MATERIALS PER 100 SQUARE FEET

Tarred Felt—3 layers Bird 15 lb. Tarred Felt ..... 46 lbs.
Pitch—Bird Roofing Pitch ..... 150 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.
Surfacing—Gravel ..... 400 lbs.
Slag ..... 300 lbs.



Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 604—Type 315-TC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Felt—Shall be Bird 15 lb. Tarred Felt thirty-two (32) ins. wide weighing approximately 15 lbs. per one hundred (100) sq. ft.

Pitch—Shall be Bird Roofing Pitch and shall not be heated above three hundred seventy-five (375) degrees Fahrenheit.

Gravel or Slag—Shall be dry and free from dirt and range from one-quarter (¼) to five-eighths (⅝) in. in size.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be coated with Bird Roofing Pitch.

(2) Three (3) plies of Bird 15 lb. Tarred Felt shall be laid over entire roof surface, each sheet lapped twenty-two (22) ins., shall be laid without wrinkles or buckles, and be embedded in Bird Roofing Pitch. Each sheet shall be nailed along upper edge with barbed nails driven through flat tinned discs not more than two (2) ft. on centers.

(3) A uniform coating of Bird Roofing Pitch shall be poured over the entire surface, using not less than sixty (60) lbs. per 100 sq. ft. into which, while hot, shall be embedded not less than four hundred (400) lbs. of gravel or three hundred (300) lbs. of slag per 100 sq. ft.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Fifteen Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 15 YEAR BUILT-UP ROOF, ASPHALT AND GRAVEL (SLAG)

Over Concrete Decks, Slope ¼" to 2" in 1'-0"

Where slope is over 2", nailing strip shall be provided for in the roof deck

When Used Over Insulated Decks, No Primer Is Required

Bird Specification No. 104—Type 315-AC

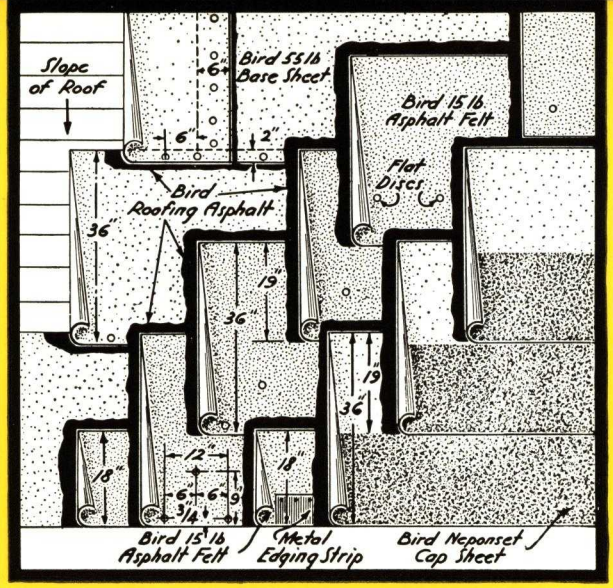
The construction for this roof is identical with Specification No. 604, with the following changes under "Installation":

(1) Entire roof surface shall first be primed with Bird Asphalt Primer:

(2) Three (3) plies of Bird 15 lb. Asphalt Felt 36 ins. wide shall be laid over entire roof surface, each sheet lapped twenty-five (25) ins. and embedded in Bird Roofing Asphalt. Each sheet shall be nailed three (3) ins. from upper edge with barbed nails driven through flat tinned discs spaced not more than twelve (12) ins. on centers.

(3) Substitute Bird Roofing Asphalt No. 16 for Bird Roofing Pitch.

(Balance of specification remains the same.)



BIRD 20 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Wood or Precast Gypsum Decks Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 201—TYPE B215-A-NW

BILL OF MATERIALS PER 100 SQUARE FEET

Base Sheet—1 layer Bird 55 lb. Base Sheet	55 lbs.
Asphalt Felt—2 layers Bird 15 lb. Asphalt Felt	31 lbs.
Asphalt—Bird Roofing Asphalt	120 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.	
Surfacing—2 layers Bird Neponset Cap Sheet	88 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 201—Type B215-A-NW, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Base Sheet—Shall be Bird 55 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Neponset Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately eighty-eight (88) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be covered with one (1) layer of Bird 55 lb. Base Sheets lapped two (2) ins. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18 and nailed on six (6) in. centers.

(2) Two (2) plies of Bird 15 lb. Asphalt Felt shall be laid over the Base Sheet, lapped nineteen (19) ins., and each sheet embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and nine (9) ins. from lower edge of sheet, spacing nails twelve (12) ins. center to center.

(3) Bird Neponset Cap Sheet shall be laid in two ply construction over the Felts, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Twenty Year Guarantee Bond to cover the roofing applied under this contract.

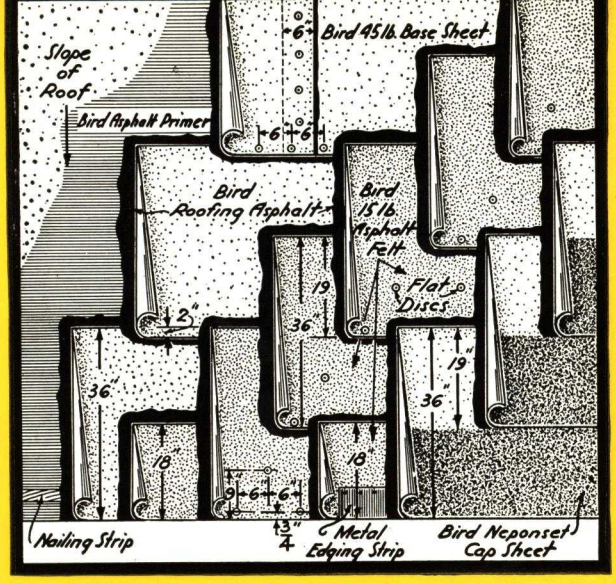
BIRD 20 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Poured Concrete, Poured Gypsum or Insulation Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 202—TYPE B215-A-NC

BILL OF MATERIALS PER 100 SQUARE FEET

Primer—Bird Asphalt Primer	10 lbs.
Base Sheet—1 layer Bird 45 lb. Base Sheet	45 lbs.
Asphalt Felt—2 layers Bird 15 lb. Asphalt Felt	31 lbs.
Asphalt—Bird Roofing Asphalt	150 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.	
Surfacing—2 layers Bird Neponset Cap Sheet	88 lbs.



When Used Over Insulated Decks, No Primer Is Required

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 202—Type B215-A-NC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Primer—Shall be Bird Asphalt Primer.

Base Sheet—Shall be Bird 45 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately forty-five (45) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Neponset Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately eighty-eight (88) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire surface to be roofed and flashed shall be coated with Bird Asphalt Primer and allowed to dry.

(2) Entire roof surface shall be covered with one (1) layer of Bird 45 lb. Base Sheet embedded full width in Bird Roofing Asphalt No. 18, and lapped two (2) ins. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18 and nailed on six (6) in. centers.

(3) Two (2) plies of Bird 15 lb. Asphalt Felt shall be laid over the Base Sheet, lapped nineteen (19) ins. and each sheet embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and nine (9) ins. from lower edge of sheet, spacing nails twelve (12) ins. center to center.

(4) Bird Neponset Cap Sheet shall be laid in two ply construction over the Felts, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

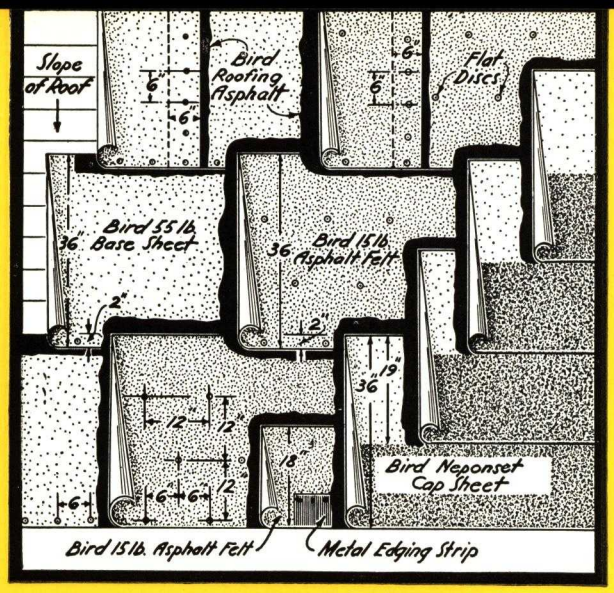
Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Twenty Year Guarantee Bond to cover the roofing applied under this contract.



BIRD 15 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Wood or Precast Gypsum Decks Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 203—TYPE B15-A-NW

BILL OF MATERIALS PER 100 SQUARE FEET

Base Sheet—1 layer Bird 55 lb. Base Sheet	55 lbs.
Asphalt Felt—1 layer Bird 15 lb. Asphalt Felt	15 lbs.
Asphalt—Bird Roofing Asphalt	90 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.	
Surfacing—2 layers Bird Neponset Cap Sheet	88 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 203—Type B15-A-NW, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Base Sheet—Shall be Bird 55 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Neponset Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately eighty-eight (88) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails.) For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be covered with one (1) layer of Bird 55 lb. Base Sheets lapped two (2) ins. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18 and nailed on six (6) in. centers.

(2) One (1) ply of Bird 15 lb. Asphalt Felt shall be laid over the Base Sheet, lapped two (2) ins. at edges and six (6) ins. at ends, and each sheet embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed at the lap and in two (2) staggered parallel rows twelve (12) and twenty-four (24) ins. from lower edge of sheet, spacing nails twelve (12) ins. center to center.

(3) Bird Neponset Cap Sheet shall be laid in two ply construction over the Felt, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Fifteen Year Guarantee Bond to cover the roofing applied under their contract.

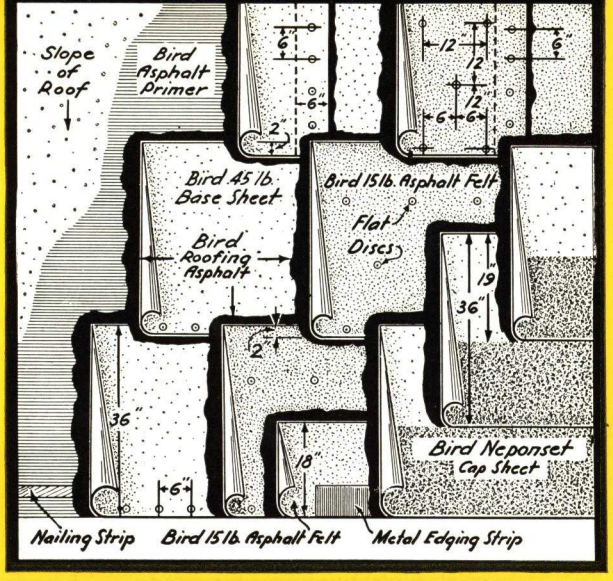
BIRD 15 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Poured Concrete, Poured Gypsum or Insulation Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 204—TYPE B15-A-NC

BILL OF MATERIALS PER 100 SQUARE FEET

Primer—Bird Asphalt Primer ..... 10 lbs.
Base Sheet—1 layer Bird 45 lb. Base Sheet ..... 45 lbs.
Asphalt Felt—1 layer Bird 15 lb. Asphalt Felt ..... 15 lbs.
Asphalt—Bird Roofing Asphalt ..... 120 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.
Surfacing—2 layers Bird Neponset Cap Sheet ..... 88 lbs.



When Used Over Insulated Decks, No Primer Is Required

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 204—Type B15-A-NC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Primer—Shall be Bird Asphalt Primer.

Base Sheet—Shall be Bird 45 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately forty-five (45) lbs. per one hundred (100) sq. ft.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Neponset Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately eighty-eight (88) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips, shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire surface to be roofed and flashed shall be coated with Bird Asphalt Primer and allowed to dry.

(2) Entire roof surface shall be covered with one (1) layer of Bird 45 lb. Base Sheet embedded full width in Bird Roofing Asphalt No. 18, and lapped two (2) ins. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18 and nailed on six (6) in. centers.

(3) One (1) ply of Bird 15 lb. Asphalt Felt shall be laid over the Base Sheet, lapped two (2) ins. at edges and six (6) ins. at ends, and each sheet embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed at the lap, and in two (2) staggered parallel rows twelve (12) ins. and twenty-four (24) ins. from lower edge of sheet, spacing nails twelve (12) ins. center to center.

(4) Bird Neponset Cap Sheet shall be laid in two ply construction over the Felt, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

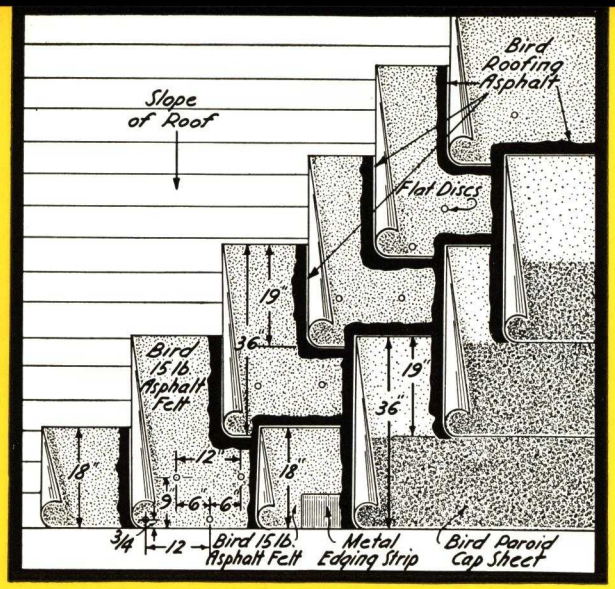
Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Fifteen Year Guarantee Bond to cover the roofing applied under this contract.



BIRD 10 YEAR BUILT-UP ROOF, ASBESTINE TALC SURFACE

Over Wood or Precast Gypsum Decks Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 303—TYPE 215-A-PW

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt—2 layers Bird 15 lb. Asphalt Felt	31 lbs.
Asphalt—Bird Roofing Asphalt	90 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.	
Surfacing—2 layers Bird Paroid Cap Sheet	55 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 303—Type 215-A-PW, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Paroid Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire roof deck shall be covered with two (2) plies of Bird 15 lb. Asphalt Felt, lapped nineteen (19) ins., and the nineteen (19) in. lap embedded in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and nine (9) ins. from lower edge of the sheet, spacing the nails twelve (12) ins. center to center.

(2) Bird Paroid Cap Sheet shall be laid in two ply construction over the Felt, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Ten Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 10 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Wood or Precast Gypsum Decks, Slope 1" to 6" in 1'-0"

Bird Specification No. 205—Type 215-A-NW

The construction of this roof is identical with Specification No. 303, with the following substitution: *Throughout*, substitute Neponset Cap Sheet (weight, 88 lbs. per square) for Paroid Cap Sheet (weight, 55 lbs. per square).

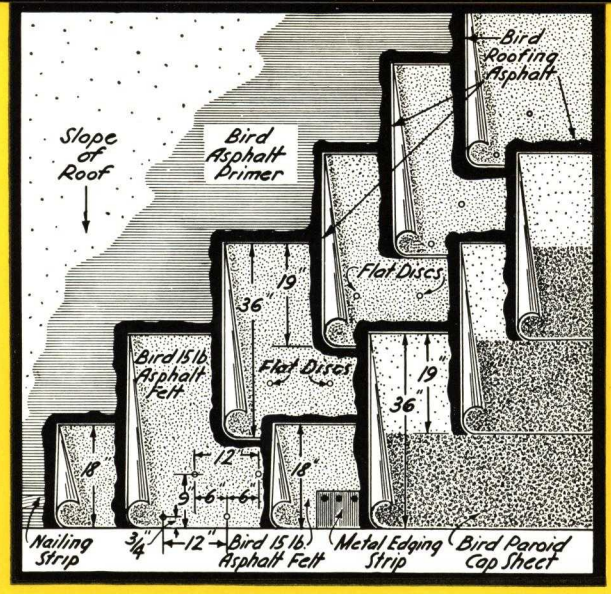
BIRD 10 YEAR BUILT-UP ROOF, ASBESTINE TALC SURFACE

Over Poured Concrete, Poured Gypsum or Insulation Slope 1" to 6" in 1'-0"

SPECIFICATION NO. 304—TYPE 215-A-PC

BILL OF MATERIALS PER 100 SQUARE FEET

Primer—Bird Asphalt Primer ..... 10 lbs.
Asphalt Felt—2 layers Bird 15 lb. Asphalt Felt ..... 31 lbs.
Asphalt—Bird Roofing Asphalt ..... 120 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.
Surfacing—2 layers Bird Paroid Cap Sheet ..... 55 lbs.



When Used Over Insulated Decks, No Primer Is Required

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 304—Type 215-A-PC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Primer—Shall be Bird Asphalt Primer.

Felt—Shall be Bird 15 lb. Asphalt Felt thirty-six (36) ins. wide weighing approximately fifteen (15) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Paroid Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire surface to be roofed and flashed shall be coated with Bird Asphalt Primer and allowed to dry.

(2) Entire roof deck shall be covered with two (2) plies of Bird 15 lb. Asphalt Felt, lapped nineteen (19) ins., and each sheet embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. Each sheet shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and nine (9) ins. from lower edge of the sheet, spacing the nails twelve (12) ins. center to center.

(3) Bird Paroid Cap Sheet shall be laid in two ply construction over the Felt, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft.

All Felts and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

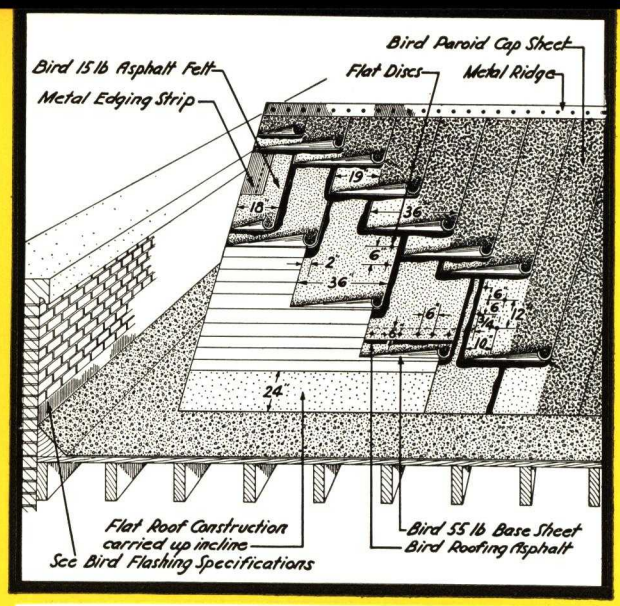
The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Ten Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 10 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Poured Concrete, Poured Gypsum or Insulation, Slope 1" to 6" in 1'-0"

Bird Specification No. 206—Type 215-A-NC

The construction of this roof is identical with Specification No. 304, with the following substitution: *Throughout*, substitute Neponset Cap Sheet (weight, 88 lbs. per square) for Paroid Cap Sheet (weight, 55 lbs. per square).



BIRD 10 YEAR BUILT-UP ROOF, ASBESTINE TALC SURFACE

Over Wood or Precast Gypsum Decks Slope 4" up in 1'-0"

SPECIFICATION NO. 301—TYPE B-PW

BILL OF MATERIALS PER 100 SQUARE FEET

Base Sheet—1 layer Bird 55 lb. Base Sheet ..... 55 lbs.
Asphalt—Bird Roofing Asphalt ..... 60 lbs.
Nails and Discs—1" barbed nails for wood or 1½" cut nails for gypsum, through flat tinned discs.
Surfacing—2 layers Bird Paroid Cap Sheet ..... 55 lbs.

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 301—Type B-PW, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Base Sheet—Shall be Bird 55 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Paroid Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire surface shall be covered with one (1) layer of Bird 55 lb. Base Sheet lapped two (2) ins. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18 and nailed on six (6) in. centers.

(2) Bird Paroid Cap Sheet shall be laid in two ply construction over the Base Sheet, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. The felt, or selvage portion of the Cap Sheet, shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and ten (10) ins. from edge, spacing nails twelve (12) ins. center to center.

Note: On inclines under three (3) ins. per foot, Base Sheet and Cap Sheet shall be laid perpendicular to the pitch. On inclines over three (3) ins. per foot, Base Sheet and Cap Sheet shall be laid parallel with the pitch.

All Base Sheets and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Ten Year Guarantee Bond to cover the roofing applied under this contract.

BIRD 10 YEAR BUILT-UP ROOF, MINERAL SURFACE

Over Wood or Precast Gypsum Decks, Slope 1" to 6" in 1'-0"

Bird Specification No. 207—Type B-NW

The construction of this roof is identical with Specification No. 301, with the following substitution: *Throughout*, substitute Neponset Cap Sheet (weight, 88 lbs. per square) for Paroid Cap Sheet (weight, 55 lbs. per square).

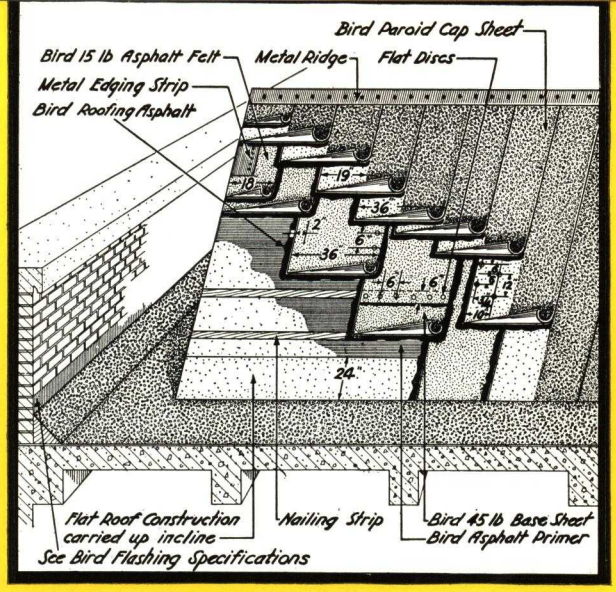
BIRD 10 YEAR BUILT-UP ROOF, ASBESTINE TALC SURFACE

Over Poured Concrete, Poured Gypsum or Insulation Slope 4" up in 1'-0"

SPECIFICATION NO. 302—TYPE B-PC

BILL OF MATERIALS PER 100 SQUARE FEET

Primer—Bird Asphalt Primer	10 lbs.
Base Sheet—1 layer Bird 45 lb. Base Sheet	45 lbs.
Asphalt—Bird Roofing Asphalt	90 lbs.
Nails and Discs—1" barbed nails for wood nailing strips or 1½" cut nails for other materials, through flat tinned discs.	
Surfacing—2 layers Bird Paroid Cap Sheet	55 lbs.



When Used Over Insulated Decks, No Primer Is Required

Work Included

The work proposed under this specification shall include all labor, material, equipment and services necessary for, and relevant to, the installation of Bird Specification No. 302—Type B-PC, Built-up Roof and Bird Flashing (state type) to (state in detail the surfaces to be covered).

Preliminary Work by Others

The preparation of the roof deck, adjoining vertical surfaces and metal construction (unless specified in Work Included) is *not* a part of the Roofing Contract but will be installed and furnished by others and shall include the following work:

(a) Roof Construction—Including cants, coves or fillets, shall be properly graded to conduct all water into gutters and roof drains, leaving all surfaces smooth and clean, in a satisfactory condition to receive roofing.

(b) Vertical Wall Construction—Including parapet walls, curbs, etc. Non-combustible walls (brick excepted) which are to receive Bird Flashing shall be provided with a nailing strip centered five (5) ins. above roof. Curbs of similar construction shall be provided with a nailing strip at top. (Where Bird Flashings are to extend through walls or under coping, walls will be built to proper height and left ready to receive flashing.)

(c) Metal Construction—Including roof drains, sheet metal flanges required at pipes, vents, conductor heads or other openings through roof, etc.

Inspection of Preliminary Work

The Roofing Contractor shall examine all surfaces on which or against which his work is to be applied and shall notify the Architect or General Contractor if for any reason there are defects which he considers detrimental to the installation of his materials. He shall see to it that all defects are corrected, all surfaces properly sloped to drains, etc., and all roof surfaces clean and dry before installing his materials. Application of roofing by Roofing Contractor shall be an acceptance of surfaces.

Materials

All Roofing Materials shall be as manufactured by Bird & Son, inc., and delivered to the job in the original packages, bearing the manufacturer's labels.

Primer—Shall be Bird Asphalt Primer.

Base Sheet—Shall be Bird 45 lb. Base Sheet for Built-up Roofs, thirty-six (36) ins. wide weighing approximately forty-five (45) lbs. per one hundred (100) sq. ft.

Cap Sheet—Shall be Bird Paroid Cap Sheet thirty-six (36) ins. wide with nineteen (19) in. selvage weighing approximately fifty-five (55) lbs. per one hundred (100) sq. ft. in place.

Asphalt—Shall be Bird No. 18 Roofing Asphalt.

Nails—For wood or wooden nailing strips shall be one (1) in. barbed nails driven through flat metal discs (or approved large head roofing nails). For gypsum or other composition decks, shall be one and one-half (1½) in. cut nails driven through flat metal discs.

Installation

(1) Entire surface to be roofed and flashed shall be coated with Bird Asphalt Primer and allowed to dry.

(2) Entire roof surface shall be covered with one (1) layer of Bird 45 lb. Base Sheet embedded full width in Bird Roofing Asphalt No. 18 and lapped two (2) in. at edges and six (6) ins. at ends. Laps shall be cemented with hot Bird Roofing Asphalt No. 18, and nailed on six (6) in. centers.

(3) Bird Paroid Cap Sheet shall be laid in two ply construction over the Base Sheet, lapped nineteen (19) ins. and embedded its full width in Bird Roofing Asphalt No. 18 applied at the rate of thirty (30) lbs. of Roofing Asphalt per mopping per one hundred (100) sq. ft. The felt, or selvage portion of the Cap Sheet, shall be nailed in two (2) staggered parallel rows three-quarters (¾) in. and ten (10) ins. from edge, spacing nails twelve (12) ins. center to center.

Note: On inclines under three (3) ins. per foot, Base Sheet and Cap Sheet shall be laid perpendicular to the pitch. On inclines over three (3) ins. per foot, Base Sheet and Cap Sheet shall be laid parallel with the pitch.

All Base Sheets and Cap Sheets shall be laid without wrinkles or buckles, and shall be thoroughly broomed into the hot asphalt to secure proper bond at all points.

Flashing

(Copy from Bird Flashing Specifications.)

Bond

If desired, where Bird & Son, inc., inspection is available, the following may be added for roofs of fifty or more squares:

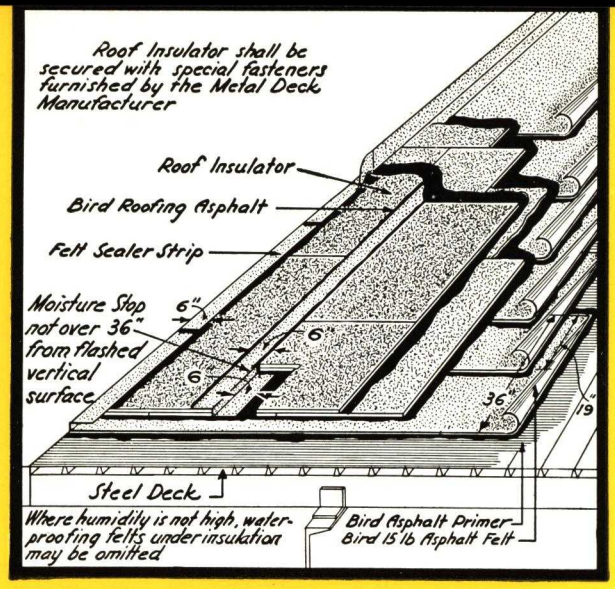
The Roofing Contractor shall be approved by Bird & Son, inc., and shall furnish a Bird Ten Year Guarantee Bond to cover the roofing applied under this contract.

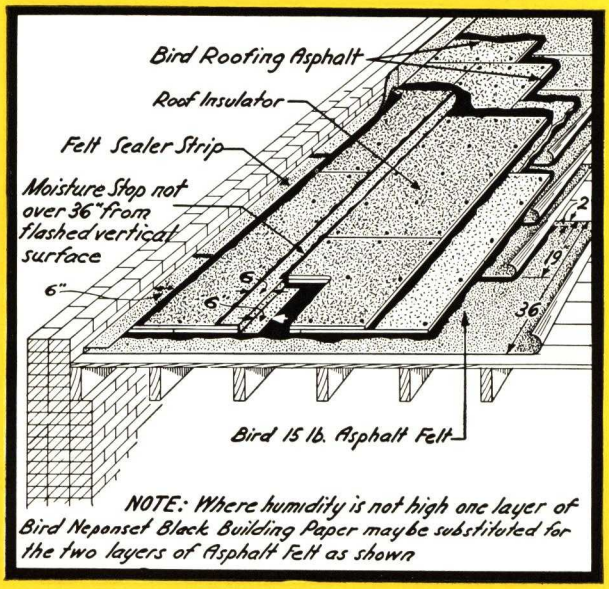
BIRD 10 YEAR BUILT-UP ROOF, MINERAL SURFACE

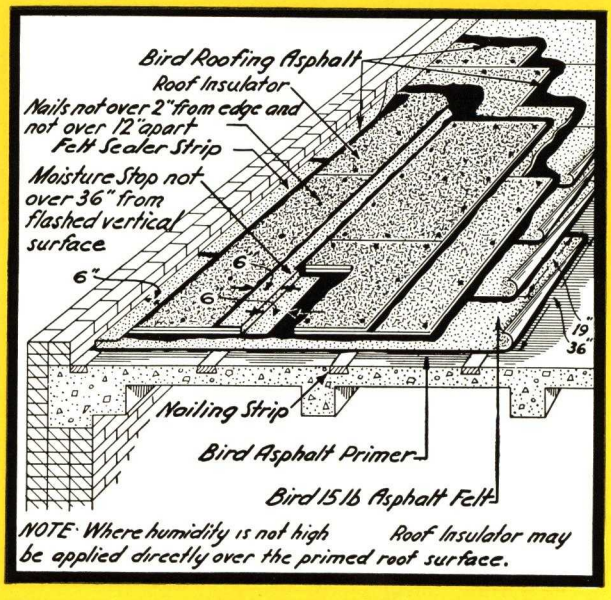
Over Poured Concrete, Poured Gypsum or Insulation, Slope 1" to 6" in 1'-0"

Bird Specification No. 208—Type B-NC

The construction of this roof is identical with Specification No. 302, with the following substitution: *Throughout*, substitute Neponset Cap Sheet (weight, 88 lbs. per square) for Paroid Cap Sheet (weight, 55 lbs. per square).







ROOF INSULATION

INSTALLATION FOR HIGH HUMIDITY CONDITIONS

(1) Preparation of Roof Deck to Receive Insulation—

Concrete decks, and steel decks not finished with a shop coat of paint, shall be primed with one (1) coat of Bird Asphalt Primer and dried prior to application of roof insulation.

(2) Application of One or More Layers of Asphalt Felt—

Primed roof deck shall be covered with two (2) layers of Bird 15 lb. Asphalt Felt, lapped nineteen (19) ins. and thoroughly embedded in hot Bird Roofing Asphalt.

These waterproof sheets shall extend up six (6) ins. plus thickness of Roof Insulation on all walls and vertical surfaces and shall finally be turned over on, and solidly mopped to, top surface of Roof Insulation when laid.

Note: When applied over wood deck the laps only shall be sealed with Bird Roofing Asphalt, keeping the mopping back two (2) ins. from the edge of the underlying sheet and spot nailing sufficiently to hold them in place.

(3) Application of One or More Layers of Insulation—

The first layer of Roof Insulation shall be applied directly over this protected roof deck, embedding the sheet in a hot mopping of Bird Roofing Asphalt applied at the rate of thirty (30) lbs. per mopping per one hundred (100) sq. ft., breaking joints both between sheets of the same layer and sheets in successive layers. Except in the case of metal decks, the final layer of Roof Insulation shall be nailed through to roof deck, using approved large head galvanized Roofing Nails sufficiently long to penetrate at least three-quarters (¾) in. into the deck or into nailing strips provided therein. Nails shall be placed along all edges and at intermediate points, spaced twelve (12) ins. on centers and not more than two (2) ins. from edge of sheet (where character of deck permits). Roof insulation over metal decks shall be secured with special fasteners furnished by the Metal Deck Manufacturer.

(4) Moisture Stop —

(4a) Roof area shall be divided up into sections not more than twenty-four (24) ft. square by means of twelve (12) in. strips of Bird 15 lb. Asphalt Felt cemented to roof deck below, carried up and over Insulation and cemented to top ply of Roof Insulation. These Moisture Stops shall begin not further than thirty-six (36) ins. from all vertical flashed surfaces and shall be carried out in such a manner that moisture seepage in from a flashed surface will be checked by Moisture Stop before it has traversed more than thirty-six (36) ins. from vertical surface.

(4b) All exposed edges of Insulation at eaves, gable ends, etc., shall be sealed by mopping one (1) ply of Bird 15 lb. Asphalt Felt up and over the exposed edge and to top of the final layer of Roof Insulation.

INSTALLATION FOR LOW HUMIDITY CONDITIONS

Where humidity is not high, waterproofing felts may be omitted on concrete or steel decks, and one layer of Bird Neponset Black Building Paper may be substituted for waterproofing felts on wood decks.

BIRD FLASHINGS WITH BIRD BUILT-UP ROOFS

Where Sheet Metal Base and Cap Flashing Are Specified

SPECIFICATION NO. 5

Preliminary

All Felts, Base Sheets and Cap Sheets shall be cut off at the wall line without turning up.

Flashing shall be installed before the application of gravel, slag or tile to the roof surface.

Preparation of Surfaces to Be Flashed

All metal to which Asphalt is to be applied shall be coated with Bird Asphalt Primer and allowed to dry.

All masonry surfaces to be flashed shall be coated with Bird Asphalt Primer and allowed to dry.

Application of Base Flashing

(1) Case I—Where roofing is composed of a heavy Base Sheet or a Base Course of 15 lb. Asphalt Felts, the Base Flashing shall be installed directly over the Base Felts and under the Finishing Felts or Cap Sheets.

(1a) Two (2) layers of Bird 15 lb. Asphalt Felt extending six (6) ins. up on vertical wall and ten (10) ins. out on roof, shall be applied, embedding each in a hot mopping of Bird Roofing Asphalt.

(1b) Sheet Metal Base Flashing shall extend not less than six (6) ins. up on vertical wall and not less than six (6) ins. out on roof over the base felts. The angle formed in the flashing shall not be sharply bent but shall be rounded and the flashing shall be nailed along its edge into deck or wood nailing strips provided therein.

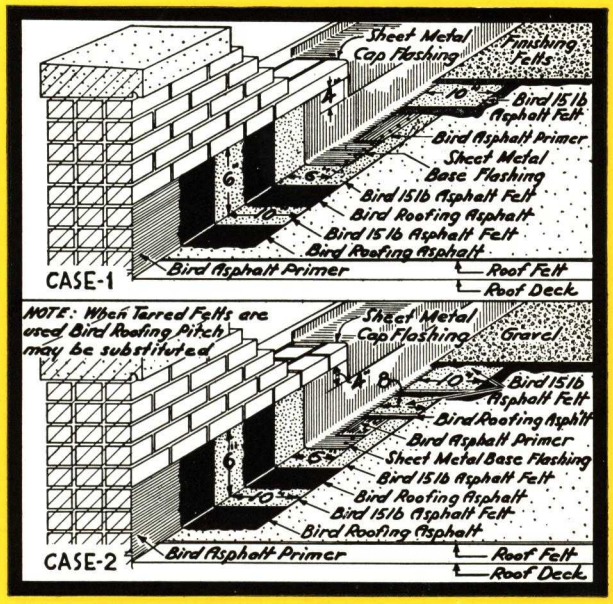
(1c) Where asphalt is used, metal flashing on the deck shall be primed with Bird Asphalt Primer and allowed to dry.

(1d) A ten (10) in. strip of Bird 15 lb. Asphalt Felt shall be embedded in a hot mopping of Bird Roofing Asphalt over the metal flashing extending on the roof. Finishing Felts as called for in Roofing Specification shall then be applied over the above Felt Strip.

(2) Case II—Where Roofing Felts are laid in shingle construction, Base Flashing shall be installed after all Roofing Felts have been laid and before application of Asphalt or Pitch, gravel or slag surfacing.

Note: In roofs employing Pitch, either Bird Roofing Asphalt or Bird Roofing Pitch may be used in the construction of flashings where Asphalt Mopping is specified.

(2a) Two (2) layers of Bird 15 lb. Asphalt Felt extending six (6) ins. up on vertical wall and ten (10) ins. out on roof, shall be applied, embedding each in a hot mopping of Bird Roofing Asphalt.



(2b) Sheet Metal Base Flashing shall extend not less than six (6) ins. up on vertical wall and not less than six (6) ins. out on roof over the base felts. The angle formed in flashing shall not be sharply bent but shall be rounded and the flashing shall be nailed along its edge into deck or wood nailing strips provided therein.

(2c) Where asphalt is used, metal flashing on the deck shall be primed with Bird Asphalt Primer and allowed to dry.

(2d) An eight (8) in. strip and a ten (10) in. strip of Bird 15 lb. Asphalt Felt shall be embedded in a hot mopping of Bird Roofing Asphalt over the metal flashing extending on the roof. The roof shall then be finished over the Felt Strip with gravel, slag or tile as called for in Roofing Specification.

Application of Cap Flashing

Metal Cap Flashing shall be bent down over the Base Flashing so that Cap Flashing shall lap Base Flashing four (4) ins.

Where Raggle Block Is Specified

SPECIFICATION NO. 6

Preliminary

The Raggle Block shall be set in masonry wall with the bottom of the Raggle Block in a line five (5) ins. from, and parallel with, the grade line of roof at wall. Raggle Block shall be set in Portland Cement mortar with all joints properly pointed, and the groove shall be thoroughly cleaned of any foreign material.

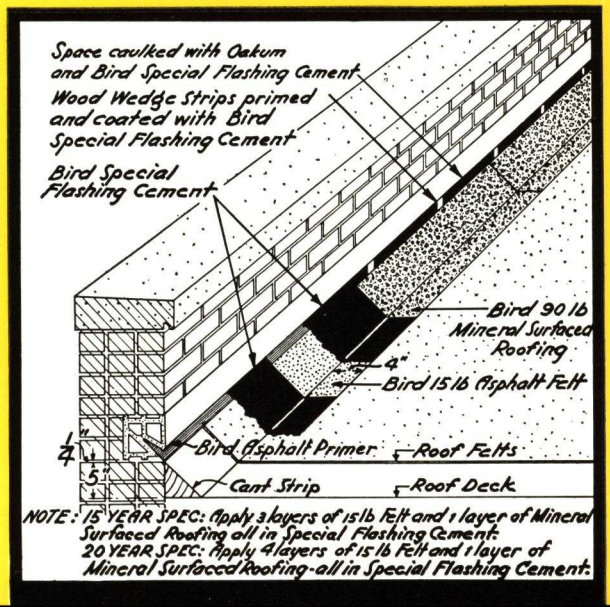
Cant Strips, constructed of material that will permit nailing, shall be installed at the angle formed by intersection of vertical surface with the roof deck. Upper edge of Cant Strip shall be approximately one-quarter (¼) in. below groove of Raggle Block. Face of Cant Strip shall be built parallel with bottom of groove of the Raggle Block.

All Roofing Felts, Base Sheets and Cap Sheets shall be laid before the Flashing is applied and shall be carried up to top of the cant and cut off at the wall line.

Flashing shall be installed before the application of gravel, slag or tile to roof surface.

Application of Flashing

(1) A coat of Bird Asphalt Primer shall be applied to groove of Raggle Block and allowed to dry.



(2) A layer of Bird Special Flashing Cement approximately one-eighth (⅛) in. thick shall be applied for full depth of the groove of Raggle Block and over roofing felts to a point on deck four (4) ins. from bottom of Cant Strip.

(3) One (1) layer of Bird 15 lb. Asphalt Felt and one (1) layer of Bird 90 lb. Mineral Surfaced Roofing shall be cut into suitable widths to extend from back of groove of Raggle Block out on the roof four (4) ins.

(4) The Bird 15 lb. Asphalt Felt shall be embedded in the Special Flashing Cement.

(5) The Asphalt Felt shall be coated with a layer of Bird Special Flashing Cement. The Mineral Surfaced Roofing shall be embedded in the Special Flashing Cement, breaking joints with the previously applied 15 lb. Asphalt Felt. End laps shall be not less than three (3) ins.

(6) Wood wedge strips, primed and coated with Bird Special Flashing Cement shall be driven into flashing groove on twelve (12) in. centers and at all laps. Remaining space in flashing groove shall be caulked with Bird Special Flashing Cement.

Note: 15 Year Roof—Three (3) layers of Bird 15 lb. Asphalt Felt and one (1) layer of Mineral Surfaced Roofing shall all be embedded in Bird Special Flashing Cement.

20 Year Roof—Four (4) layers of Bird 15 lb. Asphalt Felt and one (1) layer of Mineral Surfaced Roofing shall all be embedded in Bird Special Flashing Cement.

Where Flashing Is Not Less Than 8" High

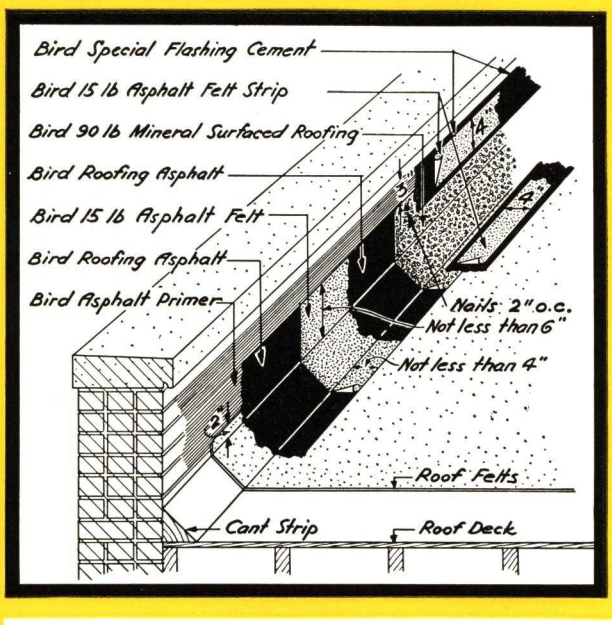
SPECIFICATION NO. 1

Preliminary

Cant Strips constructed of material that will permit nailing, shall be installed at the angle formed by intersection of vertical surface with roof. Cant Strip shall extend up the vertical surface approximately four (4) ins. and have an angle of forty-five (45) degrees with the vertical. All measurements "Up" on the vertical surfaces and "Out" on the roof deck shall be made from line of intersection of cant with the vertical surface and the line of intersection of cant with the roof surface, respectively.

All Roofing Felts, Base Sheets and Cap Sheets shall be laid before the Flashing is applied and shall be brought up the face of cant and turned up two (2) ins. on, but not cemented to, all vertical surfaces to be flashed.

Flashing shall be installed before application of gravel, slag or tile to the roof surface.



Preparation of Surfaces to Be Flashed

All masonry surfaces to be flashed shall be coated with Bird Asphalt Primer and allowed to dry.

Application of Base Flashing

(1) Base Flashing shall be composed of one (1) layer of Bird 15 lb. Asphalt Felt and one (1) layer of Bird 90 lb. Mineral Surfaced Roofing cemented to underlying surface and together with hot moppings of Bird Roofing Asphalt.

Note: In roofs employing Pitch, either Asphalt or Pitch may be used where Asphalt Mopping is specified.

(2) Base Flashing shall extend not less than six (6) ins. up on vertical surfaces and not less than four (4) ins. out on roof and shall be nailed adjacent to its upper edge and at end laps with approved large head galvanized nails spaced two (2) ins. center to center.

(3) Edge of Base Flashing on roof shall be covered with a four (4) in. wide strip of Bird 15 lb. Asphalt Felt embedded in and coated over with Bird Roofing Asphalt.

(4) End joints of Base Flashing shall be covered with a trowelled coat of Bird Special Flashing Cement into which shall be embedded a four (4) in. wide strip of Bird 15 lb. Asphalt Felt. Felt Strip shall be finished with a second trowelled coat of Bird Special Flashing Cement.

Application of Cap Flashing

(1) A layer of Bird Special Flashing Cement approximately one-eighth (⅛) in. thick and not less than five (5) ins. wide shall be trowelled on to cover nail heads, the upper edge of Base Flashing and the adjoining wall surface.

(2) A strip of Bird 15 lb. Asphalt Felt four (4) ins. wide shall be embedded in the Special Flashing Cement and an additional layer of Special Flashing Cement shall be trowelled on over the felt and finished to a feather edge and a straight line.

(3) If a sheet metal cap flashing is specified, the above Cap Flashing shall extend to where such metal projects from wall.

Where Flashing Covers the Entire Inside Wall and Top Wall Under Coping

SPECIFICATION NO. 2

Preliminary

Cant Strips constructed of material that will permit nailing, shall be installed at the angle formed by intersection of vertical surface with roof. Cant Strip shall extend up the vertical surface approximately four (4) ins. and have an angle of forty-five (45) degrees with the vertical. All measurements "Up" on vertical surfaces and "Out" on roof deck shall be made from line of intersection of cant with vertical surface and the line of intersection of cant with roof surface respectively.

All Roofing Felts, Base Sheets and Cap Sheets shall be laid before the Flashing is applied and shall be brought up the face of cant and turned up two (2) ins. on, but not cemented to, all vertical surfaces to be flashed.

Flashing shall be installed before application of gravel, slag or tile to the roof surface.

Preparation of Surfaces to Be Flashed

All masonry surfaces to be flashed shall be coated with Bird Asphalt Primer and allowed to dry.

Application of Base Flashing

(1) Base Flashing shall be composed of one (1) layer of Bird 15 lb. Asphalt Felt and one (1) layer of Bird 90 lb. Mineral Surfaced Roofing cemented to underlying surface and together with hot moppings of Bird Roofing Asphalt.

Note: In roofs employing Pitch, either Asphalt or Pitch may be used where Asphalt Mopping is specified.

(2) Base Flashing shall extend not less than six (6) ins. up on vertical surfaces and not less than four (4) ins. out on roof and shall be nailed adjacent to its upper edge and at end laps with approved large head galvanized nails spaced two (2) ins. center to center.

(3) Edge of Base Flashing on roof shall be covered with a four (4) in. wide strip of Bird 15 lb. Asphalt Felt embedded in and coated over with Bird Roofing Asphalt.

(4) End joints of Base Flashing shall be covered with a trowelled coat of Bird Special Flashing Cement into which shall be embedded a four (4) in. wide strip of Bird 15 lb. Asphalt Felt. Felt Strip shall be finished with a second trowelled coat of Bird Special Flashing Cement.

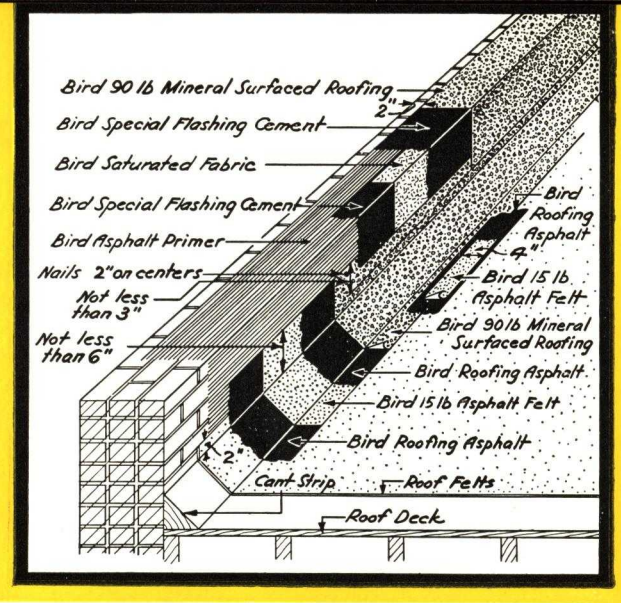
Application of Cap Flashing

(1) A layer of Bird Special Flashing Cement approximately one-eighth (⅛) in. thick shall be trowelled on to cover nail heads, the upper edge of Base Flashing, the entire inner face of wall and top of wall under coping to within two (2) ins. of outside face of wall.

(2) A strip of Bird Saturated Fabric eight (8) ins. wide shall be embedded in the Special Flashing Cement along the inner top corner of wall so that it shall extend four (4) ins. on top of wall and four (4) ins. on face of wall. This reinforcing Fabric Strip shall then be coated with Bird Special Flashing Cement.

(3) A strip of Bird 90 lb. Mineral Surfaced Roofing, wide enough to extend from within two (2) ins. of outside wall under the coping and down to cover the Base Flashing at least three (3) ins., shall be embedded in Bird Special Flashing Cement.

Alternate Specification: Bird 15 lb. Asphalt Felt, coated with Bird Special Flashing Cement may be used instead of Bird 90 lb. Mineral Surfaced Roofing in the above Cap Flashing Specification.



Where Flashing Is Not Less Than 8" High With Cap Flashing Extending Through Wall

SPECIFICATION NO. 3

Preliminary

Cant Strips constructed of material that will permit nailing, shall be installed at the angle formed by intersection of vertical surface with roof. Cant Strip shall extend up the vertical surface approximately four (4) ins. and have an angle of forty-five (45) degrees with the vertical. All measurements "Up" on the vertical surfaces and "Out" on the roof deck shall be made from line of intersection of cant with the vertical surface and the line of intersection of cant with the roof surface, respectively.

All Roofing Felts, Base Sheets and Cap Sheets shall be laid before the Flashing is applied and shall be brought up the face of cant and turned up two (2) ins. on, but not cemented to, all vertical surfaces to be flashed.

Flashing shall be installed before application of gravel, slag or tile to the roof surface.

Preparation of Surfaces to Be Flashed

All masonry surfaces to be flashed shall be coated with Bird Asphalt Primer and allowed to dry.

Application of Base Flashing

(1) Base Flashing shall be composed of one (1) layer of Bird 15 lb. Asphalt Felt and one (1) layer of Bird 90 lb. Mineral Surfaced Roofing cemented to underlying surface and together with hot moppings of Bird Roofing Asphalt.

Note: In roofs employing Pitch, either Asphalt or Pitch may be used where Asphalt Mopping is specified.

(2) Base Flashing shall extend not less than six (6) ins. up on vertical surfaces and not less than four (4) ins. out on roof and shall be nailed adjacent to its upper edge and at end laps with approved large head galvanized nails spaced two (2) ins. center to center.

(3) Edge of Base Flashing on roof shall be covered with a four (4) in. wide strip of Bird 15 lb. Asphalt Felt embedded in and coated over with Bird Roofing Asphalt.

(4) End joints of Base Flashing shall be covered with a trowelled coat of Bird Special Flashing Cement into which shall be embedded a four (4) in. wide strip of Bird 15 lb. Asphalt Felt. Felt Strip shall be finished with a second trowelled coat of Bird Special Flashing Cement.

Application of Cap Flashing

(1) The construction of vertical wall shall be stopped at elevation at which the Cap Flashing is to be installed and shall be finished smooth on top. This top finish shall then be coated with a layer of Bird Special Flashing Cement approximately one-eighth (⅛) in. thick, extending to within two (2) ins. of outside face of wall.

(2) A strip of Bird Saturated Fabric wide enough to cover the cemented portion of top of wall and to extend out from inside face of wall far enough to cover top of base flashing four (4) ins., shall be embedded in the Bird Special Flashing Cement.

(3) A second layer of Bird Special Flashing Cement shall be applied to part of Saturated Fabric embedded on top of wall.

(4) A strip of Bird 15 lb. Asphalt Felt, the same width as the Saturated Fabric and extending out from wall as does the Fabric, shall be embedded in Bird Special Flashing Cement.

(5) The Felt on top of wall shall then be coated with a layer of Bird Special Flashing Cement and the portion of fabric and felt extending from wall shall be protected so that it will not be damaged during the completion of the wall.

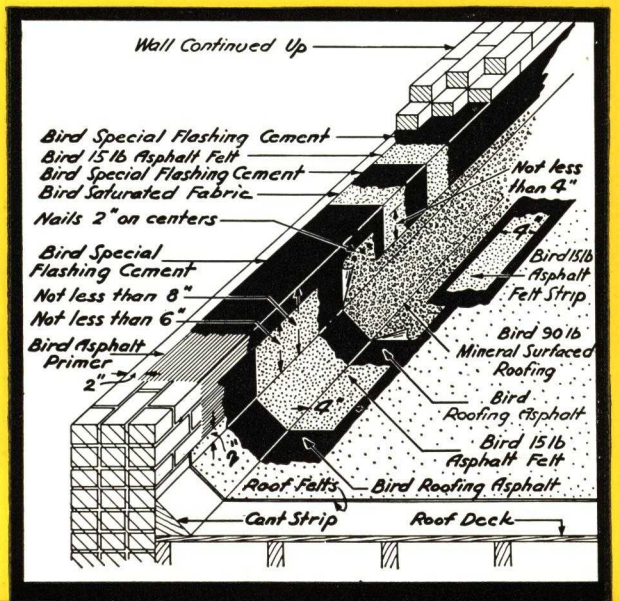
(6) After Base Flashing has been installed, a layer of Bird Special Flashing Cement extending from where Cap Flashing leaves the wall down over the upper edge of Base Flashing, at least four (4) ins., shall be applied.

(7) The Saturated Fabric of the Cap Flashing shall next be embedded in Bird Special Flashing Cement.

(8) A second layer of Bird Special Flashing Cement shall be applied over the Saturated Fabric.

(9) The Bird 15 lb. Asphalt Felt of the Cap Flashing shall also be embedded in the Bird Special Flashing Cement.

(10) A layer of Bird Special Flashing Cement shall be trowelled over the Asphalt Felt and finished to a feather edge and to a straight line.



Where No Nailing Facilities Are Provided

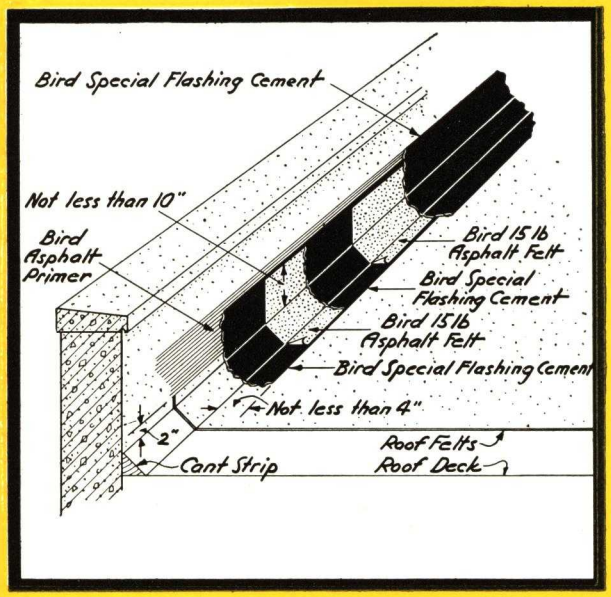
SPECIFICATION NO. 4

Preliminary

Cant Strips constructed of material that will permit nailing, shall be installed at the angle formed by intersection of vertical surface with roof. Cant Strip shall extend up the vertical surface approximately four (4) ins. and have an angle of forty-five (45) degrees with the vertical. All measurements "Up" on the vertical surfaces and "Out" on the roof deck shall be made from line of intersection of cant with the vertical surface and the line of intersection of cant with the roof surface, respectively.

All Roofing Felts, Base Sheets and Cap Sheets shall be laid before the Flashing is applied and shall be brought up the face of cant and turned up two (2) ins. on, but not cemented to, all vertical surfaces to be flashed.

Flashing shall be installed before application of gravel, slag or tile to the roof surface.



Preparation of Surfaces to Be Flashed

All masonry surfaces to be flashed shall be coated with Bird Asphalt Primer and allowed to dry.

Application of Base Flashing

(1) A layer of Bird Special Flashing Cement approximately one-eighth (⅛) in. thick shall be trowelled on the surface to receive the Flashing. The Flashing shall be carried at least ten (10) ins. high on the wall and four (4) ins. out on the roof.

(2) A layer of Bird 15 lb. Asphalt Felt shall be embedded in the Bird Special Flashing Cement.

(3) A second layer of Special Flashing Cement shall be applied to the Bird 15 lb. Asphalt Felt.

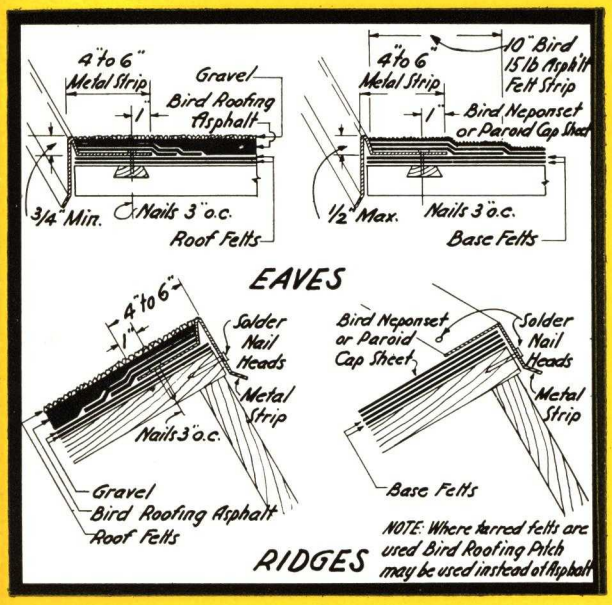
(4) A second layer of Bird 15 lb. Asphalt Felt shall be embedded in the Special Flashing Cement, breaking joints with the previously applied felt.

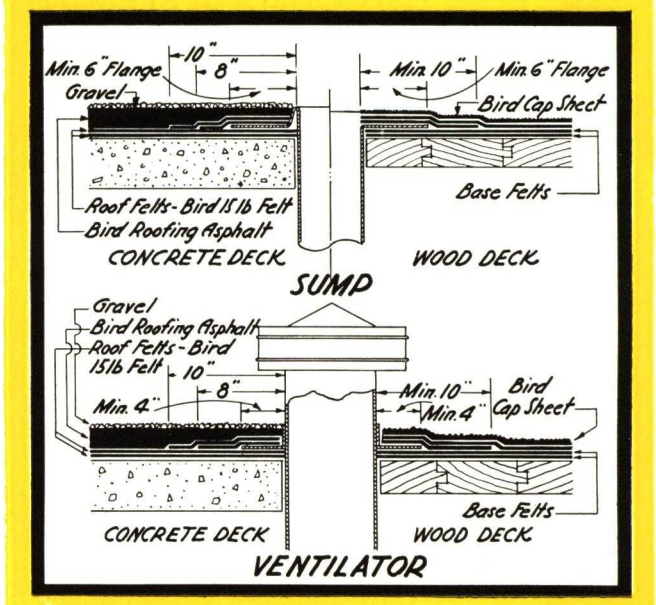
(5) The Flashing shall be finished by trowelling a third layer of Bird Special Flashing Cement over the surface of the Asphalt Felt, finishing to a feather edge and a straight line.

MISCELLANEOUS FLASHING DETAILS

The following details show standard construction for the finishing at Eaves, Ridges, and for Sump and Ventilator connections.

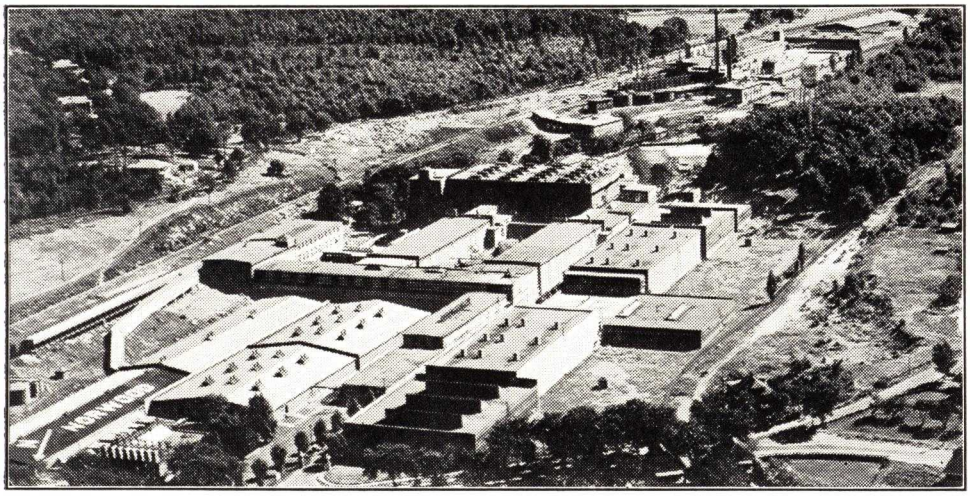
Specifications for Flanges and Edgings to meet special conditions will be furnished when requested.





The organization making
BIRD BUILDING PRODUCTS

Established 1795 . . . when Washington was President



FOUNDED in 1795, the continuous success of Bird & Son, inc., has proved the sound principles upon which Bird makes and distributes its products. A long time in business means much when demonstrated stability is coupled with a quality line of materials.

This high quality of products has been secured and maintained by constant research by the Bird laboratories and the rigid control of production exercised in the mills. This unceasing research and experimentation has resulted in the introduction of many outstanding products such as Thick Butt Shingles, Shatter Resistant Coating, Quick Setting Lap Cement, and numerous other improvements.

While this book is devoted to Bird Built-up Roofs, it is of interest to know that Bird manufactures and distributes Asphalt Mineral Surfaced Shingles and Sidings, Roll Roofings, Insulating Materials and Wallboards, Neponset Felt Base Rugs and Floor Coverings, Shipping Cases and Cartons, Flower Pots and Special Papers.

For Index to Specifications, see page 2.

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CHICAGO OFFICE
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BIRD

BUILT-UP ROOFING

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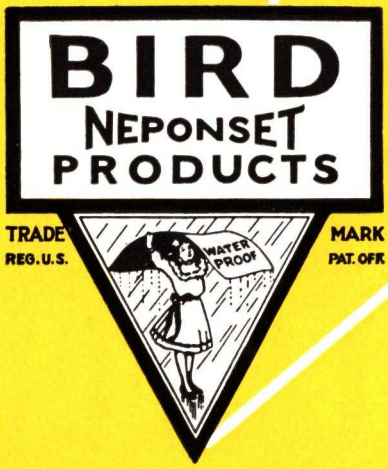

1938

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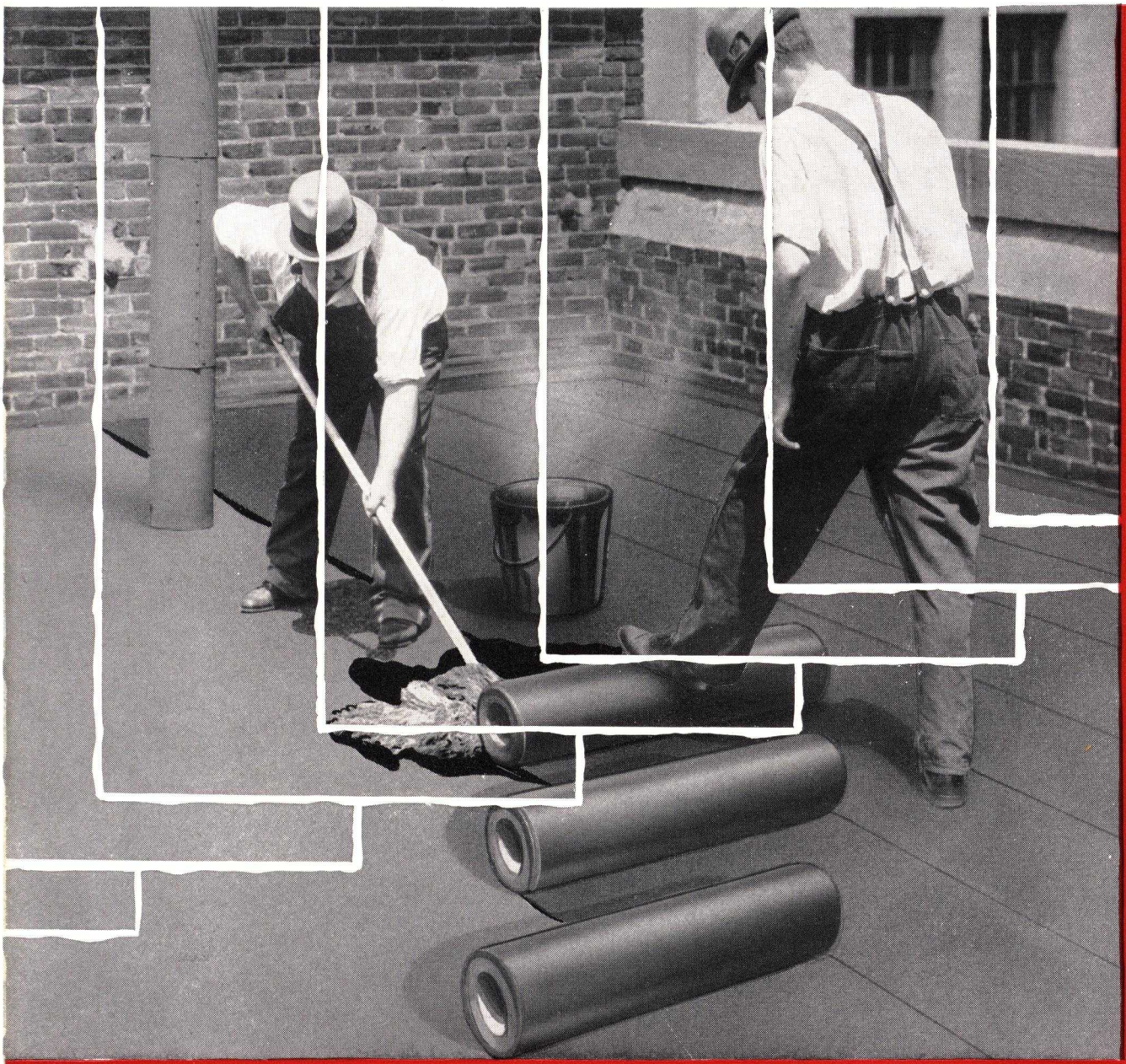
MASTER SPECIFICATIONS



Carey BUILT-UP ROOFS

BONDED 5·10·20 YEARS

Carey BUILT-UP ROOFING

AT the request of hundreds of architects we have condensed the various types of CAREY BUILT-UP ROOFING SPECIFICATIONS in such a manner as to enable us to reproduce every type of roof construction in a complete, comprehensive manner in this issue of SWEET'S ARCHITECTURAL CATALOGUES.

Every essential type of built-up roof construction, with definite recommendations as to the service adaptability of each, is incorporated in CAREY'S TWELVE (12) MASTER BUILT-UP ROOFING SPECIFICATIONS. In specifying any one of the twelve Master Specifications the architect should always indicate, in addition to the Master Built-up Roofing Specification number, the type of roof construction desired, i.e., Types A, B, C or D. He should also indicate any special conditions listed under "General Requirements Applying to All Types," such as: bond period, deck treatment, requirements for steep deck application and roof surfacing, etc., applying to the particular job.

Note: *When application is to be over wood or gypsum decks select deck treatment in accordance with type of deck.*

The minimum requirements for every item entering into the construction of Carey Built-up Roofs are well known, nationally accepted standards, re-enforced with a definite tolerance in quality. These standards of quality are established, controlled, and maintained by Carey engineers, research laboratories, and extensive modern factory facilities.

Architects may specify the types of Carey Roofs described in this catalogue with confidence, for use on all standard types of deck construction, and they are invited to correspond with the Engineering Department of THE PHILIP CAREY COMPANY for recommendations as to the roofing or waterproofing construction especially adapted to special types of deck construction or special specifications to meet unusual service conditions.

The specifications cover the following types of construction:

SLAG OR GRAVEL SURFACED ROOFS

Ten (10) and twenty (20)-year roof construction for application over all types of decks. Various types comprise:

Asphalt Saturated Rag Felt construction, slag or gravel surfaced.

Tar Saturated Rag Felt construction, slag or gravel surfaced.

Combination Asphalt Impregnated Asbestos and Asphalt Saturated Rag Felt construction, slag or gravel surfaced.

MINERAL SURFACED ROOFS

Ten (10) and twenty (20)-year roof construction for application over all types of decks. Various types comprise:

Asphalt Saturated Rag Felt construction, mineral surfaced.

Combination Asphalt Impregnated Asbestos and Asphalt Saturated Rag Felt construction, mineral surfaced.

Asphalt Impregnated Asbestos Felt construction, mineral surfaced.

ASPHALT SURFACED ROOFS

Ten (10) and twenty (20)-year roof construction for application over all types of decks. Various types comprise:

Asphalt Impregnated Asbestos Felt construction, asphalt surfaced.

Asphalt Saturated Rag Felt construction, asphalt surfaced.

Combination Asphalt Impregnated Asbestos and Asphalt Saturated Rag Felt construction, asphalt surfaced.

The recommendations governing the adaptability of each type and the application details incorporated in each type of built-up roof are the results of over half a century of manufacturing and application experience and are given in the hope that architects will carefully consider the wisdom of each recommendation.

Permanent satisfaction in built-up roof construction can only be assured when the proper type is selected to meet existing service conditions. Three vital points to be carefully considered when specifying various types of roofs are:

(1) Incline in roof deck and type of roof deck.

(2) Climatic conditions affecting the geographic location of the job.

(3) Presence of industrial gases and fumes detrimental to certain types of roof construction.

THE PHILIP CAREY COMPANY

GENERAL OFFICES AND MAIN FACTORY: LOCKLAND, OHIO
OTHER FACTORIES: FRANKLIN, OHIO; ST. LOUIS, MISSOURI; and PLYMOUTH MEETING, PA.

ASBESTOS MINES: EAST BROUGHTON, QUEBEC
BRANCHES AND DISTRIBUTERS IN ALL PRINCIPAL CITIES

For Carey Shingles and Pipe Coverings, see File Index

CAREY FELT (FELTEX)

The Carey Felt (Feltex) furnished for use in Carey Built-up Roofing Specifications is manufactured on the highest grade rag felt base and saturated with an asphalt developed especially for roofing purposes by our research laboratory and processed in our own plant. The saturant used in Carey Felt (Feltex) is of such a nature that it allows the felt to be handled as easily in cold weather as in summertime.

Carey Felt (Feltex) is 36 ins. wide, packaged in rolls containing four squares or 432 sq. ft. per roll, weight per 100 sq. ft., 15 lbs., weight per roll, approximately 65 lbs.

CAREY FIBEROCK

Carey Fiberock as manufactured for use in Carey Built-up Roofing Specifications consists of an asbestos felt that contains 85% asbestos fibers held together with a combining material and impregnated with a high grade asphalt saturant developed and processed in our own laboratories and plant. There are two weights of Carey Fiberock. The 15-lb. Fiberock is impregnated with asphalt only, while the 20-lb. Fiberock is impregnated and coated one side with asphalt. Both weights are packaged in 3 square rolls containing 324 sq. ft. per roll, 36 ins. wide. The 15-lb. weighs 45 lbs. per roll and the 20-lb., 60 lbs. per roll.

CAREY-SEAL TAR FELT

Carey-Seal Tar Felt as furnished for use in Carey Built-up Roofing Specifications is manufactured on a high grade rag felt base and saturated with a tar pitch saturant developed for this purpose. Carey-Seal Tar Felt is 32 ins. wide packaged in rolls containing 4 squares or 432 sq. ft. per roll; weight per 100 sq. ft., 15 lbs.; weight per roll, approximately 65 lbs.

CAREY ASBESTOS FELT

The Carey Asbestos Felt Base Sheets furnished for use in Carey Asbestos Specification Roofs are made on an asbestos felt base of the best quality. This asbestos base is impregnated with asphalt and then coated and sanded on both sides. The saturant developed for this particular purpose and the coating asphalt is likewise an asphalt processed for coating purposes only, and thereby seals the base sheet against all attacks of moisture.

Carey Asbestos Felt Base Sheets are packaged in two weights, 45 lbs. and 60 lbs. and are put up in one square rolls containing 108 sq. ft., the roll weight being approximately 48 lbs. for the 45-lb. sheet and approximately 65 lbs. for the 60-lb. sheet.

CAREY ASPHALT

The Carey Roofing Asphalt furnished for application of Carey Specification Roofs is an asphalt blended in such a way that it contains all properties necessary to give long life and durability to the roof. Carey Asphalt contains practically no impurities and is 99.5% soluble in carbon disulphide. Carey Asphalt is packaged in open head drums containing approximately 400 lbs. per drum.

CAREY-SEAL TAR PITCH

The Carey-Seal Tar Pitch furnished for application of Carey Tar Pitch Specification Roofs is a high grade coal tar pitch developed for use in constructing tar or gravel roofs. This material has unusual waterproofing qualities and, therefore, tends to form the basis for a serviceable and durable roof. Carey-Seal Tar Pitch is packaged in drums containing approximately 500 lbs. per drum.

THE *Carey* ROOFINDER *Index*

DECK	BOND	INCLINE in. per ft.	SURFACE	SECTION of U. S.	SPEC. NO.	PAGE NO.	UNDERWRITERS RATING
WOOD or GYPSUM	20-YEAR	¼ to ¾ ¼ to 2	Slag or Gravel	All	1	4	Class A
		¼ to ¾ ¼ to 1½	Slag or Gravel	All	3	8	Class A
		¾ to 3	Mineral	All	5	12	Class C
	10-YEAR	¼ to ¾ ¼ to 2	Slag or Gravel	All	2	6	Class A
		¼ to ¾ ¼ to 1½	Slag or Gravel	All	4	10	Class A
		¾ to 3	Mineral	All	6	13	Class C
CONCRETE or STEEL	20-YEAR	¾ to 1½	Mineral	All	7	14	Class C
		¾ to 2	Asphalt	North, East and All	9	16	Class A or C
		¾ to 1½	Asphalt	North, East and All	11	19	Class A or C
	10-YEAR	¾ to 1½	Mineral	All	8	15	Class C
		¾ to 2	Asphalt	North, East and All	10	17	Class A or C
		¾ to 1½	Asphalt	North, East and All	12	20	Class A or C

NUMBER **1**

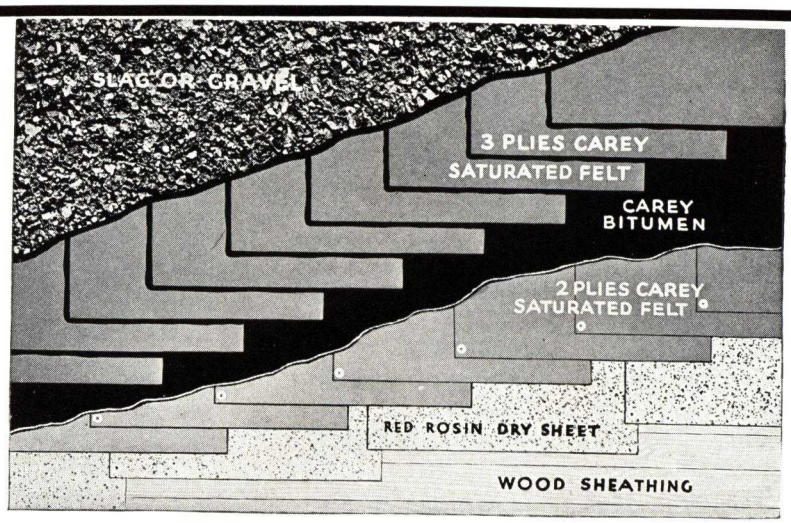
Bond: 20-Year

DECK • WOOD or GYPSUM

INCLINES • LEVEL-2 IN. per Foot

CONSTRUCTION • ASPHALT or TAR

SURFACE • SLAG or GRAVEL



Carey 20-Year Master Built-up Roofing Specification No. 1

The drawing above illustrates the construction to be followed in applying all types of built-up roofs covered by Carey Master Built-up Roofing Specification No. 1, for application over *wood sheathing.*

When the various types of construction under Carey Master Built-up Roofing Specification No. 1 are applied over gypsum decks the Red Rosin Dry Sheet is omitted and the two plies of CAREY SATURATED FELT to be laid dry are applied directly over the *gypsum deck* and secured to same with nails as indicated.

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. Asphalt or Tar per square	Weight, lbs. of Slag per square	Weight, lbs. of Gravel per square
			Rec.	Not Rec.							
A	All	Level to 2	.....	X	Class A	5 Plies Carey Feltex (Asphalt Saturated Rag Felt)	Carey Asphalt	15	135	300	400
B	All	Level to 3/4	.....	X	Class A	5 Plies Carey-Seal Tarred Felt (Tar Saturated Rag Felt)	Carey-Seal Tar Pitch	15	150	300	400
C	All	Level to 2	X	.....	Class A	2 Plies Carey Feltex (Asphalt Saturated Rag Felt) and 3 Plies Carey Fiberock (Asphalt Impregnated Asbestos Felt)	Carey Asphalt	15	135	300	400

General Requirements Applying to All Three Types

ROOF SURFACING

The size of Slag or Gravel used for surfacing the roof shall range from 1/4 in. to 5/8 in. and be clean, dry and free from dirt. When applied in extreme cold weather same shall be warmed to eliminate frost. Not less than 400 lbs. of Gravel or 300 lbs. of Slag shall be used for covering each 100 sq. ft. of roof surface.

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris, and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Note: Select one of the following paragraphs in accordance with type of deck.

Wood Decks—Before the Built-up Roofing Specification is applied the deck shall be covered with a layer of Red Rosin Sized Sheating weighing not less than 5 lbs. per 100 sq. ft., same to be lapped approximately 2 ins. and secured to the deck by occasional nailing.

Nails to be used in securing the Built-up Roofing Specification in the manner described under "Material and Application Details" shall be either 1-in. roofing nails driven through flat tin caps, or 1-in. "Simplex" nails.

Gypsum Decks—The first two sheets to be laid dry as called for in the Built-up Roofing Specification shall be applied directly over the gypsum deck and be secured to same as indicated under "Material and Application Details" with 1¾-in. roofing nails driven through flat tin caps, or 1¾-in. "Simplex" nails.

REQUIREMENTS FOR BOND

Note: All types of roofs under Carey Master Built-up Roofing Specification No. 1 are subject to a Carey 20-year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 20-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATIONS OF *Carey* No. 1 BUILT-UP ROOFS

TYPE A—Specification No. 1

Five plies of CAREY FELTEX (Asphalt Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 135 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 1—Type A.

The felts used in the construction of the roof shall be 36 ins. wide. The first two sheets shall be laid dry, lapped 19 ins. leaving 17 ins. exposed, and be secured to the deck by occasional nailing. To the surface thus provided a mopping of asphalt shall be applied into which, while hot, shall be embedded three sheets of felt, each sheet to overlap the previous sheet 25 ins. leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the plies of this three-ply construction so that at no point shall felt touch felt.

To the top surface of this construction a flood coat of hot Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. Asphalt shall not be heated over 400° F.

TYPE B—Specification No. 1

Five plies of CAREY-SEAL TARRED FELT (Tar Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 150 lbs. of CAREY-SEAL TAR PITCH and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 1—Type B.

The felts used in the construction of this roof shall be 32 ins. wide. The first two sheets shall be laid dry, lapped 17 ins., leaving 15 ins. exposed, and be secured to the deck by occasional nailing. To the surface thus provided a mopping of Tar Pitch shall be applied into which, while hot, shall be embedded three sheets of felt, each sheet to overlap the previous sheet 22 ins., leaving 10 ins. exposed. Solid moppings of Tar Pitch shall be applied between the plies of this three-ply construction so that at no point shall felt touch felt.

To the top surface of this construction a flood coat of hot Tar Pitch shall be poured from a dipper and not less than 60 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Tar Pitch, while hot, Slag or Gravel shall be embedded. Tar Pitch shall not be heated over 400° F.

TYPE C—Specification No. 1

Two plies of CAREY FELTEX (Asphalt Saturated Rag Felt) and three plies of CAREY FIBEROCK (Asphalt Impregnated Asbestos Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 135 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 1—Type C.

The felts used in the construction of the roof shall be 36 ins. wide. The first two plies shall be CAREY FELTEX laid dry and lapped 19 ins., leaving 17 ins. exposed, and be secured to the deck by occasional nailing. To the surface thus provided a mopping of Asphalt shall be applied into which, while hot, shall be embedded three plies of CAREY FIBEROCK, each sheet to overlap the previous sheet 25 ins., leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the plies of this three-ply construction so that at no point shall felt touch felt.

To the top surface of this construction a flood coat of hot Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. Asphalt shall not be heated over 400° F.

NUMBER **2**

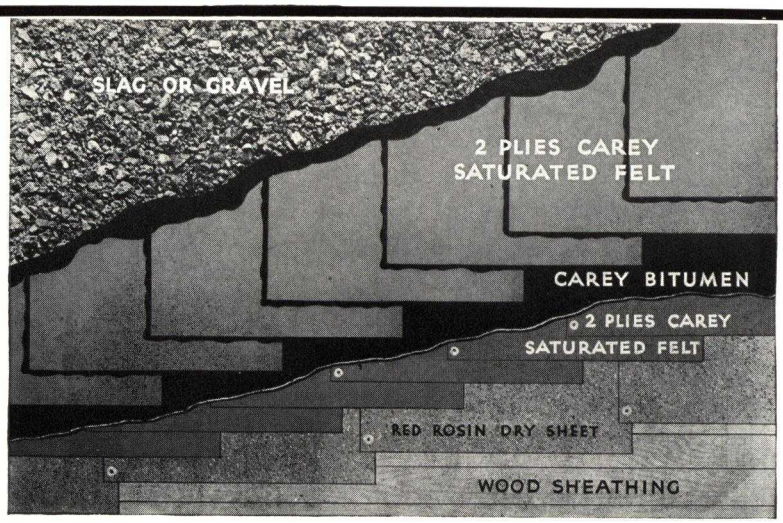
Bond: 10-Year

DECK • WOOD or GYPSUM

INCLINE • LEVEL-2 IN. per Foot

CONSTRUCTION • ASPHALT or TAR

SURFACE • SLAG or GRAVEL



Carey 10-Year Master Built-up Roofing Specification No. 2

The construction to be followed in applying all Built-up Roofing covered by Carey Master Built-up Specification No. 2 for application over *wood sheathing.*

When the various types of construction under Carey Master Built-up Roofing Specification No. 2 are applied over gypsum decks, the Red Rosin Dry Sheet is omitted and the two plies of CAREY SATURATED FELT to be laid dry are applied directly over *gypsum deck* secured to same with nails as indicated.

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. Asphalt or Tar per square	Weight, lbs. of Slag per square	Weight, lbs. of Gravel per square
			Rec.	Not Rec.							
A	All	Level to 2	.....	X	Class A	4 Plies Carey Feltex (Asphalt Saturated Rag Felt)	Carey Asphalt	15	100	300	300
B	All	Level to ¾	.....	X	Class A	4 Plies Carey-Seal Tarred Felt (Tar Saturated Rag Felt)	Carey-Seal Tar Pitch	15	125	300	400
C	All	Level to 2	X	.....	Class A	2 Plies Carey Feltex (Asphalt Saturated Rag Felt) and 2 Plies Carey Fiberock (Asphalt Impregnated Asb. Felt)	Carey Asphalt	15	100	300	400

General Requirements Applying to All Three Types

ROOF SURFACING

The size of Slag or Gravel used for surfacing the roof shall range from ¼ to ⅝ in. and be clean, dry and free from dirt. When applied in extreme cold weather same shall be warmed to eliminate frost. Not less than 400 lbs. of Gravel or 300 lbs. of Slag shall be used for covering each 100 sq. ft. of roof surface.

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris, and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Note: Select one of the following paragraphs in accordance with type of deck.

Wood Decks—Before the Built-up Roofing Specification is applied the deck shall be covered with a layer of Red Rosin Sized Sheating, weighing not less than 5 lbs. per square, same to be lapped approximately 2 ins. and secured to the deck by occasional nailing.

Nails to be used in securing the Built-up Roofing Specification in the manner described under "Material and Application Details" shall be either 1-in. roofing nails driven through flat tin caps or 1-in. "Simplex" nails.

Gypsum Decks—The first two sheets to be laid dry as called for in Built-up Roofing Specification shall be applied directly over the gypsum deck and secured to same as indicated under "Material and Application Details" with 1¾-in. roofing nails driven through flat tin caps or 1¾-in. "Simplex" nails.

REQUIREMENTS FOR BOND

Note: All types of roofs under Carey Master Built-up Roofing Specification No. 2 are subject to a Carey 10-year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 10-Year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATIONS OF *Carey* No. 2 BUILT-UP ROOFS

TYPE A—Specification No. 2

Four plies of CAREY FELTEX (Asphalt Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 100 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 2—Type A.

The Feltex used in the construction of this roof shall be 36 ins. wide. The first two sheets shall be laid dry, lapped 19 ins., leaving 17 ins. exposed, and be secured to the deck by occasional nailing. To the surface thus provided a solid mopping of Asphalt shall be applied, into which, while hot, shall be embedded two sheets of felt, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the two top plies, so that at no point shall felt touch felt. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. Asphalt shall not be heated over 400° F.

TYPE B—Specification No. 2

Four plies of CAREY-SEAL TARRED FELT (Tar Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 125 lbs. of CAREY-SEAL TAR PITCH and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 2—Type B.

The CAREY-SEAL TARRED FELT used in the construction of this roof shall be 32 ins. wide. The first two sheets shall be laid dry, lapped 17 ins., leaving 15 ins. exposed and secured to the deck by occasional nailing. To the surface thus provided a solid mopping of Tar Pitch shall be applied, into which, while hot, shall be embedded two sheets of felt, each sheet to overlap the previous sheet 17 ins., leaving 15 ins. exposed. Solid moppings of Tar Pitch shall be applied between the two top plies of felt so that at no point shall felt touch felt. To the top surface of this construction a flood coat of Tar Pitch shall be poured from a dipper and not less than 60 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Tar Pitch, while hot, Slag or Gravel shall be embedded. Tar Pitch shall not be heated over 400° F.

TYPE C—Specification No. 2

Two plies of CAREY FELTEX (Asphalt Saturated Rag Felt) and two plies of CAREY FIBEROCK (Asphalt Impregnated Asbestos Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 100 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Specification No. 2—Type C.

Felts used in the construction of roof shall be 36 ins. wide. The first two plies shall be CAREY FELTEX laid dry and lapped 19 ins., leaving 17 ins. exposed, and shall be secured to the deck by occasional nailing. To the surface thus provided a solid mopping of Asphalt shall be applied, into which, while hot, shall be embedded two plies of CAREY FIBEROCK, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the two top plies of Fiberock so that at no point shall felt touch felt. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. Asphalt shall not be heated over 400° F.

NUMBER

3

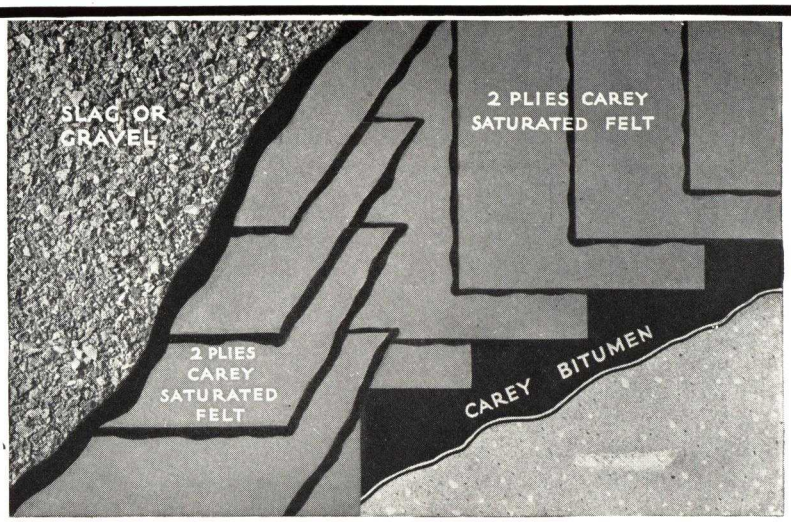
Bond: 20-Year

DECK • CONCRETE or INSULATED

INCLINE • LEVEL-1½ IN. per Foot

CONSTRUCTION • ASPHALT or TAR

SURFACE • SLAG or GRAVEL



Carey 20-Year Master Built-up Roofing Specification No. 3
The construction to be followed for application of this specification directly over a Concrete Deck

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. Asphalt or Tar per square	Weight, lbs. of Slag per square	Weight, lbs. of Gravel per square
			Rec.	Not Rec.							
A	All	Level to 1½	.....	X	Class A	4 Plies Carey Feltex (Asphalt Saturated Rag Felt)	Carey Asphalt	15	175	300	400
B	All	Level to ¾	.....	X	Class A	4 Plies Carey-Seal Tarred Felt (Tar Saturated Rag Felt)	Carey-Seal Tar Pitch	15	190	300	400
C	All	Level to 1½	X	.....	Class A	2 Plies Carey Feltex (Asphalt Saturated Rag Felt) and 2 Plies Carey Fiberock (Asphalt Impregnated Asb. Felt)	Carey Asphalt	15	175	300	400

General Requirements Applying to All Three Types

ROOF SURFACING

The size of Slag or Gravel used for surfacing shall range from ¼ in. to ⅝ in. and be clean, dry and free from dirt. When applied in extreme cold weather same shall be warmed to eliminate frost. Not less than 400 lbs. of Gravel or 300 lbs. of Slag shall be used for covering each 100 sq. ft. of roof surface.

DECK TREATMENT

Before Built-up Roofing is applied concrete deck must be thoroughly dry with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from laitance and scaling as the result of frozen mix.

STEEL DECKS

The steel deck shall first be covered with a solid mopping of Asphalt into which, while hot, shall be firmly embedded a layer of approved roof installation applied strictly according to architect's or manufacturer's specifications. On roof decks having an incline exceeding ¾ in. in 12 ins. insulation shall be secured in place with metal clips or bolts in addition to the bond provided by the Asphalt. (If additional layers of roof insulation are specified, joints between each subsequent layer shall be broken and layers of insulation shall be bonded together and firmly embedded into a solid mopping of hot Asphalt.)

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 3 are subject to a Carey 20-Year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 20-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATIONS OF *Carey* No. 1 BUILT-UP ROOFS

TYPE A—Specification No. 3

Four plies of CAREY FELTEX (Asphalt Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 175 lbs. CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 3—Type A.

The Feltex used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be mopped with a heavy coat of Asphalt, into which, while hot, two sheets of felt shall be embedded and mopped solid between the sheets with Asphalt, each sheet overlapping the previous sheet 19 ins., leaving 17 ins. exposed. The surface of this two-ply construction shall then be mopped with Asphalt, into which, while hot, two additional sheets of felt shall be applied at right angles to the first two plies, each sheet overlapping the previous sheet 19 ins., leaving 17 ins. exposed. The last two plies shall be bonded together with a solid mopping of Asphalt so that at no point shall felt touch felt. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. CAREY ASPHALT used in constructing the roof shall not be heated over 400° F.

TYPE B—Specification No. 3

Four plies of CAREY-SEAL TARRED FELT (Tar Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft. and not less than 190 lbs. of CAREY-SEAL TAR PITCH and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 3—Type B.

The CAREY-SEAL TARRED FELT used in the construction of this roof shall be 32 ins. The roof surface shall first be mopped with a heavy coat of Tar Pitch, into which, while hot, two sheets of felt shall be embedded and mopped solid between the sheets with Tar Pitch, each sheet to overlap the previous sheet 17 ins., leaving 15 ins. exposed. The surface of this two-ply construction shall then be mopped with Tar Pitch, into which, while hot, two additional sheets of felt shall be applied at right angles to the first two plies, each sheet overlapping the previous sheet 17 ins., leaving 15 ins. exposed. The last two plies shall be bonded together with a solid mopping of Tar Pitch so that at no point shall felt touch felt. To the top surface of this construction a flood coat of hot Tar Pitch shall be poured from a dipper and not less than 60 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Tar Pitch, while hot, Slag or Gravel shall be embedded. CAREY-SEAL TAR PITCH used in the construction of this roof shall not be heated over 400° F.

TYPE C—Specification No. 3

Two plies of CAREY FELTEX (Asphalt Saturated Rag Felt) and two plies of CAREY FIBEROCK (Asphalt Impregnated Asbestos Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 175 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 3—Type C.

The felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be mopped with a heavy coat of Asphalt into which, while hot, two sheets of Feltex shall be embedded and mopped solid between the sheets with Asphalt each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. The surface of this two-ply construction shall then be mopped with Asphalt, into which, while hot, two sheets of CAREY FIBEROCK shall be applied at right angles to the first two plies of Rag Felt, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. The last two plies shall be bonded together with a solid mopping of Asphalt so that at no point shall felt touch felt. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. CAREY ASPHALT used in constructing this roof shall not be heated over 400° F.

NUMBER **4**

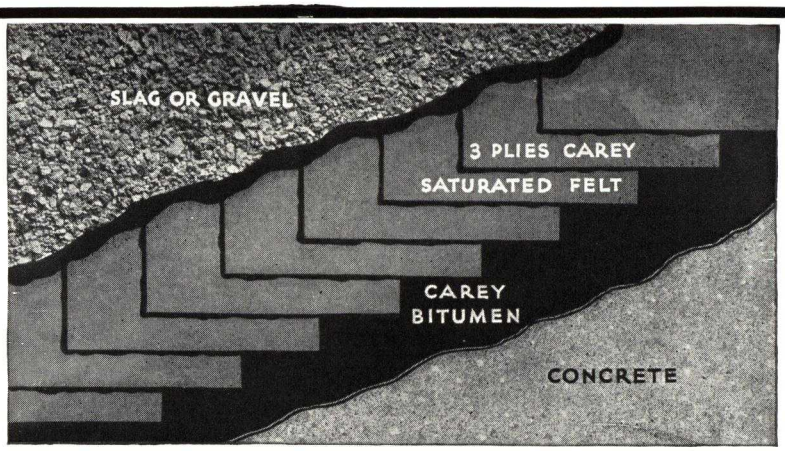
Bond: 10-Year

DECK • CONCRETE or INSULATED

INCLINE • LEVEL-1½ IN. per Foot

CONSTRUCTION • ASPHALT or TAR

SURFACE • SLAG or GRAVEL



Carey 10-Year Master Built-up Roofing Specification No. 4

The construction to be followed for applying Types A and B roof construction directly over concrete deck. Types C and D roof construction are applied in two separate operations; one ply is applied first, after which the two remaining plies are applied shingle fashion over the top of the first ply, as described under "Material and Application Details."

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. of Mopping per square	Weight, lbs. of Slag per square	Weight, lbs. of Gravel per square
			Rec.	Not Rec.							
A	All	Level to 1½	.....	X	Class A	3 Plies Carey Feltex (Asphalt Saturated Rag Felt)	Carey Asphalt	15	140	300	400
B	All	Level to ¾	.....	X	Class A	3 Plies Carey-Seal Tarred Felt (Tar Saturated Rag Felt)	Carey-Seal Tar Pitch	15	175	300	400
C	All	Level to 1½	X	.....	Class A	1 Ply Carey Feltex (Asphalt Saturated Rag Felt) and 2 Plies Fiberock (Asphalt Saturated Asb. Felt)	Carey Asphalt	15	140	300	400

General Requirements Applying to All Three Types

ROOF SURFACING

The size of Slag or Gravel used for surfacing the roof shall range from ¼ in. to ⅝ in. and be clean, dry and free from dirt. When applied in extreme cold weather same shall be warmed to eliminate frost. Not less than 400 lbs. of Gravel or 300 lbs. of Slag shall be used for covering each 100 sq. ft. of roof surface.

DECK TREATMENT

Before Built-up Roofing is applied concrete deck must be thoroughly dry with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from laitance and scaling as the result of frozen mix.

STEEL DECKS

The steel deck shall first be covered with a solid mopping of Asphalt into which, while hot, shall be firmly embedded a layer of approved roof insulation applied strictly according to architect's or manufacturer's specifications. On roof decks having an incline exceeding ¾ in. in 12 ins. insulation shall be secured in place with metal clips or bolts in addition to the bond provided by the Asphalt. (If additional layers of roof insulation are specified, joints between each subsequent layer shall be broken and layers of insulation shall be bonded together and firmly embedded into a solid mopping of hot Asphalt.)

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 4 are subject to a Carey 10-Year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 10-Year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION OF *Carey* No. 4 BUILT-UP ROOFS

TYPE A—Specification No. 4

Three plies of CAREY FELTEX (Asphalt Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 ft., and not less than 140 lbs. CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 4—Type A.

The Feltex used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be mopped with a heavy coat of Asphalt, into which, while hot, shall be applied three sheets of felt mopped solid between the sheets so that at no point shall felt touch felt, each sheet to overlap the previous sheet 25 ins., leaving 11 ins. exposed. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. CAREY ASPHALT used in the construction of the roof shall not be heated over 400° F.

TYPE B—Specification No. 4

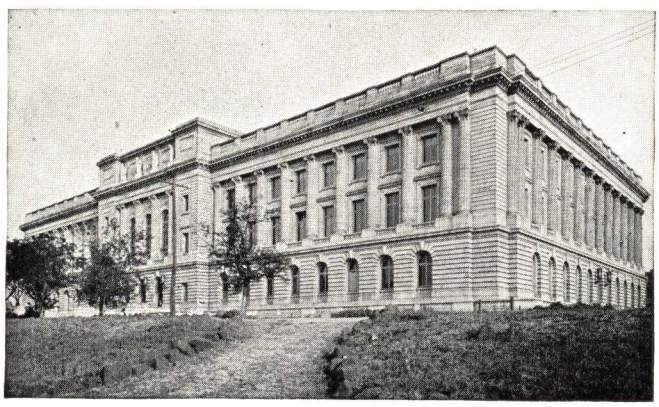
Three plies of CAREY-SEAL TARRED FELT (Tar Saturated Rag Felt), each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 175 lbs. of CAREY-SEAL TAR PITCH and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 4—Type B.

The CAREY-SEAL TARRED FELT used in the construction of this roof shall be 32 ins. wide. The roof surface shall first be mopped with a heavy coat of Tar Pitch, into which, while hot, shall be applied three layers of CAREY-SEAL TARRED FELT mopped solid between the sheets so that at no point shall felt touch felt, each sheet to overlap the previous sheet 22 ins., leaving 10 ins. exposed. To the top surface of this construction a flood coat of CAREY-SEAL TAR PITCH shall be poured from a dipper and not less than 60 lbs. shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Tar Pitch, while hot, Slag or Gravel shall be embedded. CAREY-SEAL TAR PITCH used in the construction of the roof shall not be heated over 400° F.

TYPE C—Specification No. 4

One ply of CAREY FELTEX (Asphalt Saturated Rag Felt) and two plies of CAREY FIBEROCK (Asphalt Impregnated Asbestos Felt, each ply weighing approximately 15 lbs. per 100 sq. ft., and not less than 140 lbs. of CAREY ASPHALT and 300 lbs. of Slag or 400 lbs. of Gravel shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 4—Type C.

The felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be mopped with a heavy coat of Asphalt, into which, while hot, shall be embedded one layer of CAREY FELTEX, lapping sheets 2 ins. Over the top of the Feltex sheet shall be applied another mopping of CAREY ASPHALT, into which, while hot, shall be embedded two layers of CAREY FIBEROCK, sheets to be lapped 19 ins., leaving 17 ins. exposed—sheets to be mopped solid between the plies with hot Asphalt. To the top surface of this construction a flood coat of Asphalt shall be poured from a dipper and not less than 50 lbs. of Asphalt shall be used to cover 100 sq. ft. of roof surface. Into this top flood coat of Asphalt, while hot, Slag or Gravel shall be embedded. CAREY ASPHALT used in the construction of the roof shall not be heated over 400° F.



Cuyahoga County Court House
Cleveland, Ohio

NUMBER

5

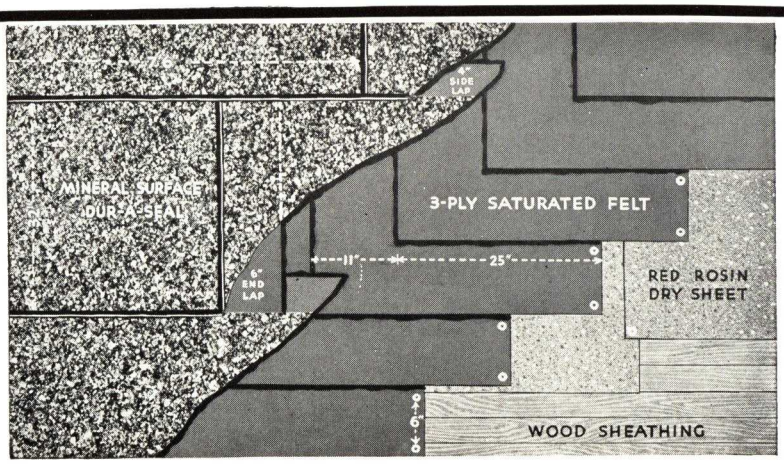
Bond: 20-Year

DECK • WOOD

INCLINE • ¾-3 IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • MINERAL CAP SHEET



Carey 20-Year Master Built-up Roofing Specification No. 5

The construction to be followed in applying all types of Built-up Roofing covered by Carey Master Built-up Roofing Specification No. 5 for application directly over wood decks.

TYPE "A" • and its Service Adaptability

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes	Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. per square Mineral Surfaced Dur-A-Seal	Weight, lbs. per square Asphalt Mopping
A	All	¾ to 3	Not rec.	Class C	3 Plies of Carey Feltex (Asphalt Saturated Rag Felt) 1 Ply Mineral Surfaced Dur-A-Seal (Asphalt Saturated)	Carey Asphalt	15	75	80

General Requirements Applying to Type A

STEEP DECK APPLICATION

When Carey Master Built-up Roofing Specification No. 5 is applied over roof decks having an incline of 1 in. in 12 ins. or greater, the cap or top sheet of CAREY MINERAL SURFACED DUR-A-SEAL shall be back-nailed approximately every 6 ins. along the underside of the end lap and approximately every 12 ins. along the underside of the side lap with 1-in. "Simplex" nails. The top or cap sheet in these instances should always be run parallel with the pitch of the roof and the sheet at the peak or ridge should extend over the ridge at least 12 ins. and be secured to the deck along the opposite slope with "Simplex" nails driven along the end of the sheet. Asphalt used in the construction of this roof when applied over decks having a pitch exceeding 1 in. in 12 ins. shall be CAREY STEEP PITCH ASPHALT.

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Gypsum Decks—When this specification is applied over gypsum decks the length of the nails called for under "Material and Application Details" shall be 1¾ in. long instead of 1 in. long.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 5 are subject to a Carey 20-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 20-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION

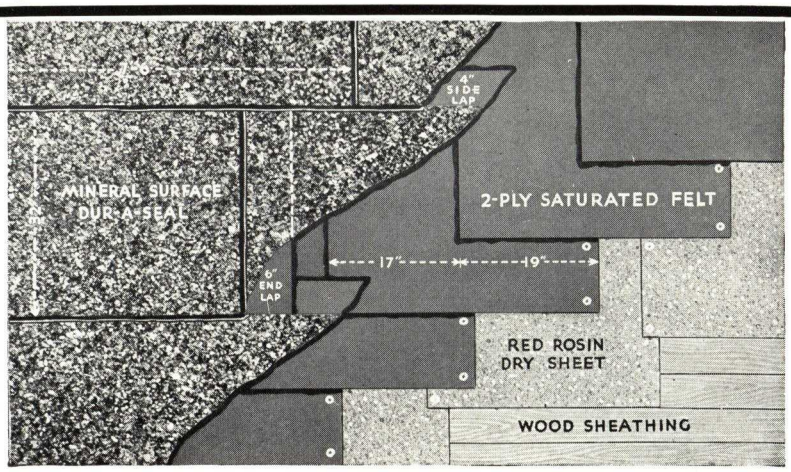
TYPE A—Specification No. 5

One layer of Red Rosin Sized Sheathing Paper, weighing not less than 5 lbs. per square, three layers of 15 lb. Feltex (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and one sheet of CAREY MINERAL SURFACED DUR-A-SEAL (Rag Felt Base), weighing approximately 75 lbs. per 100 sq. ft., and 80 lbs. of CAREY ASPHALT shall be used in the construction of Carey Master Built-up Roofing Specification No. 5—Type A.

The Dur-A-Seal Cap Sheet and Felt used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with a layer of Red Rosin Sized Sheathing Paper lapped approximately 2 ins. and secured to the deck by occasional nailing. Over this sheet shall then be applied three layers of 15-lb. Feltex, lapping sheets 25 ins., leaving 11 ins. exposed. Sheets shall be mopped solid between the laps with Carey Asphalt and in addition shall be nailed along the edge of the unsecured portion (back nailing method) with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spaced along the laps approximately every 3 in. To the surface of this three-ply construction a solid mopping of CAREY ASPHALT shall be applied, into which, while hot, shall be embedded the sheet of Mineral Surfaced Dur-A-Seal (Rag Felt Base), sheets to be applied in approximately 8-ft. lengths and lapped 4 ins. along the longitudinal seams and 6 ins. at the end seams, laps to be sealed with solid moppings of hot Asphalt. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.

NUMBER

6



Bond: 10-Year

DECK • WOOD

INCLINE • ¾-3 IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • MINERAL CAP SHEET

Carey 10-Year Matser Built-up Roofing Specification No. 6

The construction to be followed in applying all types of Built-up Roofing covered by Carey Master Built-up Roofing Specification No. 6 for application directly over Wood Decks.

TYPE "A" • and its Service Adaptability

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. per square Mineral Surf. Dur-A-Seal	Weight, lbs. per square Asphalt Mopping
			Rec.	Not Rec.						
A	All	¾ to 3	.....	X	Class C	2 Plies Carey Feltex (Asphalt Saturated Rag Felt) 1 Ply Mineral Surface Dur-A-Seal (Asphalt Saturated)	Carey Asphalt	15	75	55

General Requirements Applying to Type A

STEEL DECK APPLICATION

When Carey Master Built-up Roofing Specification No. 6 is applied over roof decks having an incline of 1 in. in 12 ins. or greater, the cap or top sheet of Carey Mineral Surfaced Dur-A-Seal shall be back nailed approximately every 6 ins. along the underside of the end lap and approximately every 12 ins. along the underside of the side lap with 1-in. "Simplex" nails. The top or cap sheet in these instances should always be run parallel with the pitch of the roof and the sheet at the peak or ridge should extend over the ridge at least 12 ins. and be secured to the deck along the opposite slope with "Simplex" nails driven along the end of the sheet. Asphalt used in the construction of this roof when applied over decks having a pitch exceeding 1 in. in 12 ins. shall be Carey Steep Pitch Asphalt.

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Gypsum Decks—When this specification is applied over gypsum decks the length of the nails called for under "Material and Application Details" shall be 1¾ in. long instead of 1 in. long.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 6 are subject to a Carey 10-year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by* The Philip Carey Company. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish The Philip Carey Manufacturing Company's 10-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION

TYPE A—Specification No. 6

One layer of Red Rosin Sized Sheathing Paper, weighing not less than 5 lbs. per square, two layers of 15-lb. Feltex (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and one sheet of Carey Mineral Surfaced Dur-A-Seal (Rag Felt Base), weighing approximately 75 lbs. per 100 sq. ft., and 55 lbs. of Carey Asphalt shall be used in the construction of Carey Master Built-up Roofing Specification No. 6—Type A.

The Dur-A-Seal Cap Sheet and Felt used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with a layer of Red Rosin Sized Sheathing Paper lapped approximately 2 ins. and secured to the deck by occasional nailing. Over this sheet shall then be applied two layers of 15-lb. Feltex, sheets lapped 19 ins., leaving 17 ins. exposed. Sheets shall be mopped solid between the laps with Carey Asphalt and in addition shall be nailed along the edge of the unsecured portion (back nailing method) with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spaced along the laps approximately every 3 ins. To the surface of this two-ply construction a mopping of Carey Asphalt shall be applied, into which, while hot, shall be embedded the sheet of Mineral Surfaced Dur-A-Seal (Rag Felt Base), sheets to be applied in approximately 8-ft. lengths and lapped 4 ins. along the longitudinal seams and 6 ins. at the end seams, laps to be sealed with solid moppings of hot Asphalt. Carey Asphalt used in the construction of this roof shall not be heated over 400° F.

NUMBER **7**

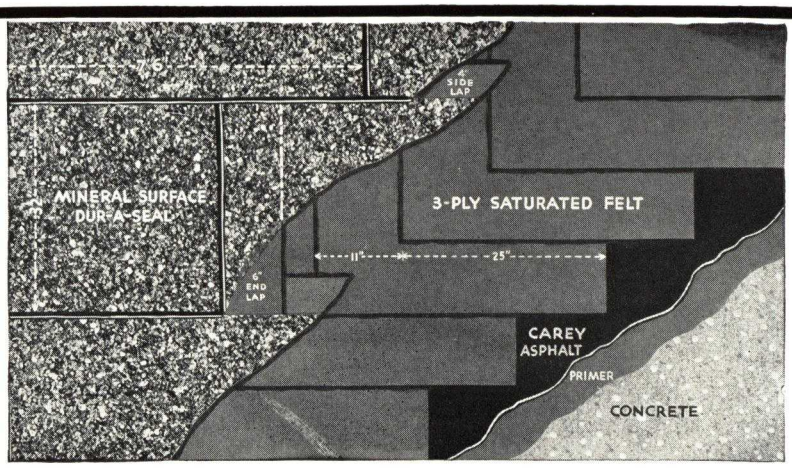
Bond: 20-Year

DECK • CONCRETE or INSULATED

INCLINE • ¾-1½ IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • MINERAL CAP SHEET



Carey 20-Year Master Built-up Roofing Specification No. 7

The construction to be followed in applying all types of Built-up Roofing covered by Carey Master Built-up Roofing Specification No. 7 for application directly over Concrete Decks.

TYPE "A" • and its Service Adaptability

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. per square Mineral Surf. Dur-A-Seal	Weight, lbs. per square Asphalt Mopping
			Rec.	Not Rec.						
A	All	¾ to 1½	.....	X	Class C	3 Plies Carey Feltex (Asphalt Saturated Rag Felt) 1 Ply Mineral Surf. Dur-A-Seal (Asphalt Saturated)	Carey Asphalt	15	75	120

General Requirements Applying to Type A

DECK TREATMENT

Before Built-up Roofing is applied concrete deck must be thoroughly dry with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from laitance and scaling as the result of frozen mix.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 7 are subject to a Carey 20-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

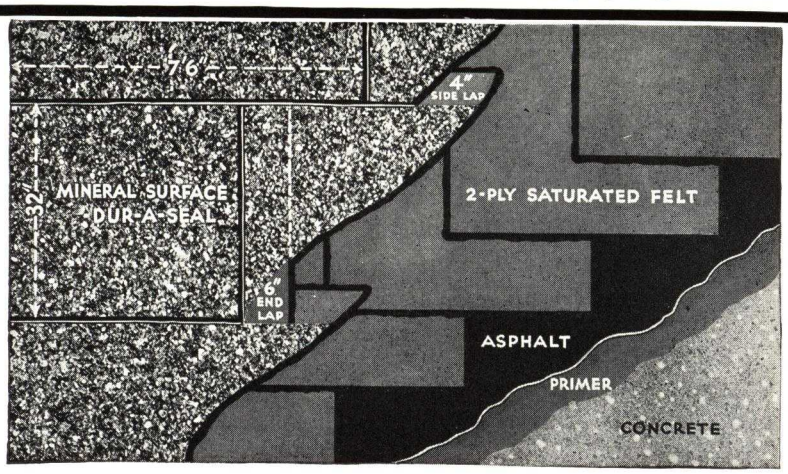
Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 20-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION

TYPE A—Specification No. 7

One gallon of Asphalt Primer, three layers of 15-lb. Feltex (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and one sheet of CAREY MINERAL SURFACED DUR-A-SEAL (Rag Felt Base), weighing approximately 75 lbs. per 100 sq. ft., and 120 lbs. of CAREY ASPHALT shall be used in the construction of Carey Master Built-up Roofing Specification No. 7—Type A.

The Dur-A-Seal Cap Sheet and Felt used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a solid mopping of Asphalt into which, while hot, shall be embedded three layers of 15-lb. Feltex, lapping sheets 25 ins., leaving 11 ins. exposed. Sheets shall be mopped solid between the plies with CAREY ASPHALT. The surface of this three-ply construction shall then be mopped with a solid mopping of CAREY ASPHALT into which, while hot, shall be embedded the sheet of Mineral Surfaced Dur-A-Seal (Rag Felt Base), sheets to be applied in approximately 8-ft. lengths and lapped 4 ins. along the longitudinal seams and 6 ins. at the end seams. Laps to be sealed with solid moppings of Asphalt. The Asphalt used in the construction of this roof shall not be heated over 400° F.



Carey 10-Year Master Built-up Roofing Specification No. 8

The construction to be followed in applying all types of Built-up Roofing covered by Carey Master Built-up Roofing Specification No. 8 for application directly over Concrete Decks.

Bond: 10-Year

DECK • CONCRETE or INSULATED

INCLINE • ¾-1½ IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • MINERAL CAP SHEET

TYPE "A" • and its Service Adaptability

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Type of Mopping	Weight, lbs. per ply of Felt per square	Weight, lbs. per square Mineral Surf. Dur-A-Seal	Weight, lbs. per square Asphalt Mopping
			Rec.	Not Rec.						
A	All	¾ to 1½	.....	X	Class C	2 Plies Carey Feltex (Asphalt Saturated Rag Felt) 1 Ply Mineral Surface Dur-A-Seal (Asphalt Saturated)	Carey Asphalt	15	75	95

General Requirements Applying to Type A

DECK TREATMENT

Before Built-up Roofing is applied concrete must be thoroughly dry with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from laitance and scaling as the result of frozen mix.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 8 are subject to 10-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 10-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION

TYPE A—Specification No. 8

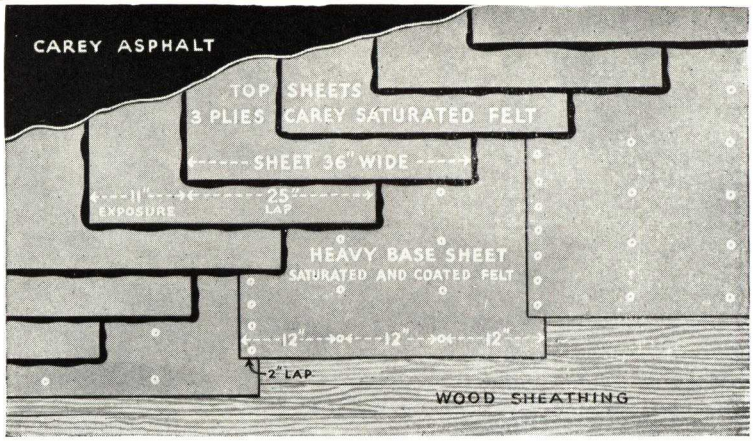
One gallon of Asphalt Primer, two layers of 15-lb. Feltex (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and one sheet of CAREY MINERAL SURFACED DUR-A-SEAL (Rag Felt Base), weighing approximately 75 lbs. per 100 sq. ft., and 95 lbs. of CAREY ASPHALT shall be used in the construction of Carey Master Built-up Roofing Specification No. 8—Type A.

The Dur-A-Seal Cap Sheet and Felt used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a solid mopping of Asphalt into which, while hot, shall be embedded two layers of 15-lb. Feltex, lapping sheets 19 ins., leaving 17 ins. exposed. Sheets shall be mopped solid between the plies with CAREY ASPHALT. The surface of this two-ply construction shall then be mopped with a solid mopping of CAREY ASPHALT into which, while hot, shall be embedded the sheet of Mineral Surfaced Dur-A-Seal (Rag Felt Base), sheets to be applied in approximately 8-ft. lengths and lapped 4 ins. along the longitudinal seams and 6 ins. at the end seams. Laps to be sealed with solid moppings of Asphalt. The Asphalt used in the construction of this roof shall not be heated over 400° F.

NUMBER

9

Bond: 20-Year



DECK • WOOD or GYPSUM

INCLINE • ¾-2 IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • ASPHALT

Carey 20-Year Master Built-up Roofing Specification No. 9

The construction to be followed in applying both types of Built-up Roofs covered by Carey 20-year Master Built-up Roofing Specification No. 9 for application over wood or gypsum decks.

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Section of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Weight, lbs. per ply Base Sheet	Weight, lbs. per ply Cap Sheets per sq.	Type Mopping	Weight per square Asphalt Mopping
			Rec.	Not Rec.						
A	All	¾ to 2	X	.....	Class A	1 Layer Carey Fiberock Base Sheet (Asphalt Impregnated Asb.) 3 plies Carey Fiberock	60	20	Carey Asphalt	100
B	North and East	¾ to 2	.....	X	Class C	1 Layer Feltex Base Sheet (Asphalt Sat. Rag Felt) 3 plies Feltex (Asphalt Sat. Rag Felt)	60	15	Carey Asphalt	100
C	All	¾ to 2	X	.....	Class C	1 Layer Feltex Base Sheet (Asphalt Sat. Rag Felt) 3 plies Fiberock (Asphalt Sat. Asbestos Felt)	45	20	Carey Asphalt	100

General Requirements Applying to Both Types

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris, and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Gypsum Decks—When this specification is applied over Gypsum Decks, nails called for under "Material and Application Details," shall be 1¾ ins. long instead of 1 in. long.

REQUIREMENTS FOR BOND

Note: All types of roofs under Carey Master Built-up Roofing Specification No. 9 are subject to a Carey 20-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by The Philip Carey Company. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish The Philip Carey Manufacturing Company's 20-Year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION

TYPE A—Specification No. 9

One layer of Carey Fiberock Asbestos Base Sheet (Asphalt Impregnated and Coated Asbestos Felt) weighing approximately 60 lbs. per 100 sq. ft., and three plies of Carey 20-lb. Fiberock (Asbestos Felt Impregnated and Coated on one side with Asphalt) each sheet weighing approximately 20 lbs. per 100 sq. ft., and 100 lbs. of Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 9—Type A.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 60-lb. Fiberock Base Sheet, lapping all sheets not less than 2 ins. and secured to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps approximately every 4 ins. In addition two rows of nails shall be run parallel to the laps through the center of the sheets, nailing approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided a solid mopping of Carey Asphalt shall be applied into which, while hot, shall be embedded three sheets of 20-lb. Fiberock, Asphalt coated side down, each sheet to overlap previous sheet 25 ins., leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot Carey Asphalt. Carey Asphalt used in the construction of this roof shall not be heated over 400° F.

TYPE B—Specification No. 9

One layer of Carey Feltex Base Sheet (Asphalt Saturated and Coated Rag Felt) weighing approximately 60 lbs. per 100 sq. ft., and three plies of 15-lb. Feltex (Asphalt Saturated Rag Felt) each sheet weighing approximately 15 lbs. per 100 sq. ft., and 100 lbs. of Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 9—Type B.

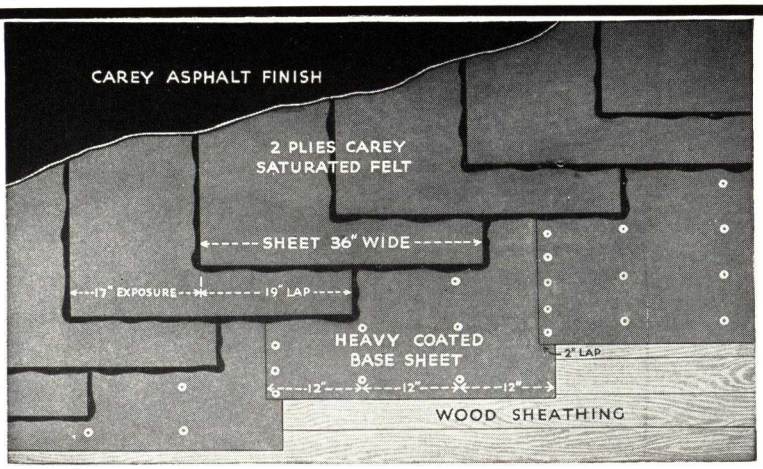
All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 60-lb. Feltex Base Sheets, lapping all sheets not less than 2 ins. and secured to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps approximately every 4 ins. In addition two rows of nails shall be run parallel to the laps through the center of the sheets, nailing approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided a solid mopping of Carey Asphalt shall be applied into which, while hot, shall be embedded three sheets of 15-lb. Feltex, each sheet to overlap the previous sheet 25 ins., leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot Carey Asphalt. Carey Asphalt used in the construction of this roof shall not be heated over 400° F.

TYPE C—Specification No. 9

One layer of Carey Feltex Base Sheet (Asphalt Saturated and Coated Rag Felt), weighing approximately 45 lbs. per 100 sq. ft., and three plies of 20-lb. Fiberock (Asbestos Felt Impregnated and Coated on One Side with Asphalt), each sheet weighing approximately 20 lbs. per 100 sq. ft., and 100 lbs. of Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-Up Roofing Specification No. 9—Type C.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 45-lb. Feltex Base Sheet, mopping this sheet not less than 2 ins. and securing it to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps, approximately every 4 ins. In addition, two rows of nails shall be run parallel to the laps through the center of the sheet, nailing approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided, a solid mopping of Carey Asphalt shall be applied into which, while hot, shall be embedded three sheets of 20-lb. Fiberock, each sheet to overlap the previous sheet 25 ins., leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot Carey Asphalt. Carey Asphalt used in the construction of this roof shall not be heated over 400° F.

NUMBER
10



Carey 10-Year Master Built-up Roofing Specification No. 10

The construction to be followed in applying all three types of Built-up Roofs covered by Carey 10-year Master Built-up Roofing Specification No. 10 for application over wood or gypsum decks.

Bond: 10-Year

DECK • WOOD OR GYPSUM

INCLINE • ¾-2 IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • ASPHALT

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Weight, lbs. Base Sheet per square	Weight, lbs. per ply Cap Sheet per square	Type Mopping	Weight per square Asphalt Mopping
			Rec.	Not Rec.						
A	All	¾ to 2	X	.....	Class A	1 layer Carey Fiberock Base Sheet (Asphalt Impregnated Asb.) 2 plies Carey Fiberock (Asphalt Impregnated Asb.)	45	20	Carey Asphalt	75
B	North and East	¾ to 2	.....	X	Class C	1 layer Feltex Base Sheet (Asphalt Sat. Rag Felt) 2 plies Carey Feltex (Asphalt Sat. Rag Felt)	30	15	Carey Asphalt	75
C	North and East	¾ to 2	X	.....	Class C	1 layer Feltex Base Sheet (Asphalt Sat. Rag Felt) 2 plies Carey Fiberock (Asphalt Impregnated Asb.)	30	20	Carey Asphalt	75

General Requirements Applying to All Three Types

DECK TREATMENT

The roof deck over which this specification is to be applied shall be dry, free from rubbish and debris and free from objectionable low spots and depressions. Roof must be applied during dry, favorable weather.

Gypsum Decks—When this specification is applied over gypsum decks the length of the nails called for under "Material and Application Details," shall be 1¾ ins. long instead of 1 in. long.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 10 are subject to a Carey 10-year Surety Bond when the roof is laid strictly according to Carey Specifications by roofing contractor approved by* The Philip Carey Company. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish The Philip Carey Manufacturing Company's 10-Year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION OF *Carey* No. 10 BUILT-UP ROOFS

TYPE A—Specification No. 10

One layer of CAREY 45-LB. FIBEROCK ASBESTOS BASE SHEET (Asphalt Impregnated and Coated Asbestos Felt), weighing approximately 45 lbs. per 108 sq. ft., and two plies of CAREY 20-LB. FIBEROCK (Asbestos Felt Impregnated and Coated on one side with Asphalt), each sheet weighing approximately 20 lbs. per 100 sq. ft., and 75 lbs. of CAREY ASPHALT shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 10—Type A.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 45-lb. Fiberock Base Sheet, lapping all sheets not less than 2 ins. and secured to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps approximately every 4 ins. In addition two rows of nails shall be run parallel to the laps through the center of the sheets, nailing approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied, into which, while hot, shall be embedded two sheets of CAREY 20-LB. FIBEROCK, Asphalt coated side down, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot CAREY ASPHALT. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.

TYPE B—Specification No. 10

One layer of CAREY 30-LB. FELTEX BASE SHEET (Asphalt Saturated Rag Felt), weighing approximately 30 lbs. per 100 sq. ft., and two plies of CAREY 15-LB. FELTEX (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and 75 lbs. CAREY ASPHALT shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 10—Type B.

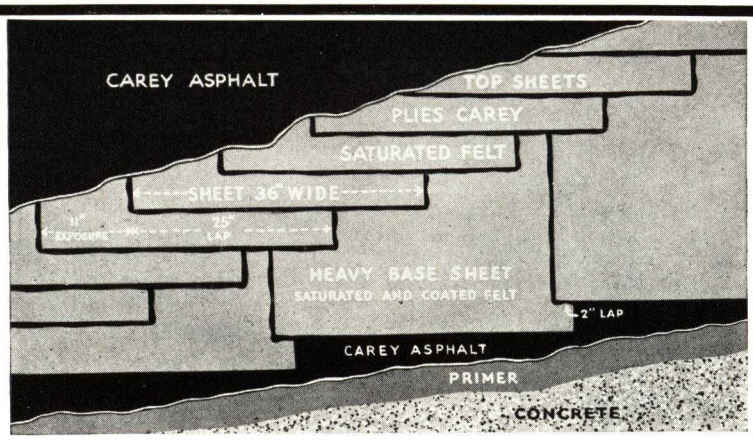
All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 30-lb. Feltex Base Sheet, lapping all sheets not less than 2 ins. and secured to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps approximately every 4 ins. In addition two rows of nails shall be run parallel to the laps through the center of the sheets, nailing approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied into which, while hot, shall be embedded two sheets of 15-lb. Feltex, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot CAREY ASPHALT. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.

TYPE C—Specification No. 10

One layer of CAREY 30-LB. FELTEX BASE SHEET (Asphalt Saturated Rag Felt), weighing approximately 30 lbs. per 100 sq. ft., and two plies of CAREY 20-LB. FIBEROCK (Asbestos Felt Impregnated and Coated one side with Asphalt), each sheet weighing approximately 20 lbs. per sq. ft., and 75 lbs. of CAREY ASPHALT shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 10—Type C.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be covered with the 30-lb. Feltex Base Sheet, lapping all sheets not less than 2 ins. and secured to the deck with 1-in. nails driven through flat tin caps or 1-in. "Simplex" nails, spacing nails along the laps approximately every 4 ins. In addition two rows of nails shall be run parallel to the laps through the center of the sheets, nailed approximately 8 ins. apart and 12 ins. from either edge. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied, into which, while hot, shall be embedded two sheets of 20-lb. Fiberock, Asphalt coated side down, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of hot CAREY ASPHALT. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.

The DeVilbiss Manufacturing Company — Toledo, Ohio



NUMBER **11**

Bond: 20-Year

DECK • CONCRETE or INSULATED

INCLINE • ¾-1½ IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • ASPHALT

Carey 20-Year Master Built-up Roofing Specification No. 11

The construction to be followed in applying both types of Built-up Roofs covered by Carey 20-year Master Built-up Roofing Specification No. 11 for application over concrete decks.

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Weight, lbs. Base Sheet per square	Weight, lbs. per ply Cap Sheets per square	Type Mopping	Weight per square Asphalt Mopping	Asphalt Primer
			Rec.	Not Rec.							
A	All	¾ to 1½	X	.....	Class A	1 layer Carey Fiberock Base Sheet (Asphalt Impregnated Asb.) 2 plies Carey Fiberock (Asphalt Impregnated Asb.)	60	20	Carey Asphalt	110	1 Gal.
B	North and East	¾ to 1½	.....	X	Class C	1 layer Carey Feltex Base Sheet (Asphalt Sat. Rag Felt) 3 plies Carey Feltex (Asphalt Sat. Rag Felt)	45	15	Carey Asphalt	125	1 Gal.
C	All	¾ to 1½	.....	X	Class A	4 plies Carey Fiberock (Asphalt Impregnated Asb. Felt)	.....	20	Carey Asphalt	125	1 Gal.

General Requirements Applying to All Three Types

DECK TREATMENT

Before Built-up Roofing is applied concrete deck must be thoroughly dry with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from laitance and scaling as the result of frozen mix.

REQUIREMENTS FOR BOND

Note: All types of roofs under Carey Master Built-up Roofing Specification No. 11 are subject to a Carey 20-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by The Philip Carey Company. *Bonds will be furnished on jobs where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish The Philip Carey Manufacturing Company's 20-Year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATIONS

TYPE A—Specification No. 11

One gallon Asphalt Primer, a base sheet of Carey Fiberock (Asphalt Impregnated and Coated Asbestos Felt), weighing approximately 60 lbs. per 100 sq. ft., two plies of Carey 20-lb. Fiberock (Asbestos Felt Impregnated and Coated on one side with Asphalt), each sheet weighing approximately 20 lbs. per 100 sq. ft., and 110 lbs. of Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 11—Type A.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a heavy coat of Asphalt into which, while hot, shall be laid the Carey 60-lb. Fiberock Base Sheet, lapping all sheets not less than 2 ins. To the surface thus provided a solid mopping of Carey Asphalt shall be applied into which, while hot, shall be embedded two sheets of 20-lb. Fiberock, Asphalt coated side down, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of Carey Asphalt. Carey Asphalt used in the construction of this roof shall not be heated over 400° F.

TYPE B—Specification No. 11

One gallon Asphalt Primer, a base sheet of Carey Feltex (Asphalt Saturated and Coated Rag Felt), weighing approximately 45 lbs. per 100 sq. ft. and three plies of Carey 15-lb. Feltex (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and 125 lbs. Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 11—Type B.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a heavy coat of Asphalt into which, while hot, shall be laid the Carey 60-lb. Feltex Base Sheet, lapping all sheets not less than 2 ins. To the surface thus provided a solid mopping of Carey Asphalt shall be applied into which, while hot, shall be embedded three sheets of felt, each sheet to overlap the previous sheet 25 ins., leaving 11 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of Carey Asphalt. Carey Asphalt used in constructing this roof shall not be heated over 400° F.

TYPE C—Specification No. 11

One Gallon Asphalt Primer, and four plies Carey 20-lb. Fiberock Asbestos Felt Impregnated and coated on one side with Asphalt, each sheet weighing approximately 20 lbs. per 100 sq. ft. and 125 lbs. Carey Asphalt shall be used in constructing 100 sq. ft. of Carey Master Built-Up Roofing Specification No. 11—Type C.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a heavy coat of asphalt into which, while hot shall be embedded four sheets of felt, each sheet to overlap the previous sheet 27 ins. leaving 9 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of Carey Asphalt. Carey Asphalt used in constructing this roof shall not be heated over 400° F.

NUMBER **12**

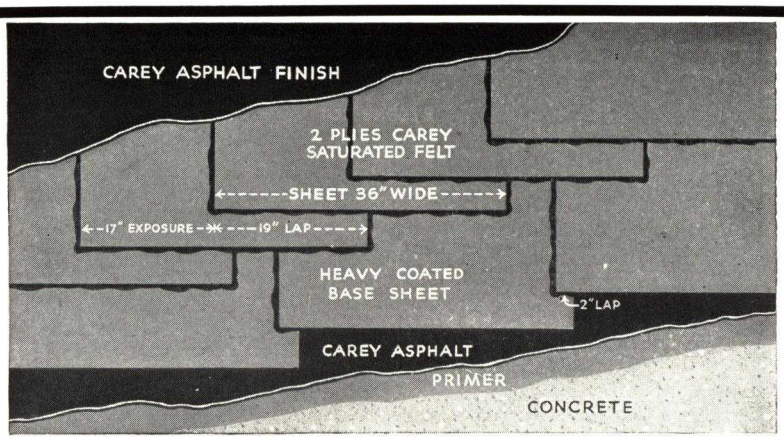
Bond: 10-Year

DECK • CONCRETE or INSULATED

INCLINE • ¾-1½ IN. per Foot

CONSTRUCTION • ASPHALT

SURFACE • ASPHALT



Carey 10-Year Master Built-up Roofing Specifications No. 12

The construction to be followed in applying all three types of Built-up Roofs covered by Carey 10-year Master Built-up Roofing Specification No. 12 for application over concrete decks.

THREE OPTIONAL TYPES • and the Service Adaptability of Each

TYPE	Sections of U. S.	Deck Slope, inches to one foot	Acid Fumes		Underwriters Laboratories Rating	Number of Layers and Type of Felt	Weight, lbs. Base Sheet per square	Weight, lbs. per ply Cap Sheet per square	Type Mopping	Weight per square Asphalt Mopping	Asphalt Primer
			Rec.	Not Rec.							
A	All	¾ to 1½	X	.....	Class A	1 layer Carey Fiberock Base Sheet (Asphalt Impregnated Asb.) 2 plies Carey Fiberock (Asphalt Impregnated Asb.)	45	20	Carey Asphalt	115	1 Gal.
B	North and East	¾ to 1½	.....	X	Class C	1 layer Carey Feltex Base Sheet (Asphalt Sat. Rag Felt) 2 plies Carey Feltex (Asphalt Sat. Rag Felt)	30	15	Carey Asphalt	115	1 Gal.
C	North and East	¾ to 1½	X	.....	Class C	1 layer Carey Feltex Base Sheet (Asphalt Sat. Rag Felt) 2 plies Carey Fiberock (Asphalt Impregnated Asb.)	30	20	Carey Asphalt	115	1 Gal.

General Requirements Applying to All Three Types

DECK TREATMENT

Before Built-up Roofing is applied concrete deck must be thoroughly dry, with all low spots or depressions removed so that satisfactory drainage to outlets will result. Roof deck shall be free from frost, loose sand or debris and surface of deck shall also be free from lait ance and scaling as the result of frozen mix.

REQUIREMENTS FOR BOND

Note: *All types of roofs under Carey Master Built-up Roofing Specification No. 12 are subject to a Carey 10-year Surety Bond when the roof is laid strictly according to Carey specifications by roofing contractor approved by* THE PHILIP CAREY COMPANY. *Bonds will be furnished on jobs of 25 squares or over where Carey roof inspection service is available.*

Bond Clause—The roofing contractor shall furnish THE PHILIP CAREY MANUFACTURING COMPANY'S 10-year Surety Bond covering both material and workmanship used in the construction of this roof.

MATERIALS AND APPLICATION OF Carey No. 12 BUILT-UP ROOFS

TYPE A—Specification No. 12

One gallon Asphalt Primer, a base sheet of CAREY 45-LB. FIBEROCK (Asphalt Impregnated and Coated Asbestos Felt), weighing approximately 45 lbs. per 108 sq. ft., two plies of CAREY 20-LB. FIBEROCK (Asbestos Felt Impregnated and Coated on one side with Asphalt), each sheet weighing approximately 20 lbs. per 100 sq. ft. and 115 lbs. of CAREY ASPHALT shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 12—Type A.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a heavy coat of Asphalt into which, while hot, shall be laid the CAREY 45-LB. FIBEROCK Base Sheet, lapping all sheets not less than 2 ins. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied into which, while hot, shall be embedded two sheets of 20-lb. Fiberock, Asphalt coated side down, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of CAREY ASPHALT. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.

TYPE B—Specification No. 12

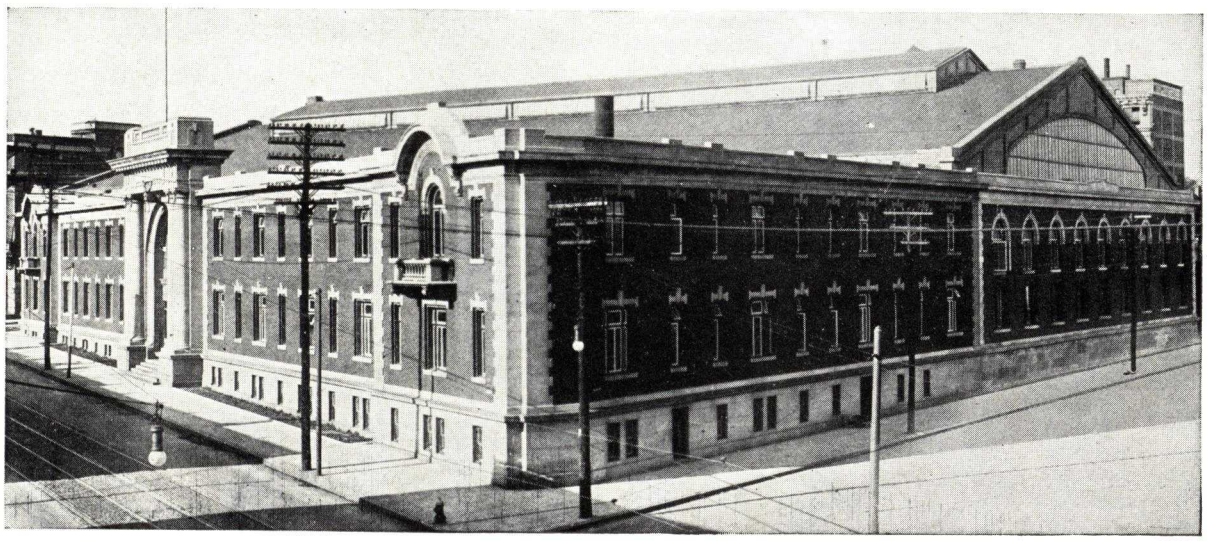
One gallon Asphalt Primer, a base sheet of CAREY FELTEX (Asphalt Saturated Rag Felt), weighing approximately 30 lbs. per 100 sq. ft., and two plies of CAREY 15-LB. FELTEX (Asphalt Saturated Rag Felt), each sheet weighing approximately 15 lbs. per 100 sq. ft., and 115 lbs. CAREY ASPHALT shall be used in constructing 100 sq. ft. of Carey Master Built-up Roofing Specification No. 12—Type B.

All felts used in the construction of this roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer to which surface shall be applied a heavy coat of Asphalt into which, while hot, shall be laid the CAREY 30-LB. FELTEX Base Sheet, lapping all sheets not less than 2 ins. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied into which, while hot, shall be embedded two sheets of felt, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of CAREY ASPHALT. CAREY ASPHALT used in constructing this roof shall not be heated over 400° F.

TYPE C—Specification No. 12

One gallon of Asphalt Primer, a base sheet of CAREY FELTEX (Asphalt Saturated Rag Felt), weighing approximately 30 lbs. per 100 sq. ft., and two plies of CAREY 20-LB. FIBEROCK (Asbestos Felt Impregnated and Coated on one side with Asphalt), each sheet weighing approximately 20 lbs. per 100 sq. ft., and 115 lbs. of CAREY ASPHALT shall be used in the construction of 100 sq. ft. of Carey Master Built-up Roofing Specification No. 12—Type C.

All felts used in the construction of the roof shall be 36 ins. wide. The roof surface shall first be primed with Asphalt Primer, to which surface shall be applied a heavy coat of Asphalt into which, while hot, shall be embedded the CAREY 30-LB. FELTEX Base Sheet, lapping all sheets not less than 2 ins. To the surface thus provided a solid mopping of CAREY ASPHALT shall be applied into which, while hot, shall be embedded two sheets of 20-lb. Fiberock, Asphalt coated side down, each sheet to overlap the previous sheet 19 ins., leaving 17 ins. exposed. Solid moppings of Asphalt shall be applied between the sheets so that at no point shall felt touch felt. The roof surface shall be finished with a uniform coating of Asphalt. CAREY ASPHALT used in the construction of this roof shall not be heated over 400° F.



Armory Drill Shed, 33rd and Lancaster Ave. **Philadelphia, Pa.**

ROOF INSULATION

For Application Over Wood, Concrete and Steel Decks

The following Carey Master Built-up Roofing Specifications are especially adapted for application over insulated wood, concrete and steel decks (asphalt primer called for in roofing specifications to be omitted unless called for in the insulation specification):

(1) 20-year Slag or Gravel surfaced: All types called for under Carey Master Built-up Roofing Specification No. 3.

(2) 10-year Slag or Gravel surfaced: All types called for under Carey Master Built-up Roofing Specification No. 4.

(3) 20-year Dur-A-Seal Mineral Surfaced: All types called for under Carey Master Built-up Roofing Specification No. 7.

(4) 10-year Dur-A-Seal Mineral Surfaced: All types called for under Carey Master Built-up Roofing Specification No. 8.

(5) 20-year smooth Asphalt finished: All types called for under Carey Master Built-up Roofing Specification No. 11.

(6) 10-year smooth Asphalt finished: All types called for under Carey Master Built-up Roofing Specification No. 12.

GENERAL REQUIREMENTS

When smooth top Asphalt finished roofs, Dur-A-Seal Mineral surfaced roofs or any other type roof not surfaced with Slag or Gravel, is specified for application over insulated poured or pre-cast concrete decks, the deck shall be primed with a coat of cold Asphalt Primer, using approximately one gallon per 100 sq. ft., before the first mopping of Asphalt, which is to bond the insulation in place, is applied.

Bitumen required for application of roof insulation shall be in addition to the total quantity specified for use in applying the built-up roofing specification.

The roof deck shall be acceptable to the roofing contractor and shall be thoroughly clean, dry and otherwise conform to the accepted standard of deck construction providing a suitable surface over which to apply a built-up roof.

At the end of each day's work the exposed edges of the insulation shall be protected from the elements with a strip of 15-lb. Saturated Felt bonded to the deck and extended over exposed edges of insulation with a mopping of hot Bitumen.

The application of the built-up roof shall follow closely the application of the insulation and at no time shall the built-up roof be applied when the surface of the insulation is moist or damp.

SPECIAL CONSTRUCTION RECOMMENDATIONS

The constructions recommended in this note, while not a part of this insulation specification, are suggested for use on jobs where improved construction is desired at small additional cost.

(A) Concrete Decks—A mopping of hot Bitumen and a layer of 15-lb. Saturated Felt applied to the deck before insulation is applied provides a better base and a dryer bonding surface for the insulation than otherwise would be provided if insulation was applied directly over the concrete.

(B) Water Stops—When insulation is applied to all types of decks it may be divided into sections by means of water stops or seal courses consisting of strips of 15-lb. Saturated Felt approximately 10½ ins. wide. One half the width of a Saturated Felt strip is bonded to the deck with hot Bitumen, the other half is extended over the edges and on to the surface of the insulation and secured to same with a mopping of hot Bitumen.

These water stops or seal courses should be placed at intervals of approximately 30 feet in both directions and at all outside edges of insulation, thereby preventing the danger of water from possible leaks traveling from one section of the insulation to another.

SPECIFICATION FOR INSULATED WOOD DECKS

The wood deck shall first be covered with two layers of Red Rosin Sized Sheathing Paper weighing approximately 5 lbs. per 100 sq. ft. Sheets shall be lapped approximately 19 ins. at the side and end laps and secured to the deck by occasional nailing. Over this surface a layer of approved insulation shall be applied strictly according to architect's or manufacturer's specifications and secured to the deck with large headed roofing nails. (If additional layers of roof insulation are specified, joints between each subsequent layer shall be broken and layers of insulation shall be bonded together and firmly embedded into a solid mopping of hot Bitumen.) Over the surface of the applied insulation the built-up roof, type as specified, shall be applied.

All Bitumen used in applying insulation shall be of the same type as is used in the construction of the built-up roof.

SPECIFICATION FOR INSULATED CONCRETE DECKS

The concrete deck shall first be covered with a solid mopping of hot Bitumen. (When Asphalt roofs are specified which are not to be surfaced with Slag or Gravel the deck shall be primed before the mopping of hot Asphalt is applied.) Into the solid mopping of Bitumen, while hot, shall be firmly embedded a layer of approved roof insulation applied strictly according to architect's or manufacturer's specifications. (If additional layers of roof insulation are specified, joints between each subsequent layer shall be broken and layers of insulation shall be bonded together and firmly embedded into a solid mopping of hot Bitumen.) Over the surface of the applied insulation the built-up roof, type as specified, shall be applied.

All Bitumen used in applying insulation shall be of the same type as is used in the construction of the built-up roof.

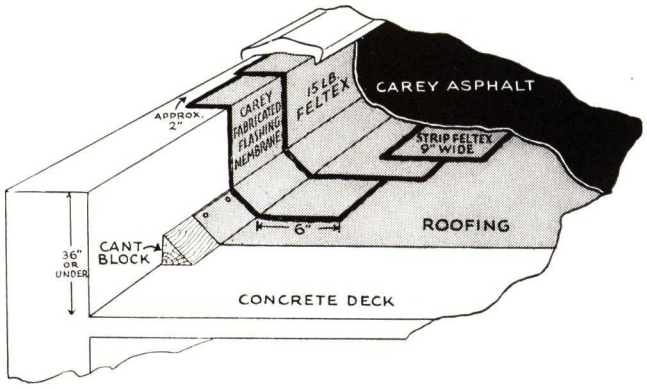
SPECIFICATION FOR INSULATED STEEL DECKS

Sections of the steel deck formed in sheets shall provide rigidity and strength and not be subject to excessive deflection. Steel deck shall be free from perforations which will allow hot Bitumen to drip through the deck and shall be free from bolt heads, purlin clips and insulation cleats and other objectionable projections. Deck and fixtures shall have a shop coat of paint. Roofing specifications constructed of Coal Tar Pitch are not recommended for application over steel deck construction.

The steel deck shall first be covered with a solid mopping of Asphalt into which, while hot, shall be firmly embedded a layer of approved roof insulation applied strictly according to architect's or manufacturer's specifications. On roof decks having an incline exceeding ¾ in. in 12 ins. insulation shall be secured in place with metal clips or bolts in addition to the bond provided by the Asphalt. (If additional layers of roof insulation are specified, joints between each subsequent layer shall be broken and layers of insulation shall be bonded together and firmly embedded into a solid mopping of hot Asphalt.)

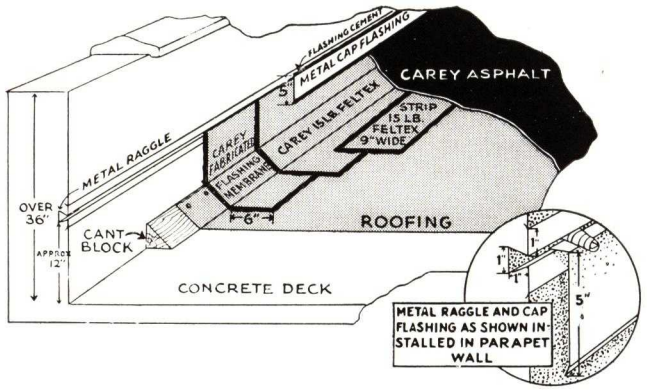
All Asphalt used in the application of insulation for bonding roofing to the surface of the insulation, when applied over steel deck, shall have a minimum melting point of 190° F. Over the surface of the applied insulation the built-up roof, type as specified, shall be applied.

CAREY BONDED FLASHING DETAILS • 10-Year



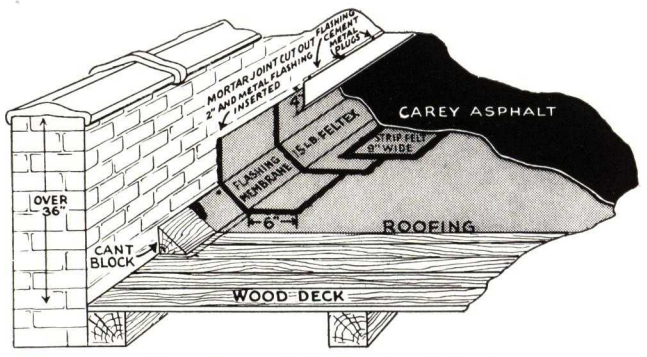
Carey Approved Flashing Detail No. 1

Recommended for use on brick or concrete parapet walls not exceeding 36 in. in height, on which coping is to be applied



Carey Approved Flashing Detail No. 2

Recommended for use on concrete parapet walls exceeding 36 in. in height



Carey Approved Flashing Detail No. 3

Recommended for use on brick parapet walls exceeding 36 in. in height

The three flashing details shown at the left are adaptable to new or replacement work and may be modified to meet almost any unusual condition. The methods of installation are clearly indicated. The text below describes the materials used in the flashing and the laying of the sheets over the wood cant strip.

Carey Fabricated Flashing Membrane

A two-ply preformed Fabricated Flashing Membrane consisting of laminations of Waterproofed Cotton Fabric and Feltex, bonded together at the factory with an especially blended and refined asphalt.

Weight of sheet per 100 sq. ft.....Approx. 32 lbs.
Stretch before fracture.....Approx. 10%
Mullen test for tensile strength
against felt side of Membrane...Approx. 190 lbs.

On account of the elasticity, stretch, strength and extreme flexibility of this material it will conform readily and bond securely with hot asphalt to parapet walls, angles and corners, thus tending to eliminate all danger of cracks and breaks found in ordinary flashing material as the result of misuse, movement in the roof deck or settling of the building.

Wood Cant Strip

Wood cant strip shall be constructed out of a diagonal half of a 4x4 which shall be placed securely in the angle of the wall and cemented in place with a mopping of hot asphalt on hard surfaced decks or toe nailed at the lower edge of the cant strip on wood decks.

The heavy base sheet and all top sheets of the built-up roof shall extend to the top edge of the wood cant strip and be secured in place with nails driven through flat tin caps, after which a 12-in. strip of Carey Fabricated Flashing Membrane shall be laid parallel with the cant strip extending 3 ins. up on the vertical side of the parapet wall and approximately 3½ ins. out on the roof and secured in place with a mopping of hot asphalt.

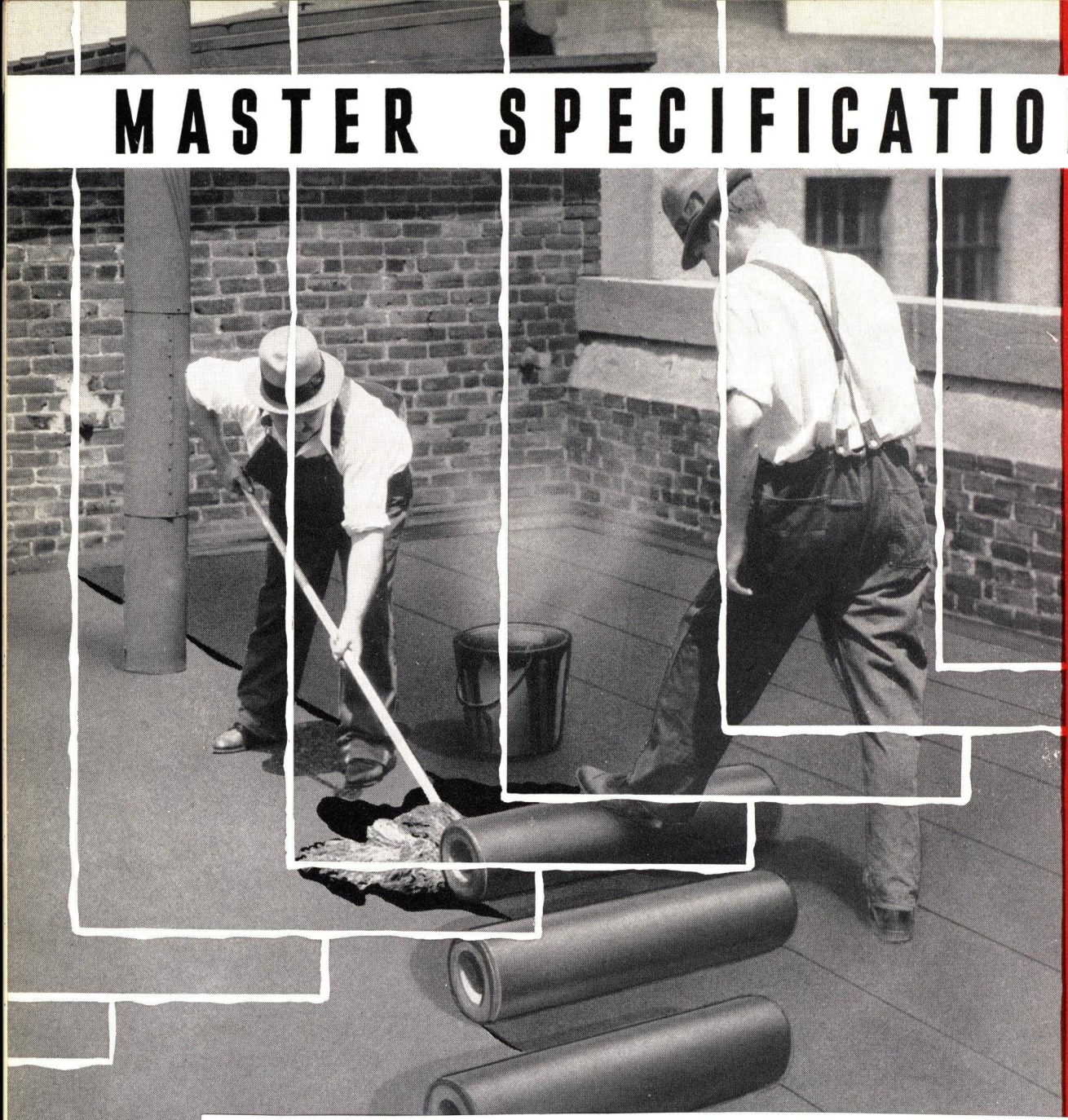
The rest of the flashing construction shall be installed in accordance with Carey Approved Flashing Details Nos. (1) (2) (3).

Alternate—Plastic Flashings

As an alternate construction it will be satisfactory to substitute Carey Flashing Cement in place of hot Asphalt as the bonding material on the above Flashing constructions.

On those details where metal Counter Flashings are specified, if Carey Flashing Cement is used as the bonding material, it will be satisfactory to use as a Counter Flashing over the top edge of the base Flashing a four inch wide strip of saturated cotton fabric laid in Carey Flashing Cement and trowel coated with same material.

MASTER SPECIFICATIONS



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Carey BUILT-UP ROOFS

BONDED 5·10·20 YEARS

6/5

CERTAIN-TEED

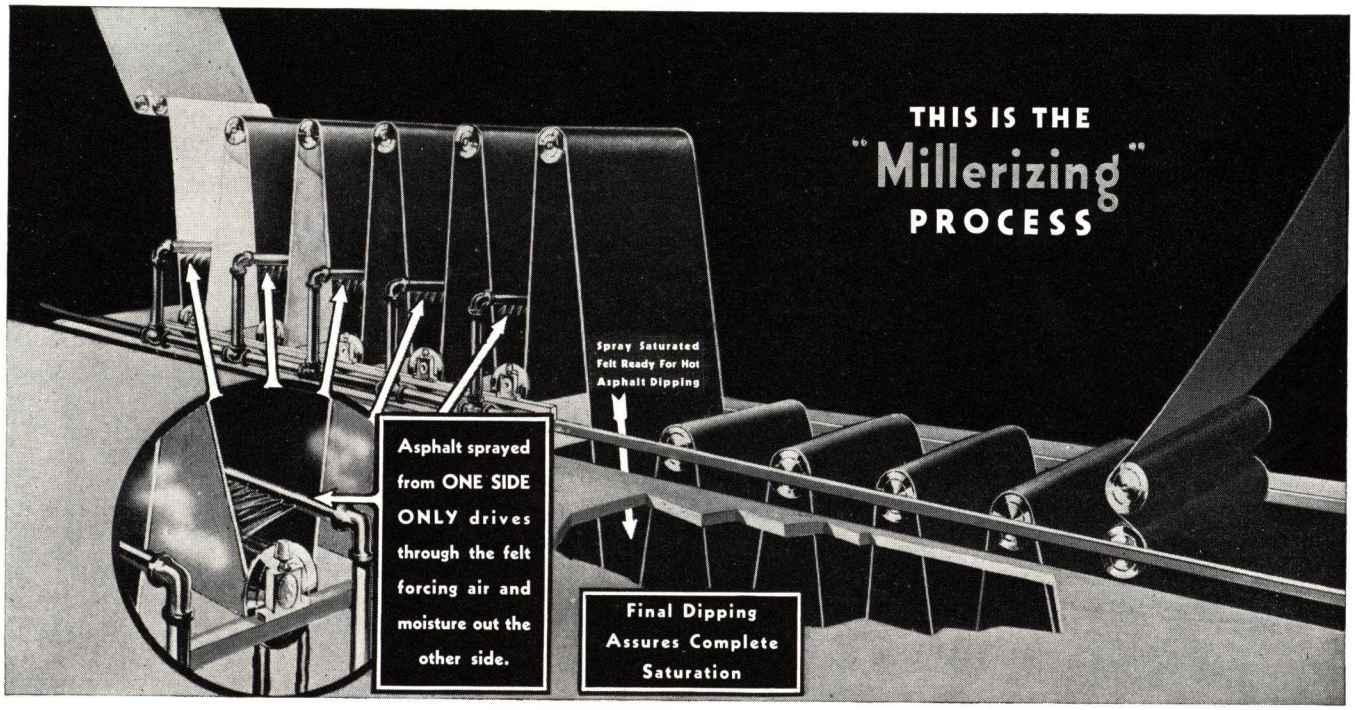
BUILT-UP ROOFS

CERTAIN-TEED PRODUCTS CORPORATION
General Offices New York, N. Y.

INDEX AND CHART ON CERTAIN-TEED SPECIFICATION ROOFS

Years of Bond Guarantee	Specification No.	Underwriters' Rating	Page No.	Type of Deck	Roof Deck Incline per foot, in.	Surface or Finish	Construction: No. of Layers of Material	Construction: No. of Moppings	Weight of Materials per Square: Roofing Asphalt	Asphalt Primer	Asphalt Felt	Gravel	Sheathing Paper	Coal Tar Pitch	Tarred Felt	19 in. Selvage Edge Roofings	Weight per Square Applied, lbs.
ASPHALT FELT AND ASPHALT, MINERAL SURFACED																	
10	522	C	3	Wood	1″ to 12″	Mineral Granules	One 30 lb. Asphalt Felt; Two 19″ Selvage Edge Roofing.	2	60	...	32	.....	...	...	...	88	180
	523	C	4	Concrete	1″ to 12″		One 15 lb. Asphalt Felt; Two 19″ Selvage Edge Roofing.	3	90	8*	16	.....	...	...	...	88	202
15	525	C	4	Wood	1″ to 12″	Mineral Granules	One 30 lb. and One 15 lb. Asphalt Felt; Two 19″ Selvage Edge Roofing.	3	90	...	48	.....	...	...	...	110	248
	526	C	4	Concrete	1″ to 12″		Two 15-lb. Asphalt Felt; Two 19″ Selvage Edge Roofing.	4	120	8*	32	.....	...	...	...	110	270
ASPHALT FELT AND ASPHALT, GRAVEL OR SLAG SURFACED																	
10	508	A	5	Wood	½″ to 3″	Gravel or Slag	One 30 lb. Asphalt Felt; One 15 lb. Asphalt Felt.	1‡	80	...	48	400🔥	...	...	...	.....	528†
	509	A	5	Concrete	½″ to 3″		One 30 lb. Asphalt Felt; One 15 lb. Asphalt Felt.	2‡	110	8*	48	400🔥	..	....	...	.....	566†
15	518	A	5	Wood	½″ to 3″	Gravel or Slag	One 30 lb. Asphalt Felt; Two 15 lb. Asphalt Felt.	2‡	110	...	64	400🔥	...	...	...	.....	574†
	519	A	6	Concrete	½″ to 3″		Three 15 lb. Asphalt Felt.	3‡	140	8*	48	400🔥	...	...	...	.....	596†
20	520	A	6	Wood	½″ to 3″	Gravel or Slag	One 30 lb. Asphalt Felt; Three 15 lb. Asphalt Felt.	3‡	140	...	80	400🔥	...	...	...	.....	620†
	521	A	6	Concrete	½″ to 3″		Four 15 lb. Asphalt Felt.	4‡	170	8*	64	400🔥	...	...	...	.....	642†
ASPHALT FELT AND ASPHALT, SMOOTH SURFACE																	
10	506	C	7	Wood	½″ to 12″	Smooth	One 30 lb. Asphalt Felt; Two 15 lb. Asphalt Felt.	3	90	..	64	.....	...	...	...	.....	154
	507	C	7	Concrete	½″ to 12″		One 30 lb. Asphalt Felt; Two 15 lb. Asphalt Felt.	4	120	8*	64	.....	...	...	...	.....	192
TARRED FELT AND PITCH, GRAVEL OR SLAG SURFACE																	
15	517	A	7	Wood	Up to 2″	Gravel or Slag	One No. 20 Sheathing Paper; Four 15 lb. Tarred Felt.	2‡	....	...	...	400🔥	5	125	64	.....	594†
	514	A	8	Concrete	Up to 2″		Three 15 lb. Tarred Felt.	3‡	....	...	...	400🔥	...	175	48	.....	623†
20	513	A	8	Wood	Up to 2″	Gravel or Slag	One No. 20 Sheathing Paper; Five 15 lb. Tarred Felt.	3‡	....	...	...	400🔥	5	150	80	.....	635†
	512	A	8	Concrete	Up to 2″		Four 15 lb. Tarred Felt.	4‡	....	...	...	400🔥	...	200	64	.....	664†
OTHER CERTAIN-TEED ROOFS **SPECIAL ROOF DECKS**																	
10, 15, 20	527	...	....	Insulation precast gypsum, etc.	½″ to 9″	As may be specified	As may be specified		As may be specified								

*Approximate weight of 1 gallon of Certain-teed Liquid Asphalt Primer.
‡Also one poured coat for top surfacing of gravel or slag.
🔥If slag is specified instead of gravel, use 300 lbs. of slag.
†Weight of gravel surfaced roof. Slag surfaced roof weighs 100 lbs. less.



"Millerizing" Process for Saturating Asphalt Felt

The best type of saturated felt for built-up Roofs or Roofing is a quality felt that is uniformly and completely saturated with a pure bitumen asphalt.

Certain-teed felts are scientifically saturated by an exclusive, controlled "Millerizing" Process which insures uniformity as well as maximum saturation. The saturation is applied to one side of the sheet over and again until it penetrates through to the other side. On its way through, the asphalt pushes out all air and moisture, filling all the hollow spaces and penetrating and saturating every fibre in the sheet. (See the illustration above for further description of the "Millerizing" Process.)

By means of this scientific method of saturation, it is possible to insure *uniform and complete saturation of every sheet* of Certain-teed saturated felt.

CERTAIN-TEED BUILT-UP ROOF SPECIFICATIONS

ASPHALT FELT AND ASPHALT — MINERAL SURFACED

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 522

Roof Incline 1" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:

1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.

Asphalt:

2 moppings Certain-teed "STEEP" Roofing Asphalt. 60 lbs.

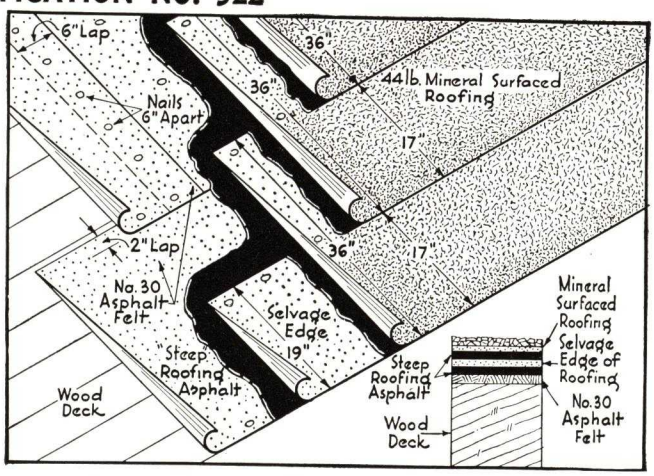
Nails:

For wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.

Surfacing:

2 layers No. 44 Certain-teed 19" Selvage Edge Mineral Surfaced Roofing ..... 88 lbs.

Total Weight of Roof ..... 180 lbs.



CONDENSED BUILT-UP ROOF SPECIFICATION NO. 522

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Wood Sheathing or Pre-cast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 522.

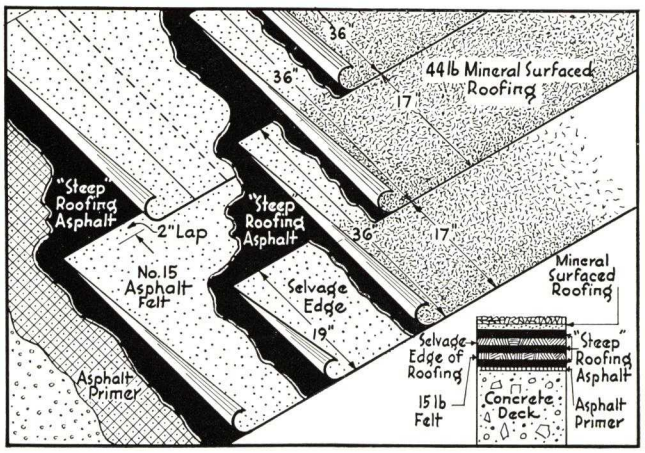
Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available. Consult the nearest Certain-teed sales office for details.

10 YEAR ROOF

ASPHALT FELT AND ASPHALT — MINERAL SURFACED (Continued)

Over Concrete or Poured Gypsum—SPECIFICATION NO. 523

10 YEAR ROOF



Roof Incline 1" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

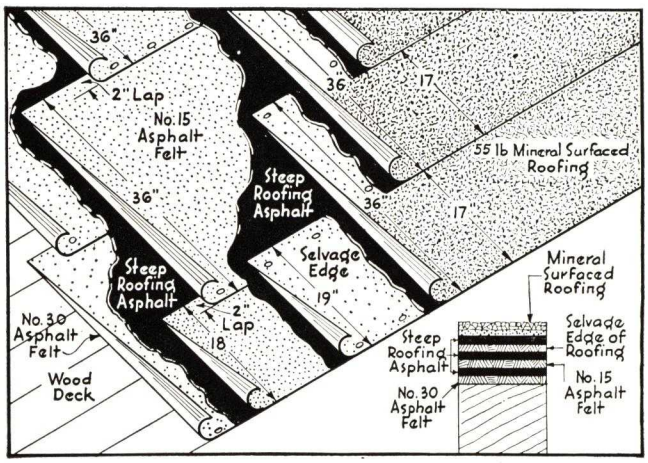
Primer:	
1 coat Certain-teed Liquid Asphalt Primer	8 lbs.
Asphalt Felt:	
1 layer Certain-teed 15 lb. Asphalt Felt	16 lbs.
Asphalt:	
3 moppings Certain-teed "STEEP" Roofing Asphalt	90 lbs.
Surfacing:	
2 layers Certain-teed 44 lb. 19" Selvage Edge Mineral Surfaced Roofing	88 lbs.
Total Weight of Roof	202 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 523

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 523. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 525

15 YEAR ROOF



Roof Incline 1" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:	
1 layer of Certain-teed 30 lb. Asphalt Felt	32 lbs.
1 layer of Certain-teed 15 lb. Asphalt Felt	16 lbs.
Asphalt:	
3 moppings Certain-teed "STEEP" Roofing Asphalt	90 lbs.
Nails:	
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.	
Surfacing:	
2 layers Certain-teed 55 lb. 19" Selvage Edge Mineral Surfaced Roofing	110 lbs.
Total Weight of Roof	248 lbs.

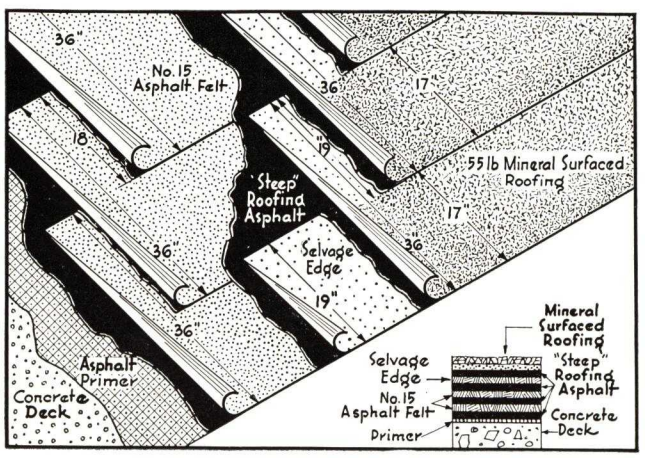
CONDENSED BUILT-UP ROOF SPECIFICATION NO. 525

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 525.

Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available. Consult the nearest Certain-teed sales office for details.

Over Concrete or Poured Gypsum—SPECIFICATION NO. 526

15 YEAR ROOF



Roof Incline 1" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Primer:	
1 coat Certain-teed Asphalt Primer	8 lbs.
Asphalt Felt:	
2 layers Certain-teed 15 lb. Asphalt Felt	32 lbs.
Asphalt:	
4 moppings Certain-teed "STEEP" Roofing Asphalt	120 lbs.
Surfacing:	
2 layers Certain-teed 55 lb. 19" Selvage Edge Mineral Surfaced Roofing	110 lbs.
Total Weight of Roof	270 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 526

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 526. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

ASPHALT FELT AND ASPHALT — GRAVEL OR SLAG SURFACED

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 508

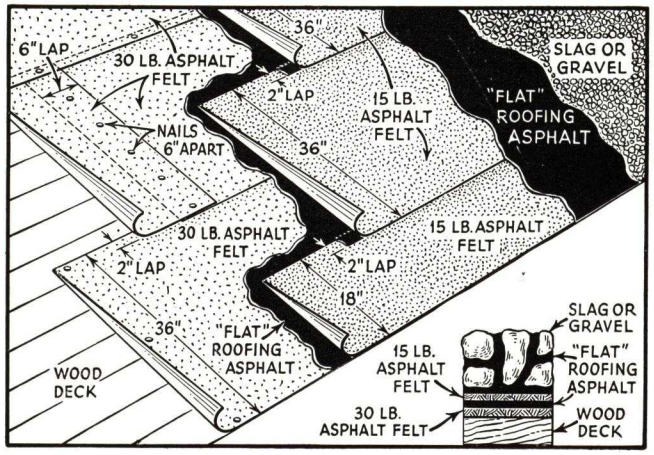
Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
1 layer Certain-teed 15 lb. Asphalt Felt..... 16 lbs.
Asphalt:
1 mopping Certain-teed "FLAT" Roofing Asphalt.... 30 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt.. 50 lbs.
Nails:
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced .....528 lbs; Slag Surfaced..... 428 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 508

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 508. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.



10 YEAR ROOF

Over Concrete or Poured Gypsum—SPECIFICATION NO. 509

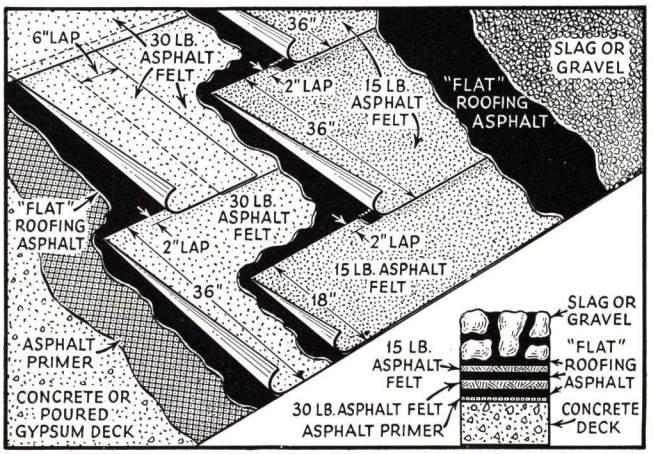
Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Primer:
1 coat Certain-teed Liquid Asphalt Primer..... 8 lbs.
Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
1 layer Certain-teed 15 lb. Asphalt Felt..... 16 lbs.
Asphalt:
2 moppings Certain-teed "FLAT" Roofing Asphalt. 60 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt. 50 lbs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size ..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced ..... 566 lbs.; Slag Surfaced..... 466 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 509

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 509. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.



10 YEAR ROOF

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 518

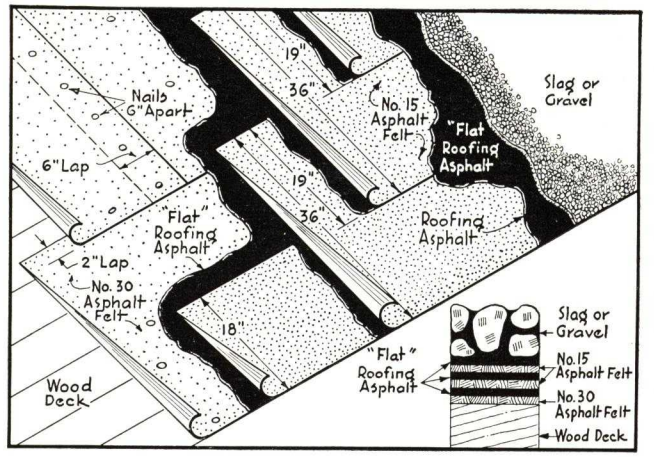
Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
2 layers Certain-teed 15 lb. Asphalt Felt..... 32 lbs.
Asphalt:
2 moppings Certain-teed "FLAT" Roofing Asphalt. 60 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt. 50 lbs.
Nails:
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced..... 574 lbs.; Slag Surfaced..... 474 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 518

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 518. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

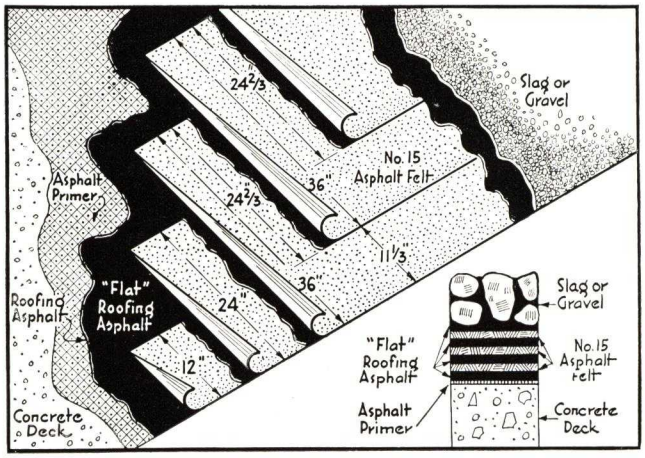


15 YEAR ROOF

ASPHALT FELT AND ASPHALT — GRAVEL OR SLAG SURFACED (Continued)

Over Concrete or Poured Gypsum—SPECIFICATION NO. 519

15 YEAR ROOF



Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Primer:
1 coat Certain-teed Liquid Asphalt Primer..... 8 lbs.
Asphalt Felt:
3 layers Certain-teed 15 lb. Asphalt Felt..... 48 lbs
Asphalt:
3 moppings Certain-teed "FLAT" Roofing Asphalt.. 90 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt.. 50 lbs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced 596 lbs.; Slag Surfaced..... 496 lbs.

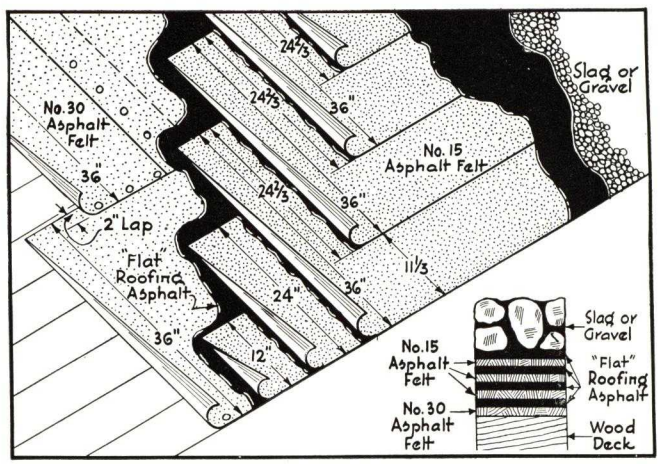
CONDENSED BUILT-UP ROOF SPECIFICATION NO. 519

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 519.

Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 520

20 YEAR ROOF



Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
3 layers Certain-teed 15 lb. Asphalt Felt..... 48 lbs.
Asphalt:
3 moppings Certain-teed "FLAT" Roofing Asphalt.. 90 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt.. 50 lbs.
Nails:
For wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced 620 lbs.; Slag Surfaced..... 520 lbs.

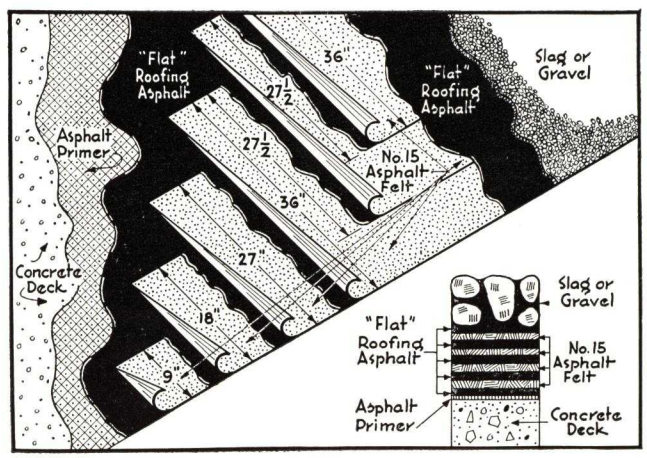
CONDENSED BUILT-UP ROOF SPECIFICATION NO. 520

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt to be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 520.

Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

Over Concrete or Poured Gypsum—SPECIFICATION NO. 521

6 20 YEAR ROOF



Roof Incline ½" to 3" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Primer:
1 coat Certain-teed Liquid Asphalt Primer..... 8 lbs.
Asphalt Felt:
4 layers Certain-teed 15 lb. Asphalt Felt..... 64 lbs.
Asphalt:
4 moppings Certain-teed "FLAT" Roofing Asphalt.. 120 lbs.
1 flood coat Certain-teed "FLAT" Roofing Asphalt.. 50 lbs.
Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.
Total Weight of Roof:
Gravel Surfaced 642 lbs.; Slag Surfaced..... 542 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 521

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Specification No. 521. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

ASPHALT FELT AND ASPHALT — SMOOTH SURFACE

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 506

Roof Incline ½" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
2 layers Certain-teed 15 lb. Asphalt Felt..... 32 lbs.

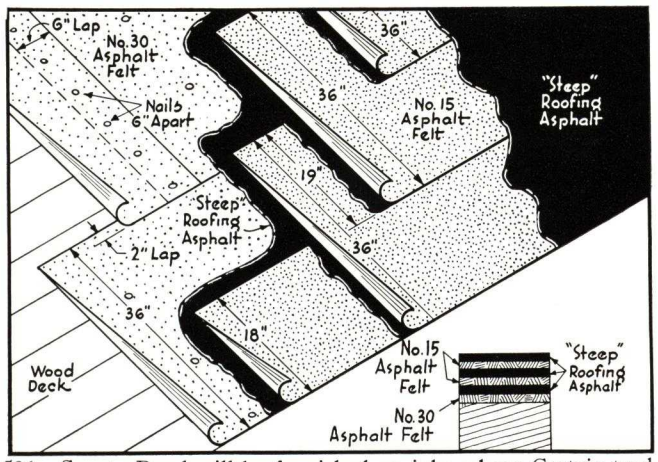
Asphalt:
3 moppings Certain-teed "STEEP" Roofing Asphalt. 90 lbs.

Nails:
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.

Total Weight of Roof:
Applied Roof..... 154 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 506

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 506. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.



10 YEAR ROOF

Over Concrete or Poured Gypsum—SPECIFICATION NO. 507

Roof Incline ½" to 12" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Primer:
1 coat Certain-teed Liquid Asphalt Primer..... 8 lbs.

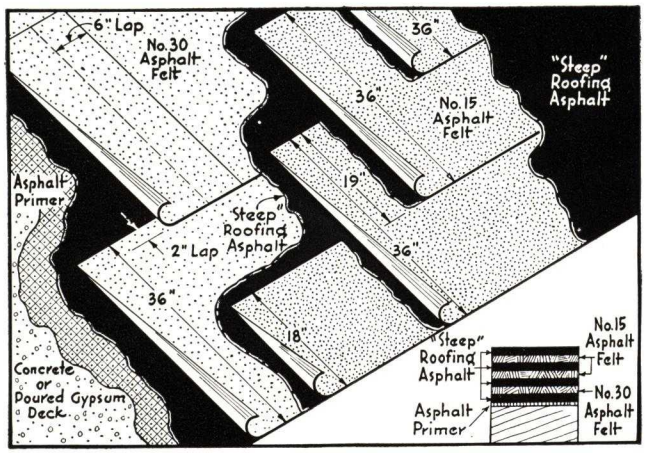
Asphalt Felt:
1 layer Certain-teed 30 lb. Asphalt Felt..... 32 lbs.
2 layers Certain-teed 15 lb. Asphalt Felt..... 32 lbs.

Asphalt:
4 moppings Certain-teed "STEEP" Roofing Asphalt. 120 lbs.

Total Weight of Roof:
Applied Roof..... 192 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 507

Certain-teed Asphalt Felt and Certain-teed Roofing Asphalt shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 507. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.



10 YEAR ROOF

TARRED FELT AND PITCH — GRAVEL OR SLAG SURFACED

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 517

Roof Incline Up to 2" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Sheathing Paper:
1 layer Certain-teed Sheathing Paper (Unsaturated) 5 lbs.

Tarred Felt:
4 layers of No. 15 Certain-teed Tarred Felt..... 64 lbs.

Pitch: Certain-teed Coal Tar Pitch..... 125 lbs.

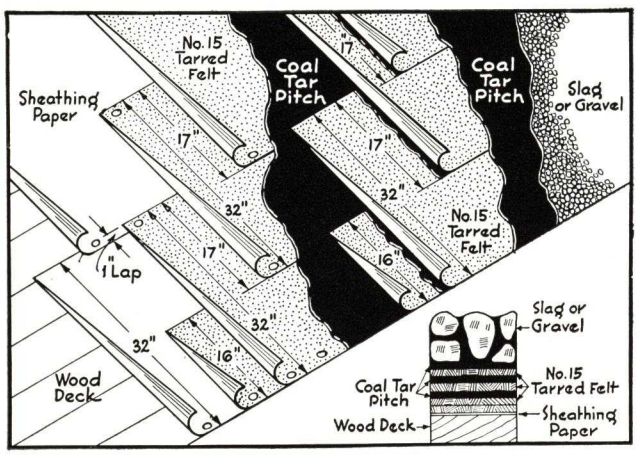
Nails:
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.

Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.

Total Weight of Roof:
Gravel Surfaced.....594 lbs.; Slag Surfaced..... 494 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 517

Certain-teed Tarred Felt and Certain-teed Coal Tar Pitch shall be applied over Wood Sheathing or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 517. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

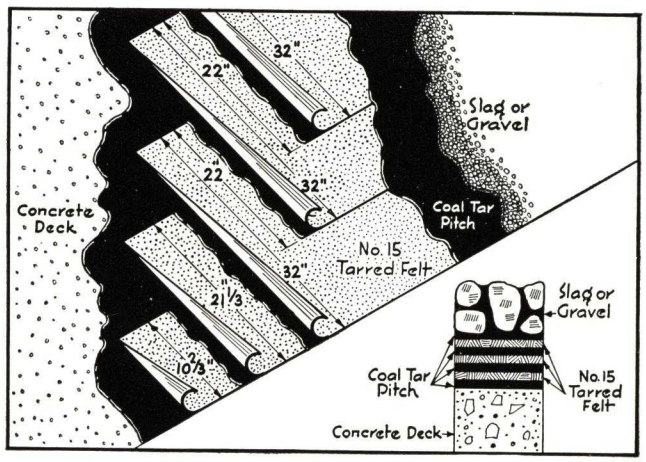


15 YEAR ROOF

TARRED FELT AND PITCH — GRAVEL OR SLAG SURFACED (Continued)

Over Concrete or Poured Gypsum—SPECIFICATION NO. 514

15 YEAR ROOF



Roof Incline Up to 2" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Tarred Felt:
3 layers of Certain-teed No. 15 Tarred Felt..... 48 lbs.

Pitch:
Certain-teed Coal Tar Pitch..... 175 lbs.

Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.

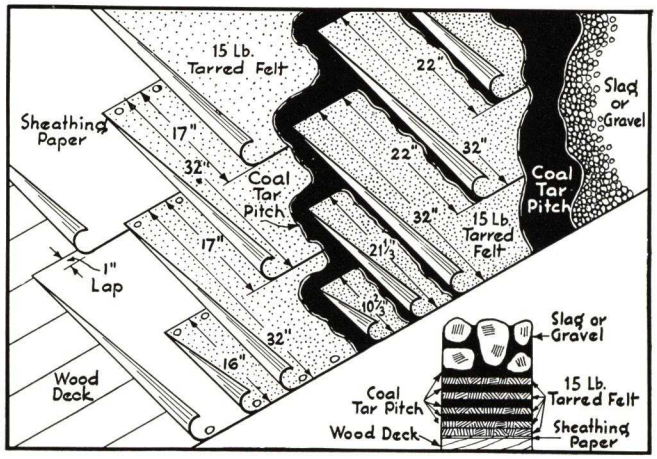
Total Weight of Roof:
Gravel Surfaced..... 623 lbs.; Slag Surfaced..... 523 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 514

Certain-teed Tarred Felt and Certain-teed Coal Tar Pitch shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Roof Specification No. 514. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

Over Wood Sheathing or Precast Gypsum—SPECIFICATION NO. 513

20 YEAR ROOF



Roof Incline Up to 2" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Sheathing Paper:
1 layer Certain-teed Sheathing Paper (Unsaturated) 5 lbs.

Tarred Felt:
5 layers No. 15 Certain-teed Tarred Felt..... 80 lbs.

Pitch:
Certain-teed Coal Tar Pitch..... 150 lbs.

Nails:
For Wood, use 1" Simplex Nails or 1" Large Head Roofing Nails. For Gypsum, use 1½" cut nails through flat tin discs.

Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.

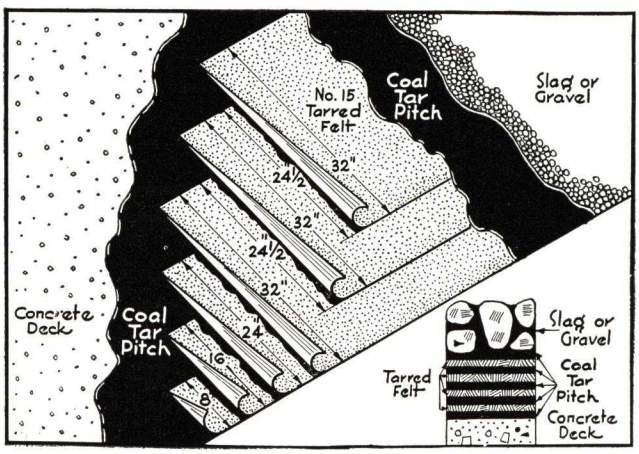
Total Weight of Roof:
Gravel Surfaced..... 635 lbs.; Slab Surfaced..... 535 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 513

Certain-teed Tarred Felt and Certain-teed Coal Tar Pitch shall be applied over Wood or Precast Gypsum in accordance with Certain-teed Built-up Roof Specification No. 513. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

Over Concrete or Poured Gypsum—SPECIFICATION NO. 512

20 YEAR ROOF



Roof Incline Up to 2" per Foot

BILL OF MATERIALS PER 100 SQUARE FEET

Tarred Felt:
4 layers of Certain-teed No. 15 Tarred Felt..... 64 lbs.

Pitch:
Certain-teed Coal Tar Pitch..... 200 lbs.

Surfacing:
Gravel, standard ¼" to ⅝" size..... 400 lbs.
Slag, standard ¼" to ⅝" size..... 300 lbs.

Total Weight of Roof:
Gravel Surfaced.....664 lbs.; Slag Surfaced..... 564 lbs.

CONDENSED BUILT-UP ROOF SPECIFICATION NO. 512

Certain-teed Tarred Felt and Certain-teed Coal Tar Pitch shall be applied over Concrete or Poured Gypsum in accordance with Certain-teed Built-up Roof Specification No. 512. Surety Bond will be furnished on jobs where Certain-teed Roof Inspection Service is available.

BASE AND COUNTER FLASHINGS

For Certain-teed 20 and 15 Year Built-up Roofs

SPECIFICATION NO. 524

GENERAL

Certain-teed Flashing Specifications are approved and specified for use in connection with Certain-teed Built-up Roofs. Special requirements not covered by these specifications may be eligible for approval upon submission of details to the CERTAIN-TEED PRODUCTS CORPORATION, New York, N. Y.

Surety Bond—When these flashings are used in connection with Certain-teed Bonded Built-up Roofs, the CERTAIN-TEED PRODUCTS CORPORATION will issue a Surety Bond on the flashing for the same period of years as the built-up Roofing Bond is issued. Write for details.

Materials and Labels—All roofing materials used in Certain-teed flashings shall be as manufactured or approved by the CERTAIN-TEED PRODUCTS CORPORATION and shall be delivered to the job in their original packages bearing the manufacturer's registered labels.

Cant Strips—Cant strips shall be of material which will permit nailing, shall extend up vertical surfaces at least 4 in. and the face of the cant strip shall have an incline of approximately 45 degrees. No vents or other pipes or braces shall be constructed through nor within 12 in. of the cant strip.

Raggle Blocks or Forms—Raggle blocks or forms shall be built into the walls so that the lower edge of the opening is approximately 6 in. above the roof deck surface.

Preparation of Surfaces — All concrete, brick and other masonry surfaces to be covered with Certain-teed Base and Counter Flashing, also including the surfaces of the opening in raggle blocks and forms, shall be dry and free from dust and dirt and shall be given one continuous coat of Certain-teed Asphalt Primer.

Masonry walls to be covered with Certain-teed Flashings shall be properly waterproofed at the top and sides or through wall to prevent seepage behind flashing.

End Laps—All felts and roofing used in construction of base flashing shall be lapped at least 6 in. in the direction of the downward slope of the roof.

Note: **Complete the specification by adding one of the following Types (A, B, C or E).**

SPECIFICATION NO. 524—TYPE A
Mineral Surfaced Felt Base Flashing; Metal Counter Flashing

Roof Base—All felts and cap sheets of roofing shall be carried over the cant strips, turned up 2 in. on, but not sealed to, all vertical surfaces, and shall be nailed 8 in. on centers along a line 1½ in. down from the top edge of the cant strip.

Base Flashing — After priming as specified, the surfaces to be covered with Certain-teed Flashings shall be uniformly mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded three layers of 15-lb. Asphalt Felt. Each sheet shall be embedded without wrinkles or buckles in the hot asphalt so that no place shall felt touch felt, and shall start at a horizontal line 5 in. above the top edge of the cant strip and shall extend down and out horizontally on the roof 2 in., 4 in. and 6 in. respectively.

The surface of these felts shall then be uniformly mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded one layer of 90 lb. Mineral Surfaced Roofing in the hot asphalt so that at no place shall felt touch felt. This Mineral Surfaced Roofing shall extend over the cant strip and out horizontally 6 in. on the roof and be securely nailed along its top edge every 8 in. into the brick mortar joints. The finish roof coat of gravel or slag and asphalt or pitch shall then be carried over the base flashing to the bottom of the cant.

Counter Flashing — The counter flashings shall be 3 lb. lead or 16 oz. cornice temper copper with both edges folded or re-turned upon themselves at least ½ in. and with ends lapped 4 in. but not soldered. The lower edge shall overlap the base flashing at least 4 in. and shall be parallel to the roof line.

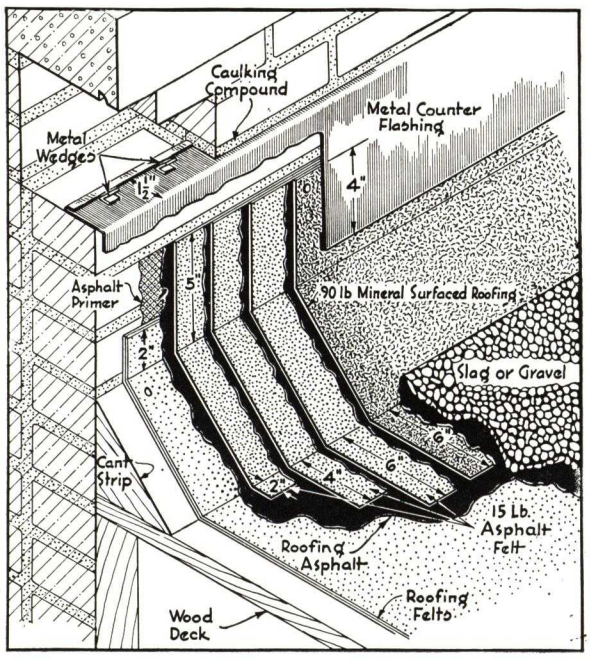
The top edge shall be entered at least 1½ in. into the first brick joint above the counter flashing, shall be secured with metal wedges not more than 12 in. apart, pointed solidly in place and the reglet shall then be filled with Plastic Cement.

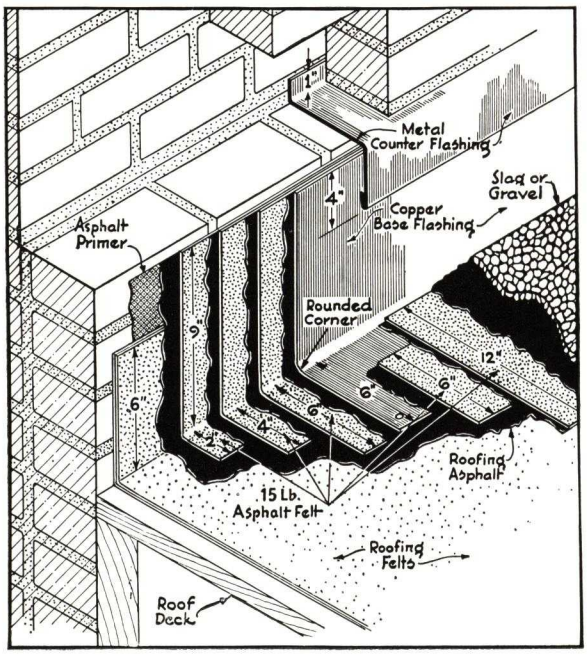
SPECIFICATION NO. 524—TYPE B
Metal Base Flashing; Metal Counter Flashing

Roof Base—All layers of felt used in the construction of the Built-up Roof shall be turned up 6 in. on, but not sealed to, all vertical surfaces.

Base Flashing—After priming as specified, the surfaces to be covered with Certain-teed Flashings shall be uniformly mopped with hot "STEEP" Asphalt (heated to approximately 400°

NO. 524—TYPE A FLASHING





NO. 524—TYPE B FLASHING

BASE AND COUNTER FLASHINGS (Continued)

SPECIFICATION NO. 524—TYPE B (Continued)

F.) into which, while hot, shall be embedded three layers of 15 lb. Asphalt Felt. Each sheet shall be embedded without wrinkles or buckles in the hot asphalt so that at no place shall felt touch felt, and shall start at a horizontal line 9 in. above the roof deck and shall extend down and out horizontally on the roof 2 in., 4 in. and 6 in., respectively. Felts shall be nailed along their top edge every 8 in. into the brick mortar joints.

The surface of these felts shall then be uniformly mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded sheets of 3 lb. lead or 16 oz. cornice temper copper laid with 4 in. end laps mopped in hot asphalt but not soldered. This metal base flashing shall extend down and out horizontally 6 in. on the roofing and shall be securely nailed 8 in. on centers along a line 1 in. in from the bottom edge into nailing strip on roof deck. The angle formed in the flashing shall not be sharply bent but shall be rounded.

Two layers of 15 lb. Asphalt Roofing Felt, 6 in. and 12 in. wide, respectively, shall be laid to project equally on each side of bottom edge of base flashing. These felts shall be laid without wrinkles or buckles in hot asphalt and shall be covered with a uniform mopping of hot asphalt on completion. Over this shall then be applied the finished coat of the roof.

Counter Flashing—The counter flashings shall be 3 lb. lead or 16 oz. cornice tempered copper with both edges folded or re-turned upon themselves at least ½ in. and with ends lapped 4 in. but not soldered. The lower edge shall overlap the flashing at least 4 in. and shall be parallel to the roof line.

The top edge of the flashing shall be turned up at right angles to form a lip 1 in. high back of the first course of brick above the counter flashing and shall be built in as the masonry work progresses.

SPECIFICATION NO. 524—TYPE C
Mineral Surfaced Felt Base and Counter Flashing

Roof Base—All felts and cap sheets of roofing shall be carried over the cant strips, turned up 2 in. on, but not sealed to, all vertical surfaces, and shall be nailed 8 in. on centers along a line 1½ in. down from the top edge of the cant strip.

Base Flashing—After priming as specified, the surface to be covered with Certain-teed Flashings shall be uniformly mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded three layers of 15 lb. Asphalt Felt. Each sheet shall be embedded without wrinkles or buckles in the hot asphalt so that at no place shall felt touch felt, and shall start at a horizontal line 5 in. above the top edge of the cant strip and shall extend down and out horizontally on the roof 2 in., 4 in. and 6 in., respectively. Felts shall be nailed along their top edge every 8 in. into the brick mortar joints. The wall surface above the edge of these felts and extending onto the top of the wall 6 in. under the coping shall be mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded one layer of 90 lb. Mineral Surfaced Roofing in the hot asphalt so that at no place shall felt touch felt. This Mineral Surfaced Roofing shall extend from a point 2 in. from the outer face of the wall, down the wall surface over the cant strip and out 6 in. horizontally on the roof. Over this shall then be applied the finished coat of the roof to the bottom of the cant.

If the wall is more than 36 in. high measured from the roof deck, a sheet of 30 lb. Asphalt Felt shall be mopped over the wall and cant strip before the 90 lb. Mineral Surfaced Roofing is mopped in place.

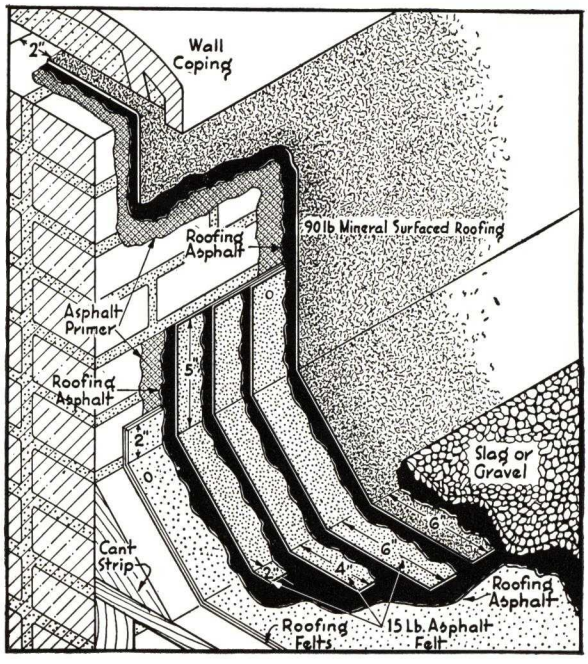
SPECIFICATION NO. 524—TYPE E
Flashing with Raggle Blocks or Metal Forms

Roof Base—All felts and cap sheets of roofing shall be carried over the cant strips and cut off evenly on a line 1 in. from the lower edge of the opening in the raggle block.

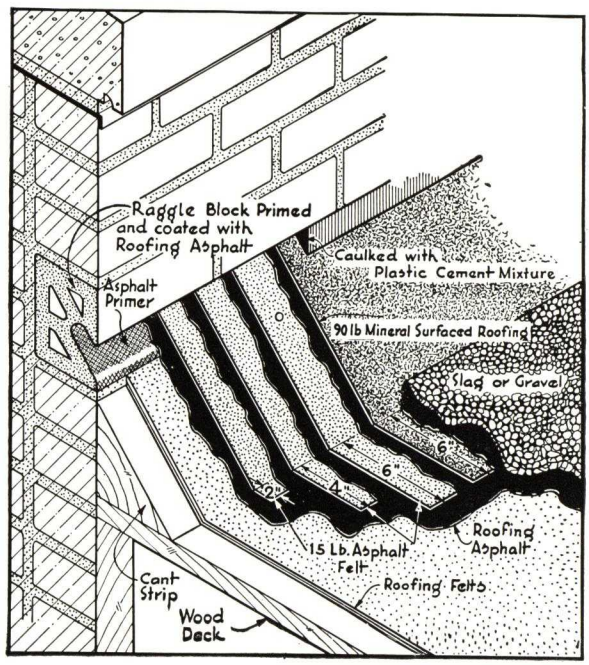
Base Flashing—After priming the raggle blocks as specified, apply Certain-teed Plastic Cement in the openings and uniformly mop the surfaces to be covered with Certain-teed Flashings with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded three layers of 15 lb. Asphalt Felt. Each sheet shall be embedded without wrinkles or buckles in the hot asphalt so that at no place shall felt touch felt, and shall start from the top of the opening in the raggle block and shall extend down and out horizontally on the roof 2 in., 4 in. and 6 in., respectively. Felts shall be nailed every 8 in. along a line 1½ in. down from the top edge of the cant strip, shall then be uniformly mopped with hot "STEEP" asphalt (heated to approximately 400° F.) into which, while hot, shall be embedded one layer of 90 lb. Mineral Surfaced Roofing in the hot asphalt so that at no place shall felt touch felt.

After flashing has been otherwise completed the opening in the raggle block shall be carefully caulked with Plastic Cement with approximately 25% Portland Cement.

NO. 524—TYPE C FLASHING



NO. 524—TYPE E FLASHING



For Certain-teed 10 Year Built-up Roofs

SPECIFICATION NO. 528

Refer to General Note Below Specification No. 524

SPECIFICATION NO. 528—TYPE G
Felt Base Flashing; Fabric Counter Flashing

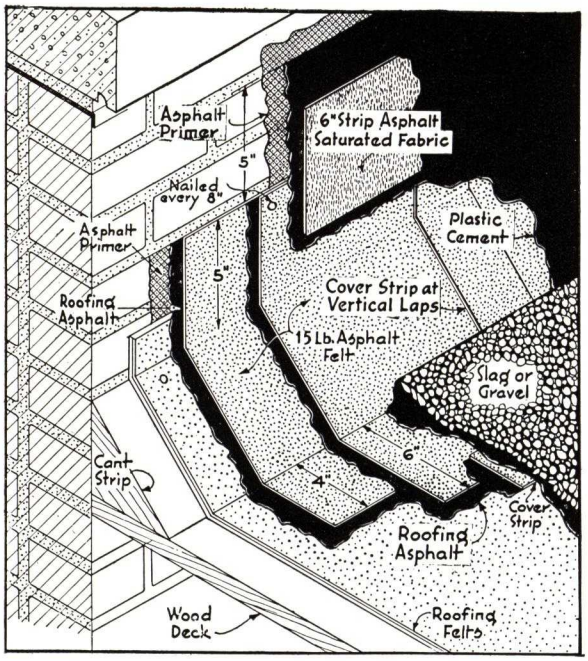
Roof Base—All felts and cap sheets of roofing shall be carried over the cant strips, turned up 2 in. on, but not sealed to, all vertical surfaces and shall be nailed on 8-in. centers along a line 1½ in. down from top edge of cant strip.

Base Flashing—Embed two layers of 15 lb. Asphalt Felt in hot "STEEP" asphalt extending from a horizontal line 5 in. above the top edge of the cant strip and out on the roofing 4 in. and 6 in. respectively. Nail the top edges of the felts every 8 in. Cover the bottom edge and all vertical laps with a 6 in. strip of 15 lb. Asphalt Felt embedded in hot "STEEP" asphalt or Plastic Cement. Then apply a uniform coat of Certain-teed Plastic Cement over the base flashing from the bottom of the cant up and on the primed wall 5 in. above the top of the base flashing.

Cap Flashing—In the Plastic Cement embed a 6 in. wide strip of Asphalt Saturated Fabric extending 3 in. above and below the top edge of the base flashing. Nail the top edge of the fabric every 8 in. Then cover the fabric strip with a uniform coat of Plastic Cement.

Completing the Flashing—After flashings have been otherwise completed, the finish roof coat on roof deck shall be carried over the base flashing to the bottom of cant.

NO. 528—TYPE G FLASHING



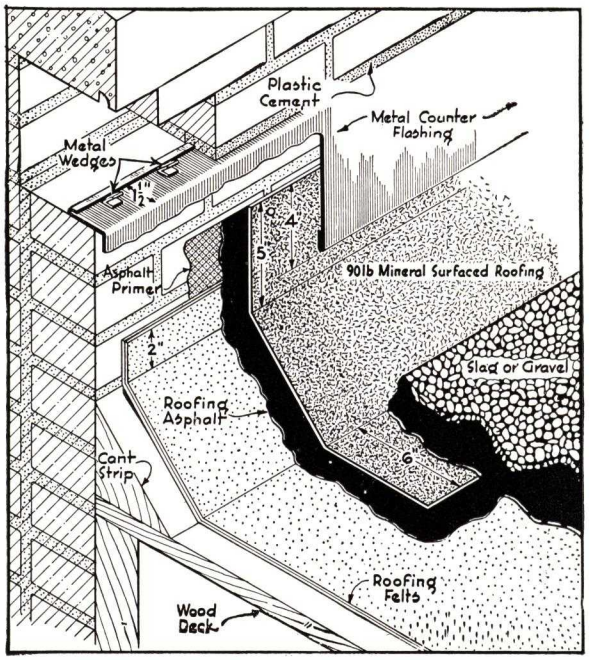
SPECIFICATION NO. 528—TYPE H
Mineral Surfaced Felt Base; Metal Counter Flashing

Base Flashing—Embed one layer of 90 lb. Mineral Surfaced Roofing in hot "STEEP" asphalt, starting in a horizontal line 5 in. above the top edge of the cant strip and extending out horizontally 6 in. on the roofing. Nail the top edge every 8 in.

Counter Flashing—Shall be 3 lb. Lead or 16 oz. Copper with the top edge re-turned upon itself at least ½ in. The top edge of the Counter Flashing shall be entered at least 1½ in. into the first brick joint above the base flashings and secured with metal wedges 12 in. apart, pointed solidly in place with Plastic Cement. The lower edge of the Counter Flashing shall overlap the flashing at least 4 in. End laps shall be 4 in. but not soldered.

Completing the Flashing—After the flashings have been otherwise completed, the finish roof coat on roof deck shall be carried over the base flashing to the bottom of cant.

NO. 528—TYPE H FLASHING

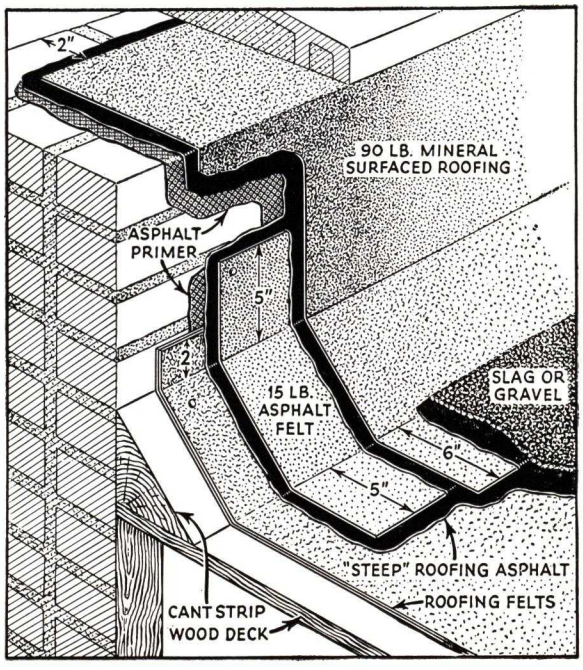


SPECIFICATION NO. 528—TYPE J
Mineral Surfaced Roofing Under Coping

Base Flashing—Embed a layer of 15 lb. Asphalt Felt in hot "STEEP" asphalt starting in a horizontal line 5 in. above the top edge of the cant strip and extending out horizontally 6 in. on the roofing. Then embed one layer of 90 lb. Mineral Surfaced Roofing in hot "STEEP" asphalt, covering the wall on top to a point within 2 in. of the outer face of the wall, and down the inner face of the wall and out 6 in. horizontally on the roof. Set coping in place in usual manner.

Completing the Flashing—After flashings have been otherwise completed, the finish roof coat on roof deck shall be carried over the base flashing to the bottom of cant.

NO. 528—TYPE J FLASHING



6/5

CERTAIN-TEED

PRODUCTS

FOR BETTER BUILT-UP ROOFS

ASPHALT PRIMER

FLAT ROOFING ASPHALT

STEEP ROOFING ASPHALT

20 POUND SHEATHING PAPER

15 POUND ASPHALT FELT

30 POUND ASPHALT FELT

44 POUND 19" SELVAGE EDGE MINERAL SURFACED ROOFING

55 POUND 19" SELVAGE EDGE MINERAL SURFACED ROOFING

90 POUND MINERAL SURFACED ROOFING

PLASTIC CEMENT

ASBESTOS ROOF COATING

ASPHALT SATURATED FABRIC

COAL TAR PITCH

15 POUND TARRED FELT

CERTAIN-TEED PRODUCTS CORPORATION

General Offices

100 EAST 42nd STREET

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BALTIMORE, MD.
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CLEVELAND, OHIO
DALLAS, TEXAS
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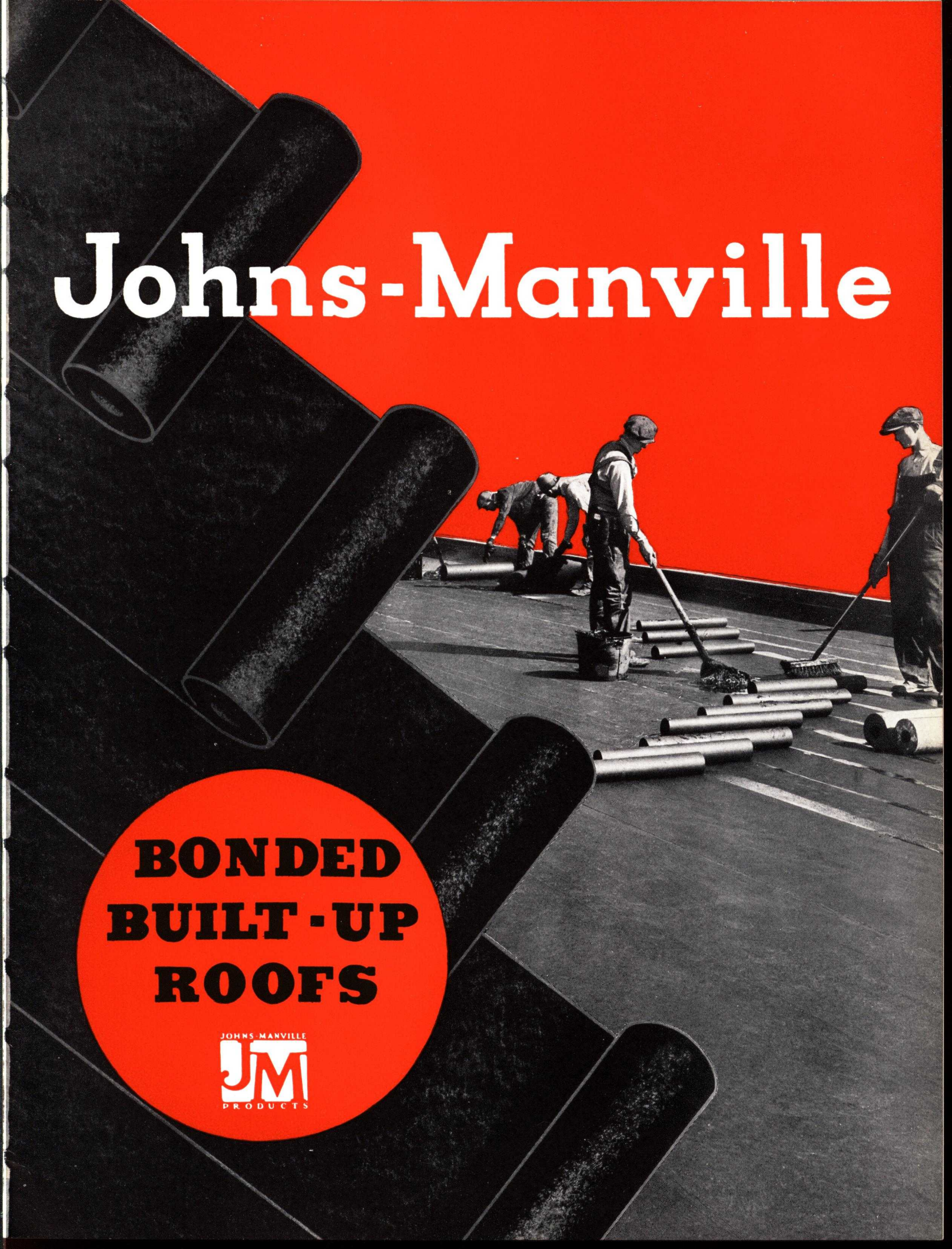
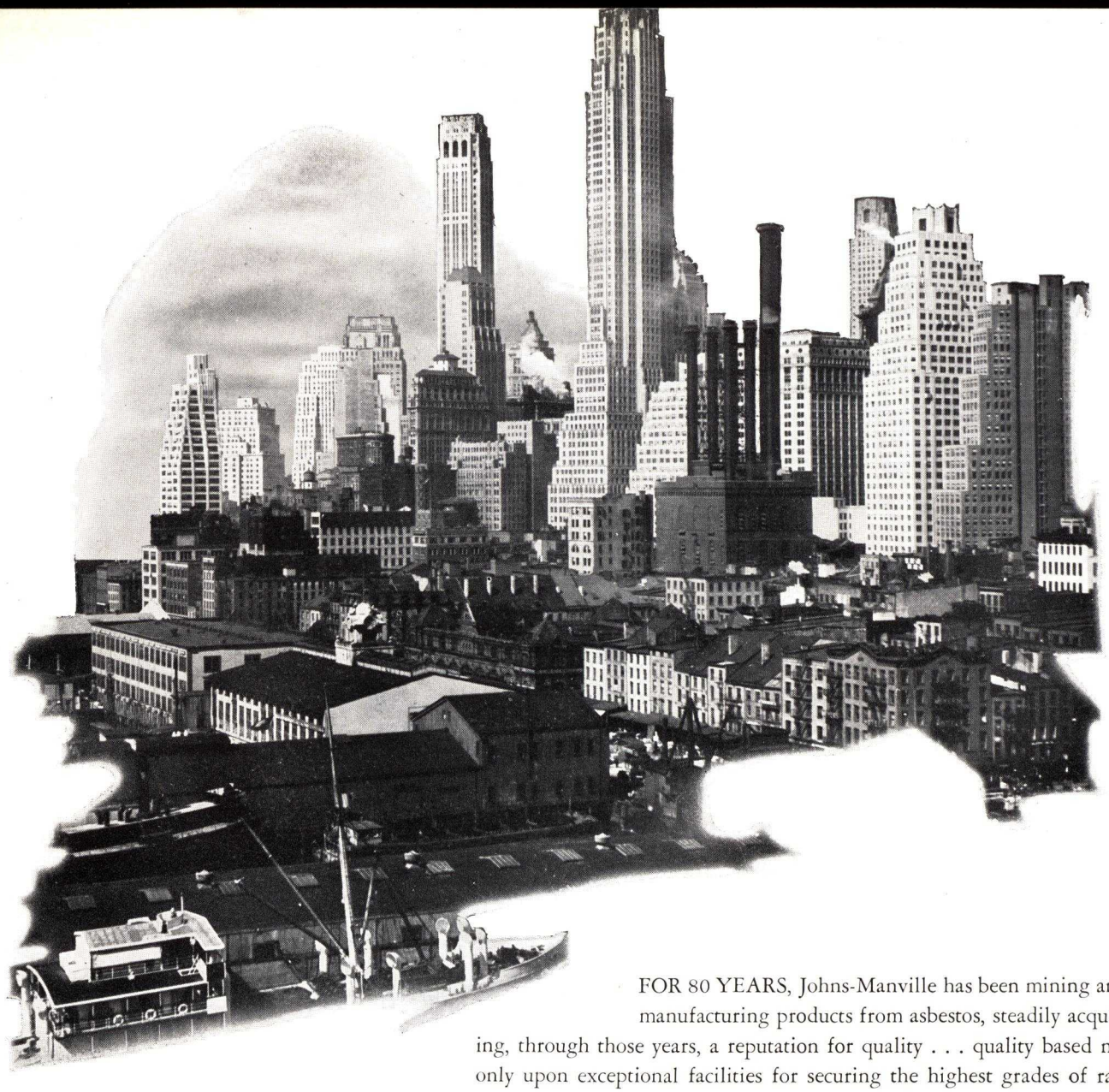
Johns-Manville



BONDED BUILT-UP ROOFS

JOHNS-MANVILLE
JM
PRODUCTS



FOR 80 YEARS, Johns-Manville has been mining and manufacturing products from asbestos, steadily acquiring, through those years, a reputation for quality . . . quality based not only upon exceptional facilities for securing the highest grades of raw material . . . as one would expect from the largest asbestos mine in the world . . . but also the quality which results from years of research and experience in fabricating asbestos in its eleven huge factories throughout the United States.

For sixty of those 80 years, Johns-Manville has combined the facilities of a great mine with the expert knowledge and skill of a large manufacturer in the making of asbestos roofings, controlling every step from mine to market, to the distinct advantage of every present or prospective user of a Johns-Manville Built-up Roof.

In the pages which follow are discussed the inherent qualities which make a roof dependable, long-lived and fire-resistant, and the lasting benefits which will accrue from proper materials, properly applied.

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Johns-Manville Corporation

Johns-Manville

22 East 40th Street, New York, N. Y.

Offices in All Large Cities

JOHNS-MANVILLE *Complete* BUILT-UP ROOF SERVICE

REALIZING that no one type of built-up roof can be acceptable or usable under all conditions, and recognizing the factor of individual preference, Johns-Manville has developed a number of different types of built-up roofs and is in a position to furnish a roof to meet practically any condition or personal preference.

The various standard J-M Built-Up Roofs are tabulated and condensed specifications given on pages 12 and 13, with ratings of the Underwriters' Laboratories, Inc. The roofs are classified on the basis of quality, the kind and slope of deck, the type of felt, finish, etc. Detailed individual specifications begin on page 14.

SMOOTH-SURFACED ASBESTOS BUILT-UP ROOFS

While Johns-Manville furnishes built-up roofs of every type, the smooth-surfaced asbestos roof is recommended as the one best designed to stand up under all conditions and to give complete, trouble-free protection for the life of the building.

J-M Smooth-surfaced Asbestos Built-up Roofs are the outcome of several decades of study and experience in producing durable, fireproof, weatherproof, lightweight roofs at a moderate cost. They are suitable for practically every type of industrial building, warehouse, office building, hotel, hospital and apartment house.

They are built up of alternating layers of asphalt-saturated asbestos felt and roofing asphalt.

J-M Asbestos Felts, with which J-M Bonded Asbestos Roofs are built up, will not support combustion even when impregnated and coated with asphalt. The Underwriters' Laboratories, Inc., give Class A ratings to many different types of J-M Asbestos Roofs. They are fire-resistant to the highest degree.

J-M Bonded Roofing Asphalt—a relatively recent development in asphalt processing which has proved to be far superior to ordinary asphalts—is used on all J-M Bonded Asbestos Roofs. Tests at the Johns-Manville Research Laboratories at Manville, N. J., have demonstrated that the unusual ability of J-M Bonded Asphalt to stand up under all conditions of service will add years to the life of the roof.

ADDITIONAL J-M BONDED ROOFS

In addition to Asbestos Roofs, Johns-Manville also supplies Combination Roofs, composed of a rag base felt and asbestos finishing felts, and a complete line of Slag or Gravel-surfaced Roofs, using tar-saturated asbestos felts, tar-saturated rag felts, or asphalt-saturated rag felts. These types of J-M Bonded Roofs are also included in the tables on pages 12 and 13.

APPROVED ROOFING CONTRACTORS INSPECTION . . BONDS . . ENDORSEMENTS

As the best results are obtained only when the proper roofing is correctly laid, Johns-Manville has appointed Approved Roofing Contractors throughout the country, whose appointments have been based upon experience, integrity and financial responsibility.

J-M INSPECTIONS ARE AVAILABLE

Johns-Manville maintains a corps of inspectors whose services are available in connection with bonded built-up roofs. This service is required in connection with every roof which is to be bonded, both before, during and after application.

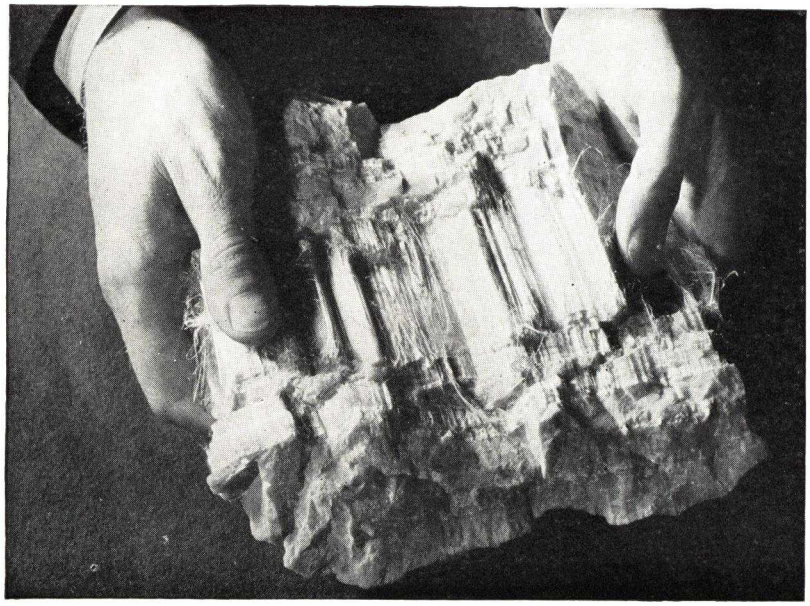
BOND BY NATIONAL SURETY CORP.

All Johns-Manville Built-up Roofs, except on the Pacific Coast, will, when desired, be covered by a bond of National Surety Corp., guaranteeing the performance of the particular roof for a period of from ten to twenty years, depending on the type of roof applied. This bond is issued only on roofs laid by Johns-Manville Approved Roofing Contractors and in connection with Johns-Manville inspection service.

10-YEAR FLASHING ENDORSEMENT

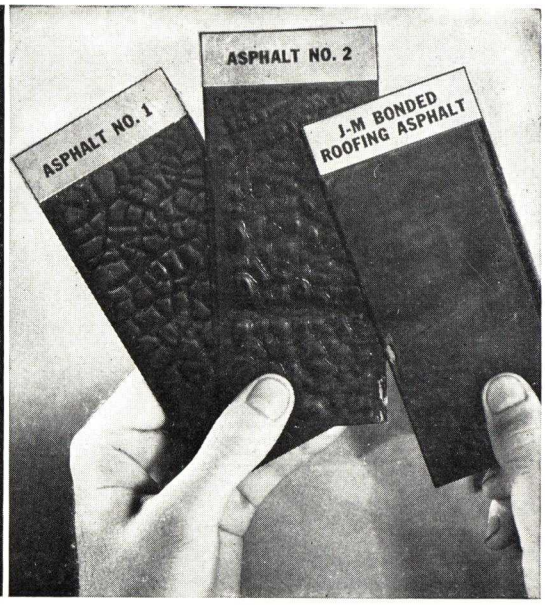
Where Johns-Manville Flashing Materials are used in conjunction with Johns-Manville Roofing, a ten-year flashing endorsement will be attached to and become part of the bond, under the same conditions as are imposed for the roof.

Complete protection afforded



ASBESTOS

Asbestos—fibres of stone—fireproof, rotproof, enduring — the base of a good built-up roof. Crude asbestos fibres are here shown still attached to the serpentine rock matrix



WEATHERING TEST ON ASPHALT

After water, heat and cold were played on these samples of roofing asphalt for the equivalent of 10 years of actual weathering, J-M Bonded Roofing Asphalt (right) was still apparently as good as new

J-M Smooth-surfaced Asbestos Built-up Roofs give the best assurance of roof permanence

SINCE the primary purpose of a roof is permanent protection from the elements, it is obvious that a good roof must not only shed water, it must *stay* waterproof. And, for permanence, it must also be proof against fire and decay.

Scientific research has found no waterproofing agent better than asphalt, which has been proved to be less brittle at low temperatures and less fluid at high temperatures than any other known waterproofing material. Yet there are many kinds and grades of asphalt. In the effort to secure the permanence requisite in a good roofing asphalt, J-M research engineers have developed a processed asphalt known as J-M Bonded Roofing Asphalt, which has shown marked superiority over all other asphalts ordinarily used for such purpose.

TESTS ON J-M BONDED ROOFING ASPHALT

In a series of accelerated tests by machine weathering, the J-M Laboratories subjected samples of Bonded Roofing Asphalt and other commercial asphalts to alternating cycles of exposure to heat, rain and sub-zero temperature, equivalent to ten years of actual service. Although the samples were practically identical in appearance before testing, the illustration at the right shows how J-M Bonded Asphalt stood up when the others failed. It is this unusual permanence which led to the adoption of J-M Bonded Roofing Asphalt as the waterproofing agent in J-M Bonded Built-up Roofs.

However, even the best asphalt cannot, alone, make a good roof. There must be a flexible reinforcement, durable and non-combustible, which can itself be impregnated with asphalt to keep it waterproof, and which at the same time will protect the asphalt from its one cause of deterioration — the drying-out action of the sun. Asbestos felt meets these requirements exactly.

ASBESTOS USED IN J-M ROOFING FELTS

Centuries ago it was found that asbestos fibres could be woven into a fireproof cloth, but only during the past 80 years has it become commercially useful. Today this basic material is used in brake lining for automobiles and trucks because it is the only fibrous material that will not burn or disintegrate under high temperatures. For the same reason, it is used in woven form in asbestos theater curtains, fire-fighting suits, gloves, etc. In combination with portland cement it is made into rigid asbestos roofing, siding and shingles, corrugated Transite for roofing and siding, pipe and underground conduit, electrical barriers, etc.

As used in built-up roofing, the asbestos fibres are first felted and then impregnated with asphalt, making a *flexible stone roofing material, imperishable and fireproof.*

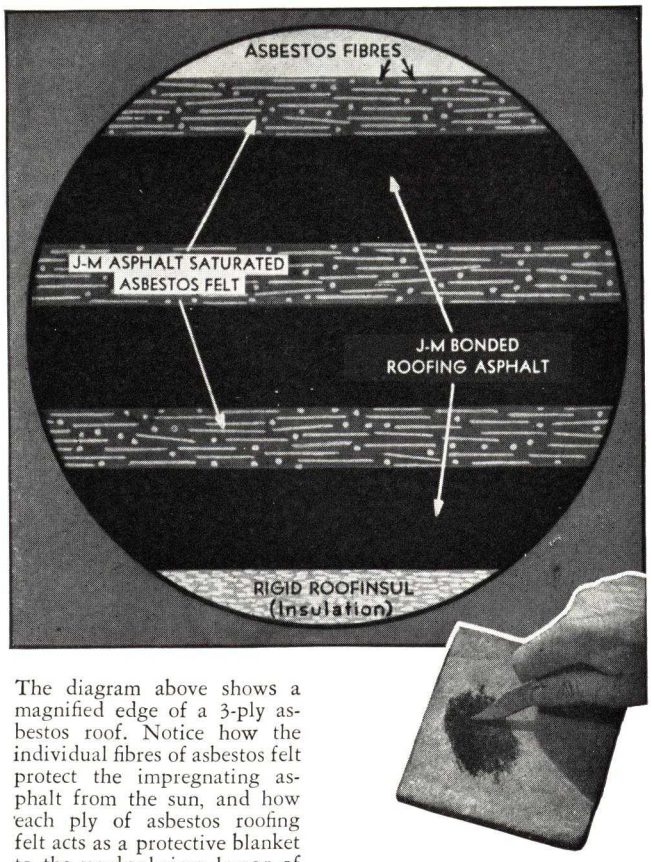
by J-M Bonded Built-up Roofs

HOW THE WATERPROOFING ASPHALT IS PRESERVED BY ASBESTOS FELT

THE characteristic difference between asbestos fibre and all other natural fibres is that asbestos fibre is a solid filament, not a hollow tube. There can be no capillary action through it. This makes asbestos felt highly difficult to impregnate, since the waterproofing must be forced between and around the fibres, coating them and filling all the interstices, rather than their soaking it up with the blotterlike effect of organic fibres.

But this very lack of capillary action and consequent resistance to impregnation is the source of the protection which asbestos felt affords the vital waterproofing asphalt, once the felt is impregnated with it. The essential oils of the asphalt are protected from evaporation due to the continuous drying-out action of the sun, which so rapidly deteriorates other types of roofing, and the asbestos built-up roof *stays* waterproof. The accompanying diagram illustrating the security afforded by asbestos felt is self-explanatory.

When the asbestos felt has been impregnated with J-M Bonded Roofing Asphalt, and Bonded Roofing Asphalt used as the cementing layer between the plies of felt forming the built-up roof, the asphalt is preserved in practically its original condition. The result is a smooth-surfaced roof that *stays* waterproof for years, with minimum upkeep.



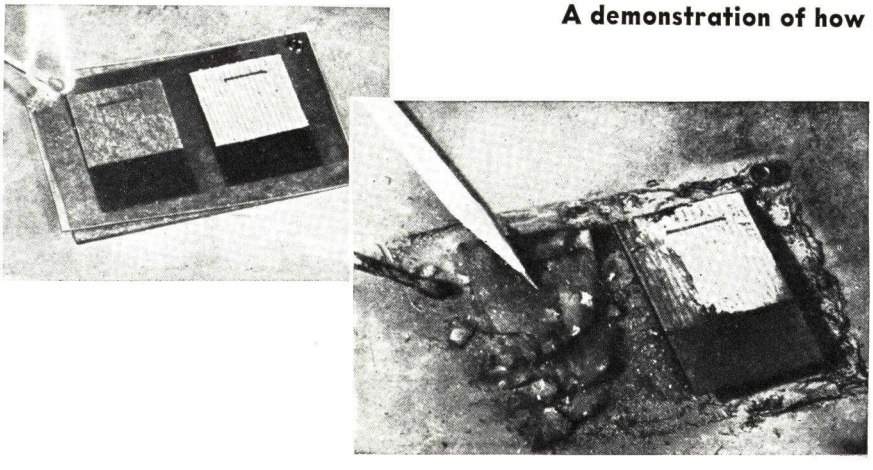
The diagram above shows a magnified edge of a 3-ply asbestos roof. Notice how the individual fibres of asbestos felt protect the impregnating asphalt from the sun, and how each ply of asbestos roofing felt acts as a protective blanket to the underlying layer of waterproofing asphalt. (At right) If you scrape the gray surface of an asbestos roof with a pen-knife, the black asphalt appears below. You can repeat this test a dozen times in the same spot and obtain the same results

PROOF AGAINST FIRE AND DECAY

But asbestos does more than merely protect from weather. Asbestos is fire-proof and rot-proof and thus adds the other two essentials to roof permanence. Its very existence—in the oldest igneous rocks—proves its endurance against the destructive forces of fire, time and the elements.

Asbestos felt is virtually felted fibres of stone. It cannot decay; it will not burn. Exhaustive tests by the Underwriters' Laboratories, which included exposure to radiant heat, burning brands and direct flame, have proved that asbestos felt, even when impregnated and coated with asphalt as used in a J-M Built-Up Roof, will not support combustion. J-M Asbestos Roofs are so fire-resistant that, in every type, there will be found roofs that carry the Underwriters' Class A rating, which takes the base rate of insurance.

A demonstration of how Asbestos Felt resists fire



You can make this experiment in your own office with a J-M Roofing "Sandwich." This consists of pieces of J-M Asbestos Felt and rag felt stapled between sheets of a highly inflammable material. Lay the "sandwich" on a fireproof surface and light it. Instantly it bursts into flame. In a few seconds it goes out—yet in that time the organic rag felt is reduced to ashes, while the enduring mineral J-M Asbestos Felt remains, slightly sooty perhaps, but unharmed. A "sandwich" for this test will be promptly mailed on request at any Johns-Manville office.

9 Advantages of a J-M Smooth-Surfaced Asbestos Roof

1 PROVED BY TEST OF TIME

The lasting qualities of a Johns-Manville Smooth-surfaced Asbestos Roof are clearly demonstrated on pages 8 and 9 in which are listed actual installations of this type of roof which have withstood the elements for 20 years or more.

2 CAN BE APPLIED TO EVERY ROOF WHICH WILL DRAIN WATER

We do not recommend the use of dead level roof decks. Roof decks should be graded to proper drains to prevent possibility of areas which will not drain. Undrained spots become unhealthful and breeding grounds for mosquitoes, as well as creating unequal exposures of different parts of the roof surface to the elements which creates the likelihood of unequal strains developing in the surface.

3 NO PROTECTIVE COVERING NEEDED

Asbestos Roofing Felts do not require the use of slag or gravel for the protection of the asphalt and the felts. The asbestos in the felt prevents the sun from causing the deterioration or drying-out of the asphalt in and between the felts.

4 HIGHLY FIRE-RESISTANT

The J-M 20-Year Smooth-surfaced Asbestos Roof is given a Class A rating, and the similar J-M 15-Year Roof a Class B rating, by the National Board of Fire Underwriters.

5 DECAY-PROOF

Asbestos felts, being made from rock fibre and asphalt, can not decay. The roof built up from these felts and asphalts will withstand heat and cold and the constant destructive action of the elements under all conditions.

6 LEAKS EASILY LOCATED

An unforeseen accident or unusual expansion and contraction of the roof deck may damage any roof surface and cause it to leak. With a J-M Smooth-surfaced Asbestos Roof, any such damaged areas can be quickly located.

7 EASY TO REPAIR

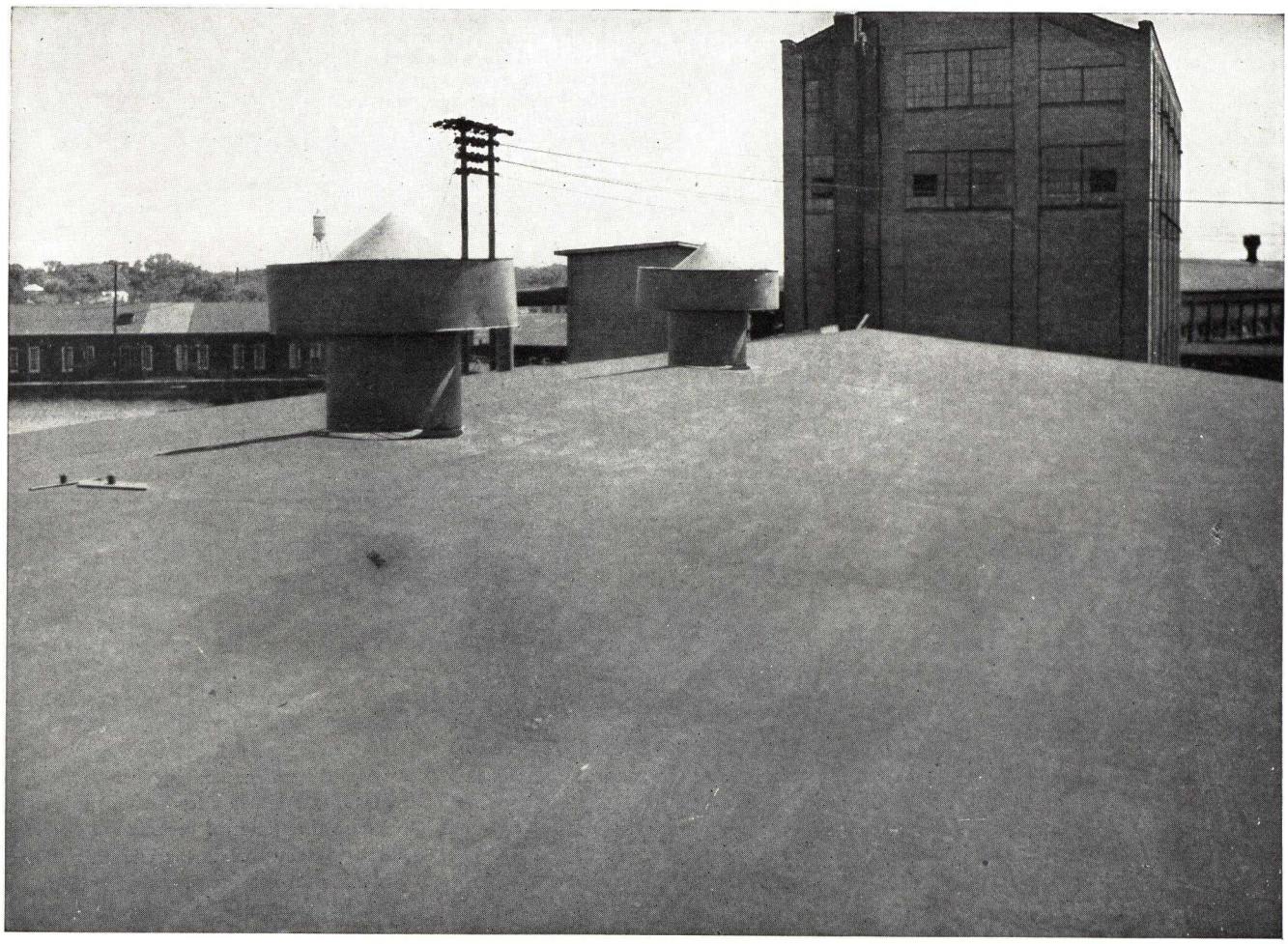
The construction of J-M Smooth-surfaced Asbestos Roofs is such that repairs can be made quickly and inexpensively.

8 NO EXCESSIVE WEIGHT

The smooth-surfaced asbestos felt roof finish does not require the protection of slag or gravel, therefore saving in the construction necessary to support the weight of such materials.

9 FIRST COST IS LAST COST FOR WATERPROOFING

Everything included in the built-up roof construction is a waterproofing in itself.



J-M Smooth-surfaced Asbestos Roof on the plant of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin.

The Critical Part of a Roof is the Flashing

MORE than at any other place on a roof, a leak is apt to occur at the junction formed by the roof deck and a vertical surface, such as a parapet wall, skylight curb or wall of an adjacent building. Most roof decks are separate units from these vertical surfaces and are constructed of different materials. There is a natural weakness at the angle, due to shrinkage of the material, expansion or contraction, or other movement of the building.

In addition to this it must be remembered that a parapet wall stands up above the roof where driving rain beats against it from both sides as well as the top. Consequently, the wall absorbs a certain amount of moisture. For this reason it is most desirable that the flashing should go all the way through the wall. This method isolates the roof deck and keeps water from seeping down through the wall and under the roofing.

APPLICATION OF ROOFING AND FLASHING SHOULD BE TWO DISTINCT OPERATIONS

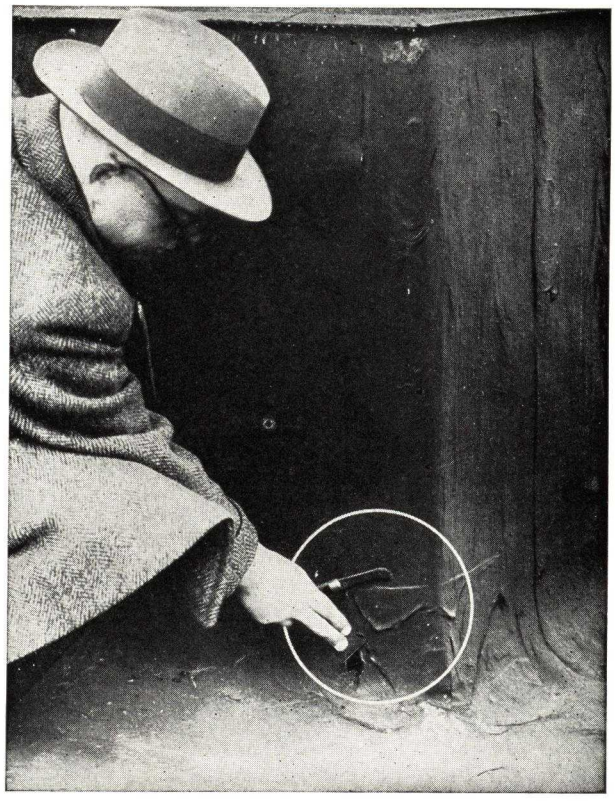
Johns-Manville has designed several types of flashing so that any of the different conditions encountered in a roof can be handled successfully. In designing these flashings, the application of roofing and flashing have definitely been made two separate operations. The laying of the roofing felts should be completed before applying the flashing. Before any work is done, a "cant strip" or "V"-shaped piece of lumber or other nailing base is installed at the angle formed by the roof and the vertical surface, so that instead of a sharp angle there is formed a gradual slope.

J-M FLASHING BECOMES A PART OF THE WALL

Johns-Manville Asbestos Flashing Felts are made from the same basic materials as the asbestos roofing felts. The waterproofing or cementing agent is Johns-Manville Asbestile, a heavy-bodied, plastic cement composed of asbestos fibres, asphalt and other mineral ingredients, which hardens after application and *becomes a part of the wall itself.*

"THROUGH-THE-WALL" FLASHING PROVIDES GREATER PROTECTION THAN ANY OTHER KIND

A Johns-Manville Asbestos Flashing Felt is first applied to the wall with asphalt and turned out over the finished roof to form the *base* flashing. This felt must be nailed to the wall. The edge of the flashing felt *on the roof* is then reinforced with felt strips. The *cap* flashing is then installed. This consists of running one asbestos felt and one ply of saturated fabric from a point one inch back from the front face of the wall, through the wall, over a key, and then extending down the wall, lapping the top of the base felt, all applied with Asbestile. This forms a complete seal for the roof structure.



More leaks occur at the flashing than at any other part of a roof. THROUGH-THE-WALL FLASHING is the safest known method of providing a permanently weather-tight job at this vulnerable point.

Naturally, there must be variations of this "through-the-wall" method of flashing in order to take care of different methods of construction and different materials. In the case of a concrete parapet wall, where it is impossible to go through the wall itself, the cap flashing is carried up over the concrete wall and under the coping. In cases where metal cap flashing is used, the Johns-Manville base flashing is installed as described above and the metal cap flashing should go through the wall, for adequate protection.

IMPORTANCE OF FLASHING EMPHASIZES NEED FOR COMPETENT APPLICATION

It is obvious that inferior or short-cut methods of flashing will weaken the entire roof from a waterproofing standpoint. This is another reason why such care is taken in selecting Johns-Manville Approved Roofing Contractors. They will apply the flashing in accordance with Johns-Manville recommendations, assuring leakproof, fireproof roofs at every point.

Detailed specifications and drawings on the Johns-Manville System of Flashing will be found on pages 33 to 35.

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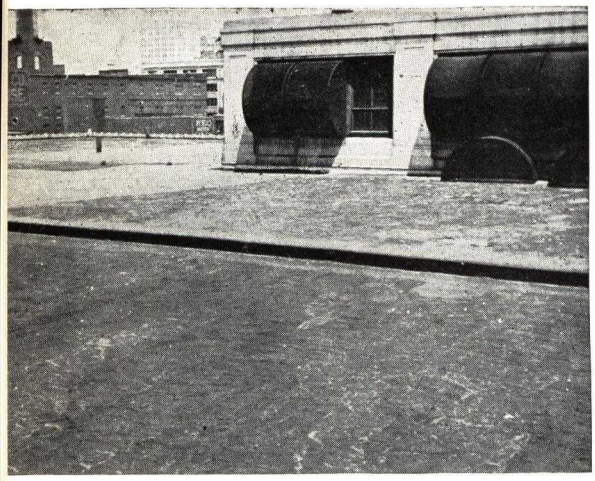
Some J-M Asbestos Roofs which are still in



A 25-YEAR OLD AT KANSAS CITY, MO.

In 1912, this J-M roof was applied on the building of the Kansas City Star. Says the owner, "Certain portions are subjected to foot traffic, but it has given excellent service with practically no cost for repairs or maintenance."

A 25-YEAR OLD AT CHICAGO, ILL.

This J-M Asbestos Roof was laid in 1913 for Reid, Murdock & Company, 325 No. La-Salle St. The roof has given very satisfactory service.

A 25-YEAR OLD AT SOUTH BEND, IND.

This J-M Smooth-surfaced Asbestos Roof has been protecting the Oliver Farm Equipment Company factory for a full quarter of a century.

Johns-Manville Smooth-surfaced Asbestos Built-up Roofs have an unusual performance record, as evidenced by the nineteen roofs illustrated or listed on these two pages. Every one of these roofs has had a service life of 20 years or longer . . . and all are still in good condition.

Note the pleasing gray appearance of the roofs. As has been explained on page 5, this gray surface is the top-most layer of the asbestos fibres in the asbestos felt which blankets the vital waterproofing asphalt and protects it from the deteriorating action of the sun.

In addition to the roofs illustrated, among the many other Johns-Manville roofs with service records of 20 years or more, are the following typical examples:

A 36-YEAR OLD

At Newark, N. J.

Building No. 4 of General Leather Company. Says Chief Engineer Krill, "During that entire period it has not required any maintenance whatever."

THREE 25-YEAR OLDS

At San Francisco, Cal.

The J-M Smooth-surfaced Asbestos Roof on the John Deere Plow Company plant was applied in 1912—and is still giving satisfactory service.

At Detroit, Mich.

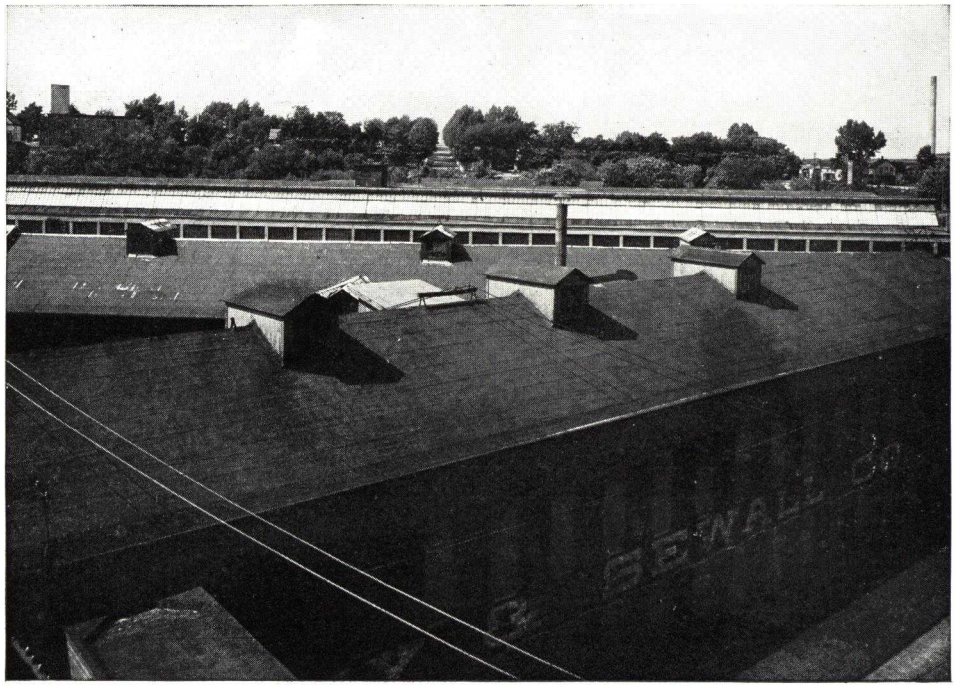
Detroit Baseball Company reports, "Your asbestos roofs were installed in 1912 on right and left field pavilions at Navin Park. They have withstood weather and the added punishment of thousands of baseballs striking them. The material appears in good condition."

At Louisville, Ky.

American Medicinal Spirits Company writes, "The performance more than speaks for itself."

BELOW . . . A 20-YEAR OLD AT WATERTOWN, N. Y.

Bagley and Sewall Company report that their J-M Smooth-surfaced Asbestos Roofs appear to be in condition to last many years longer.



their prime, though more than 20 years old

FOUR 24-YEAR OLDS

At Seattle, Wash.

The roof of the Bell Street Dock, Port of Seattle, is still in good condition, although it was applied as long ago as 1913.

At Bluefield, W. Va.

Huff, Andrews and Thomas Company writes about their J-M roof, "Except for some shovel cuts caused by the removal of snow last winter, it is in excellent condition. . . . Overhead expense has been reduced to a minimum. . . . Anticipate many more years of service on this roof."

At Chicago, Ill.

Sears, Roebuck & Co. (Grocery Building) report two 24-year old J-M Asbestos Roofs still "in good condition."

At Los Angeles, Cal.

Agent for Brockman Building reports "repairs to J-M roofs have probably not exceeded $10 during all this time." Roof applied in 1913.

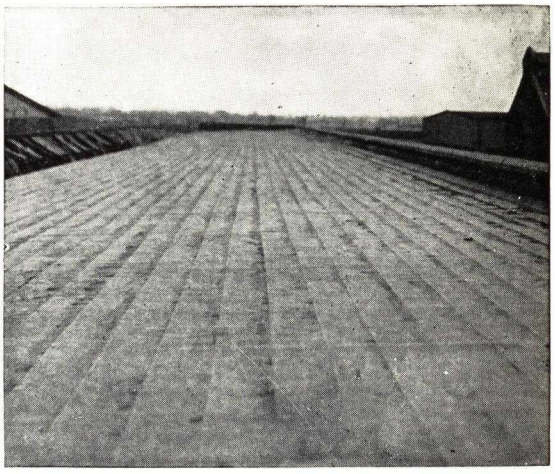
TWO 23-YEAR OLDS

At Seattle, Wash.

The world war had just started when a J-M roof was applied on the Lincoln High School in Seattle. The asbestos felts are in splendid shape today.

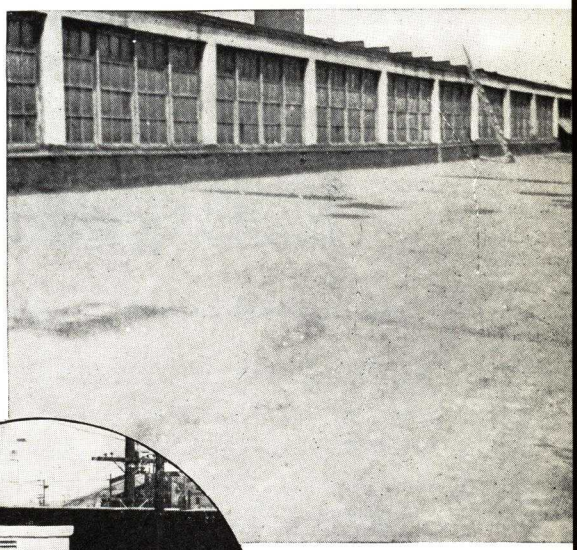
At Los Angeles, Cal.

New Method Laundry states that their J-M roof "has given continuous service and is still in excellent condition."



A 27-YEAR OLD AT BEACH GROVE, IND.

This J-M Smooth-surfaced Asbestos Roof was applied in 1910. The photograph shows that it is still in good condition and will undoubtedly give many more years of satisfactory service.



A 24-YEAR OLD AT DETROIT, MICH.

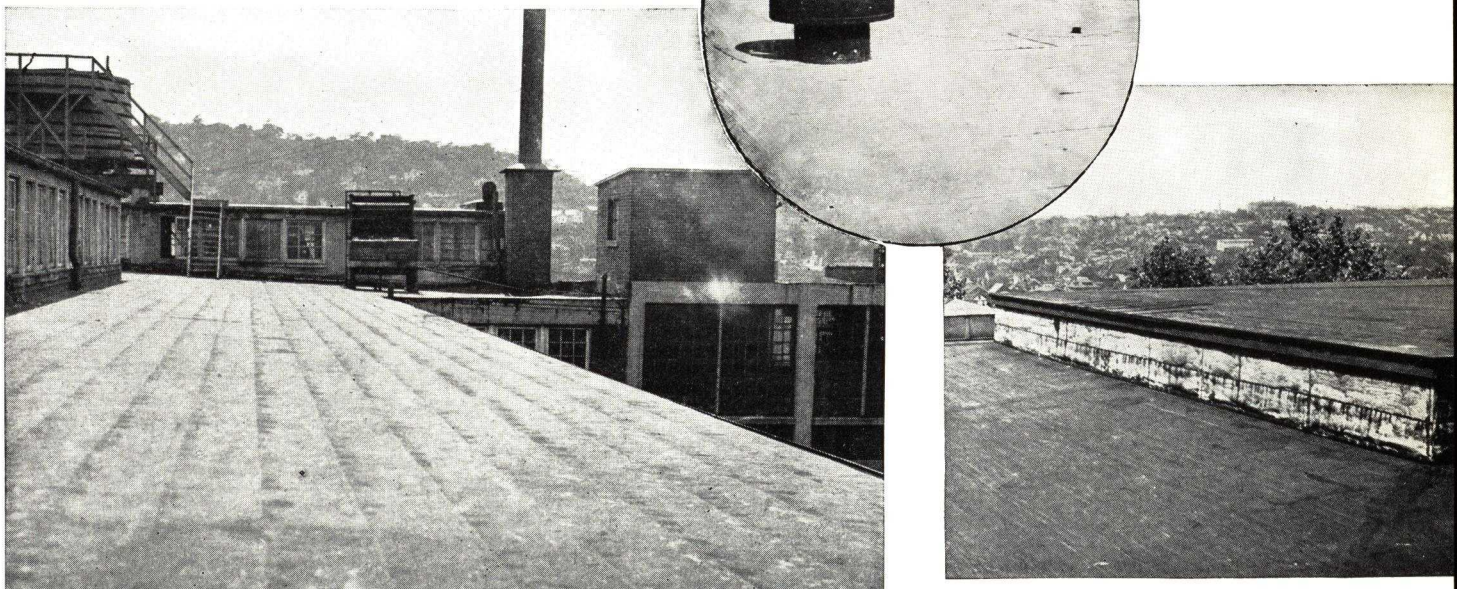
In 1913 a J-M Asbestos Roof was laid for the Enterprise Foundry Company. And now they state, "This roof looks good for many more years."

IN CIRCLE—A 22-YEAR OLD AT LOS ANGELES, CAL.

On March 4, 1915, this J-M roof was laid on the warehouse of the Hauser Packing Company. "Good for many more years of service."

BELOW—A 24-YEAR OLD AT CINCINNATI, OHIO

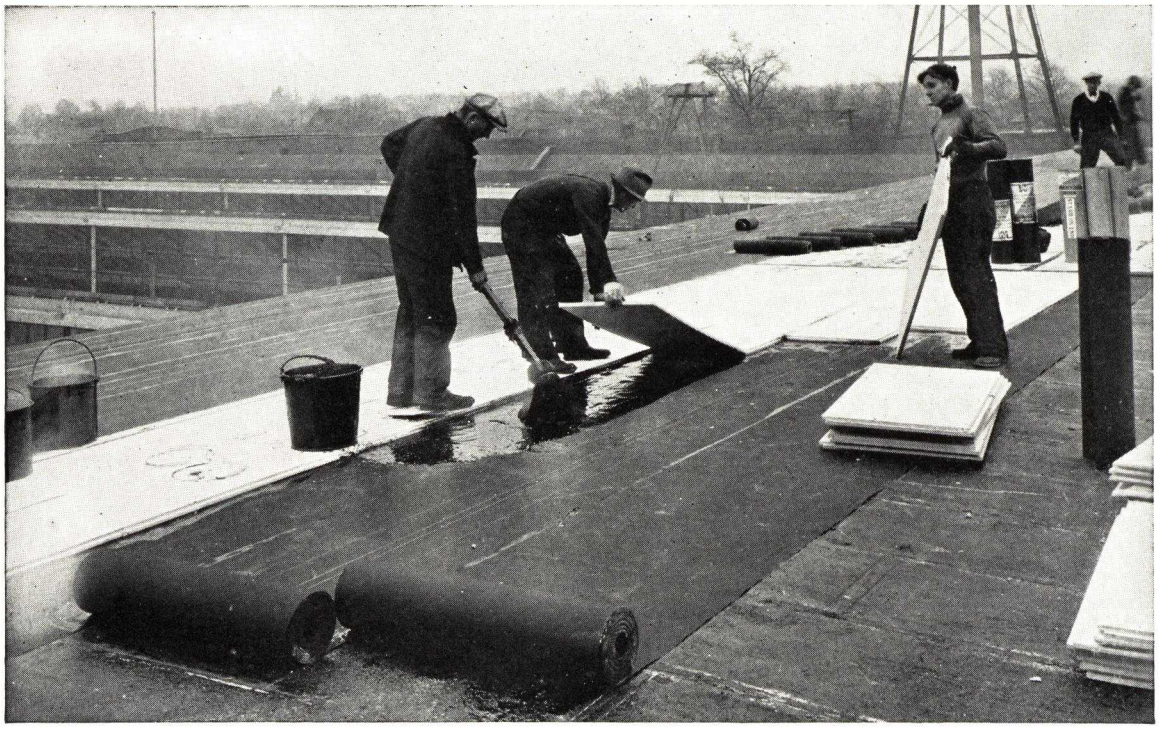
"Nearly a quarter of a century," says the American Valve and Meter Company of their J-M Smooth-surfaced Asbestos Roof.



A 20-YEAR OLD AT SEATTLE, WASH.

Meany Hall, University of Washington, is protected by this J-M Smooth-surfaced Asbestos Roof, in good condition after 20 years.

6 Good Reasons for specifying a



APPLYING J-M ROOFINSUL

Roof insulation not only saves fuel and assures comfortable interior temperatures, but also protects both the roof deck and the built-up roof itself

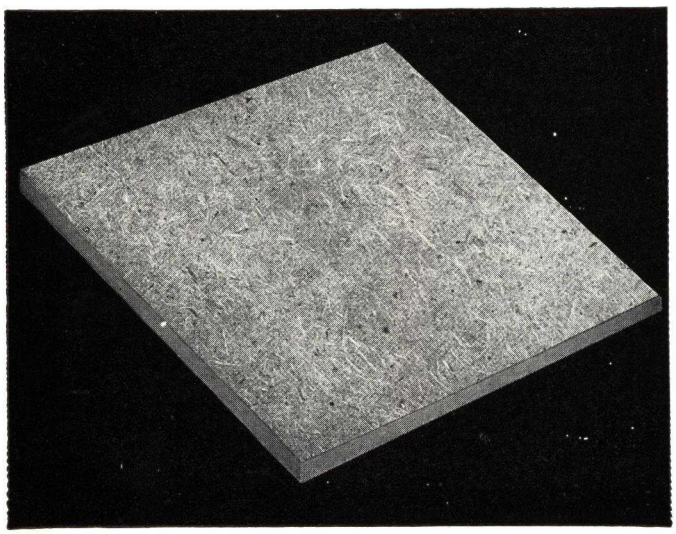
JOHNS-MANVILLE ROOFINSUL

Light in Weight — High in Insulating Value

J-M Roofinsul was designed especially for use as insulation over roof decks, principally under J-M Bonded Asbestos Built-up Roofs. It is light in weight and has a high insulating value, and is also rigid and structurally strong. J-M Roofinsul has a high resistance to moisture absorption. It lasts for years in the open and, when covered with a J-M Bonded Asbestos Roof, will last as long as the roof itself.

Any desired number of layers of J-M Roofinsul can be installed to give any needed insulating efficiency, without adding appreciably to the weight of the roof.

J-M Roofinsul is furnished 24″ x 48″. The standard thickness is ½″. If sheets of greater thickness than ½″ are desired, two or more sheets are stapled together, with a ¾″ ship-lap joint on all four edges. Weight approximately 0.8 lb. per sq. ft., ½″ thick.



EFFICIENT, STRONG J-M ROOFINSUL

Heat Losses in Roof Construction for Insulated and Uninsulated Roofs

Type of Roof	*Thickness of J-M Roofinsul*	*Heat Loss in B.t.u. per sq. ft., per deg. F. temperature difference per hour*
7/8″ wood deck and smooth-surfaced built-up roof	None	.533
	½″	.296
	1″	.205
	1½″	.157
	2″	.127
1⅝″ wood deck and smooth-surfaced built-up roof	None	.381
	½″	.242
	1″	.178
	1½″	.140
	2″	.116
4″ concrete and smooth-surfaced built-up roof	None	.676
	½″	.336
	1″	.223
	1½″	.167
	2″	.134
5″ concrete and smooth-surfaced built-up roof	None	.625
	½″	.323
	1″	.217
	1½″	.164
	2″	.132

J-M Roofinsul-insulated Roof

1. Prevents Condensation and Roof Drip

J-M Roofinsul prevents condensation on the under side of the deck and eliminates discoloration of ceilings and the annoyance and damage caused by roof drip.

Regardless of how carefully a wood deck may be constructed, vapors penetrate the planking, condense on the underside of the built-up roof and rot starts at the top, unseen, and works down. While the problem of rot can be eliminated by the use of concrete, that of condensation and roof-drip remains.

When air comes in contact with a cooler surface, such as the underside of a roof, its temperature is lowered. If the temperature of the surface is below the dew point of the water vapor in the air, the excess moisture is deposited on the surface as condensation. Insulation of the proper thickness will keep the temperature of the surface above the dew point and prevent the deposition of moisture.

2. Protects Deck against Rot and Corrosion

By preventing condensation, J-M Roofinsul protects the deck against rot and corrosion. When the deck is of concrete or other non-combustible material, it reduces the danger of cracking (commonly caused by sudden temperature changes) and thereby tends to prevent moisture from reaching the reinforcing steel members.

3. Prevents Damage to Roofing Felts through deck movement

J-M Roofinsul protects the roofing felts themselves. All roof decks will move, to some extent, under temperature changes. When this cycle of alternate expansion and contraction continues over a long period of time, any cracks in the deck may eventually be transmitted to the built-up roof unless there is an intervening layer of insulation. J-M Roofinsul not only minimizes movement of the deck by keeping its temperature more uniform, but also provides sufficient resiliency to take up strains, due to any movement which does occur, and prevent their transmission to the felts, thus prolonging the life of the roof.

4. Provides Closer Interior Temperature Control

J-M Roofinsul permits closer control over interior temperatures both in summer and winter, assuring more comfortable, uniform working conditions throughout the year. Uniform interior temperatures are also a vital necessity in the operation of many modern industrial processes.

5. Improves Working Conditions

Insulation with J-M Roofinsul effectively retards the passage of heat through the roofs, thus saving on fuel and air conditioning bills. See the heat loss table on the opposite page.

6. Lowers Heating And Air-Conditioning Costs

On new construction, J-M Roofinsul makes it possible to reduce considerably the investment in heating and air conditioning equipment. And on either new or old buildings, it appreciably lowers operating costs on such equipment.

DECAY FROM MOISTURE CONDENSATION

Moisture condensation and the resultant decay made the removal of these old wood decks imperative. J-M Roofinsul would have prevented this expense

Index and Condensed Specifications for

Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	J-M Specification Number	Page No.	Surface	Number of Plies and Kind of Felt	Number of Moppings Asphalt [A] or Pitch [P]	Weight of Materials, in Pounds per Square: Sheathing Paper	Felts: Asbestos	Felts: Rag	Asphalt	Pitch	Roof Coating	Gravel	Slag	Total Weight per Square, in Pounds: Smooth Surface or Crushed Slate	Gravel Surface	Slag Surface	Underwriters' Rating
WITHOUT INSULATION																		
WOOD or PRE-CAST GYPSUM DECK																		
Smooth Surface																		
¼ to 9	20	100	14	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	115	—	90	—	8	—	—	213	—	—	A
¼ to 9	15	103	14	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	95	—	60	—	8	—	—	163	—	—	A
¼ to 9	15	200	15	Smooth	One No. 45 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	40	50	60	—	8	—	—	158	—	—	—
¼ to 9	10	202	15	Smooth	One No. 30 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	40	33½	60	—	8	—	—	141½	—	—	—
¼ to 9	20	205	△	Smooth	One No. 45 Asphalt-Saturated Rag Felt Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	50	90	—	8	—	—	208	—	—	—
Gravel or Slag Surface																		
¼ to 2	20	300	16	Gravel or Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	81	145	—	—	400	300	—	626	526	A
¼ to 2	15	304	16	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-3	—	—	65	115	—	—	400	300	—	580	480	A
2 to 4	10	301	17	Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	81	150	—	—	—	250	—	—	481	A*
¼ to 2	20	600	**17	Gravel or Slag	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felts	P-4	5	—	81	—	150	—	400	300	—	636	536	A
¼ to 2	15	604	**18	Gravel or Slag	One ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-3	5	—	65	—	125	—	400	300	—	595	495	A
2 to 6	10	601	**18	Slag	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felts	P-4 A-1	5	—	81	45	60	—	—	250	—	—	441	A*
Crushed Slate Surface																		
1 to 4	10	402	△	Crushed Slate	Three 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-4	—	—	149	120	—	—	—	—	269	—	—	C
4 to 9	10	400	△	Crushed Slate	Two 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-2	—	—	133	60	—	—	—	—	193	—	—	C
NON-COMBUSTIBLE DECK (except Pre-cast Gypsum or Steel)																		
Smooth Surface																		
¼ to 9	20	101	22	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	95	—	90	—	8	—	—	193	—	—	A
¼ to 9	15	201	22	Smooth	One No. 45 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	40	50	90	—	8	—	—	188	—	—	—
¼ to 9	10	203	23	Smooth	One No. 30 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	40	33½	90	—	8	—	—	171½	—	—	—
Smooth Surface under Promenade Tile																		
¼ to ½	20	112	△	Smooth	Two plies Rosin-Sized Paper Four 20-lb. Asphalt-Saturated Asbestos Felts	A-5	10	80	—	160	—	—	—	—	—	250	—	—
¼ to 1	§	612	**27	Smooth	Five 15-lb. Tar-Saturated Asbestos Felts	P-6	—	81	—	—	200	—	—	—	—	281	—	—
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2†	20	602	**26	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2†	15	605	**26	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A
2 to 6‡	10	603	**27	Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-4 A-1	—	65	—	45	65	—	—	250	—	—	425	A*
Crushed Slate Surface																		
1 to 4	10	403	△	Crushed Slate	Three 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-5	—	—	149	150	—	—	—	—	299	—	—	C
4 to 9	10	401	△	Crushed Slate	One 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-3	—	—	116	90	—	—	—	—	206	—	—	C
			33 to 35		**J-M BASE and CAP FLASHING**													

△ Complete specification not included in this catalog but furnished on request.
* Class A Underwriters' rating on pitches up to and including 3" per foot.
† ¼" to 2" over Poured Gypsum Decks; ¼" to 1" over Book Tile or Poured or Precast Concrete Decks.
‡ 2" to 6" over Poured Gypsum Decks; 1" to 6" over Poured Concrete Decks.
§ Bond term on application.

**** Available, also, employing rag felt instead of asbestos felt. See note appended to the specification on the page number indicated.**

Note:
No roof bonds are issued on the Pacific Coast.

Johns-Manville Bonded Built-up Roofs

Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	J-M Specification Number	Page No.	Surface	Number of Plies and Kind of Felt	Number of Moppings Asphalt [A] or Pitch [P]	Weight of Materials, in Pounds per Square: Sheathing Paper	Felts: Asbestos	Felts: Rag	Asphalt	Pitch	Roof Coating	Gravel	Slag	Total Weight per Square, in Pounds: Smooth Surface or Crushed Slate	Gravel Surface	Slag Surface	Underwriters' Rating
WITH INSULATION																		
APPLICATION OF INSULATION																		
		500	31	Application of J-M Roofinsul Over Wood Decks														
		501	32	Application of J-M Roofinsul Over Non-Combustible Decks														
		502	32	Application of J-M Roofinsul Over Steel Decks														
WOOD or PRE-CAST GYPSUM DECK																		
Smooth Surface																		
¼ to 9	20	104	19	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
¼ to 9	15	106	19	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	B
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2	20	606	**20	Gravel or Slag	One Ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-5	5	65	—	—	175	—	400	300	—	645	545	A
¼ to 2	15	608	**21	Gravel or Slag	One Ply Rosin-Sized Paper (over wood only) Three 15-lb. Tar-Saturated Asbestos Felts	P-4	5	49	—	—	150	—	400	300	—	604	504	B
2 to 6	10	610	**21	Slag	One Ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-3 A-1	5	65	—	45	105	—	—	250	—	—	470	A*
NON-COMBUSTIBLE DECK (except Pre-cast Gypsum or Steel)																		
Smooth Surface																		
¼ to 9	20	105	23	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
¼ to 9	15	107	24	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	A
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2□	20	607	**28	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2□	15	609	**29	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A
2 to 6‡	10	611	**29	Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-3 A-1	—	65	—	45	94	—	—	250	—	—	454	A*
STEEL DECK																		
Smooth Surface																		
½ to 9	20	108	30	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
½ to 9	15	109	30	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	—
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
¼ to 2□	20	607	**28	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2□	15	609	**29	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A

* Class A Underwriters' rating on pitches up to and including 3" per foot.
□ ¼" to 2" over Poured Gypsum Decks; ¼" to 1" over Poured Concrete Decks.
‡ 2" to 6" over Poured Gypsum Decks; 1" to 6" over Poured Concrete Decks.

**** Available, also, employing rag felt instead of asbestos felt. See note appended to the specification on the page number indicated.**

Note: No roof bonds are issued on the Pacific Coast

SPECIFICATION No. 100

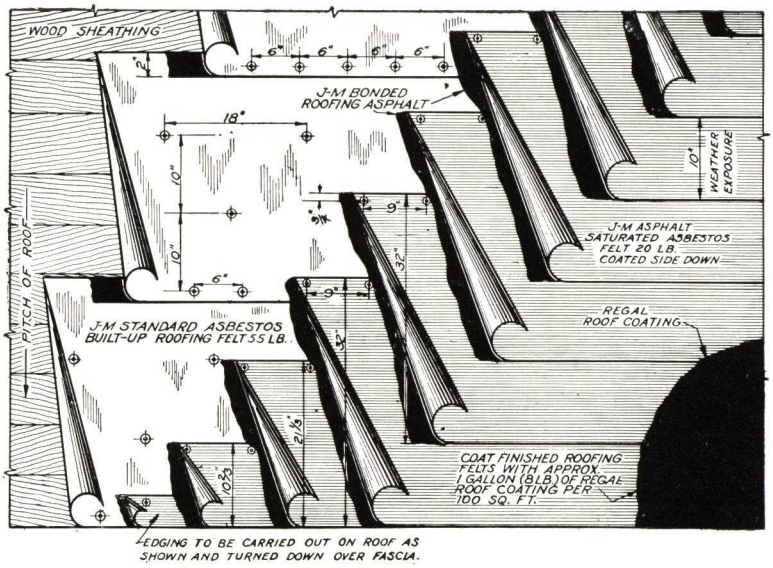
J-M 20-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-up Roofing Felt.	55 lb.
FINISHING FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3″ to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3″ to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2″, sealing the laps with the asphalt and nailing at 6″ centers through the laps and at 18″ centers through the longitudinal center of each sheet, in two lines spaced 10″ apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22″ over the preceding one, mopping the full width under each with the asphalt and nailing at 9″ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—*(Copy from J-M Standard Specification for Flashing, page 33.)*

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 103

J-M 15-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH **Waterproofing: ASPHALT**

Felts: ASBESTOS **Inclines: ¼ in. to 9 in. per ft.**

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-up Roofing Felt	55 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3″ to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3″ to the foot all felts shall be laid parallel to the pitch. All felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2″, sealing the laps with the asphalt and nailing at 6″ centers through the laps and at 18″ centers through the longitudinal center of each sheet, in two lines spaced 10″ apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17″ over the preceding one, mopping the full width under each with the asphalt and nailing at 9″ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—*(Copy from J-M Standard Specification for Flashing, page 33.)*

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 200

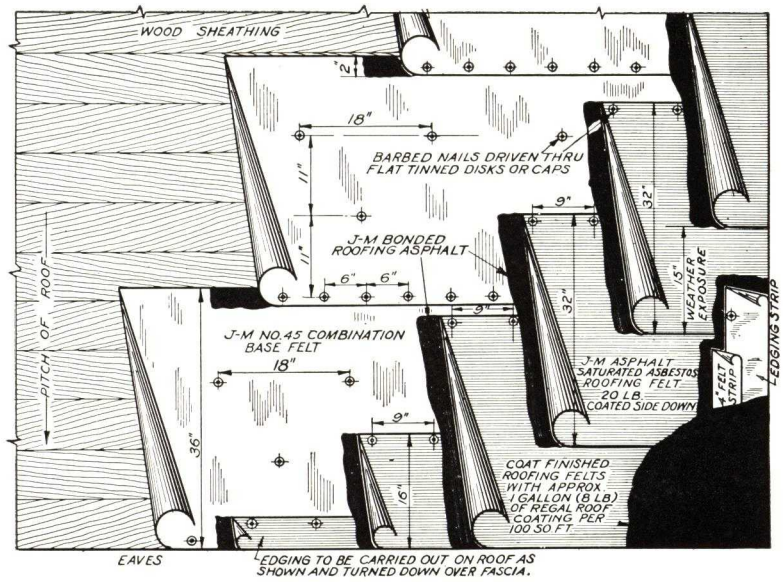
J-M 15-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS and RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt, 50 lbs. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3″ to the foot or less, the 50-lb. rag felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3″ to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 50-lb. rag felt, lapping the sheets 2″, sealing the laps with the asphalt and nailing at 6″ centers through the laps and at 18″ centers through the longitudinal center of each sheet in two lines spaced 11″ apart, the nails to be staggered.

Over the 50-lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17″ over the preceding one, mopping the full width under each with the asphalt and nailing at 9″ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 202

J-M 10-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH Felts: ASBESTOS and RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt (Rag Felt, 33½ lbs. per 108 sq. ft.)	33½ lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3″ to the foot or less, the 33½-lb. rag felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3″ to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 33½-lb. rag felt, lapping the sheets 2″, sealing the laps with the asphalt and nailing at 6″ centers through the laps and at 18″ centers through the longitudinal center of each sheet in two lines spaced 11″ apart, the nails to be staggered.

Over the 33½-lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17″ over the preceding one, mopping the full width under each with the asphalt and nailing at 9″ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

SPECIFICATION No. 300

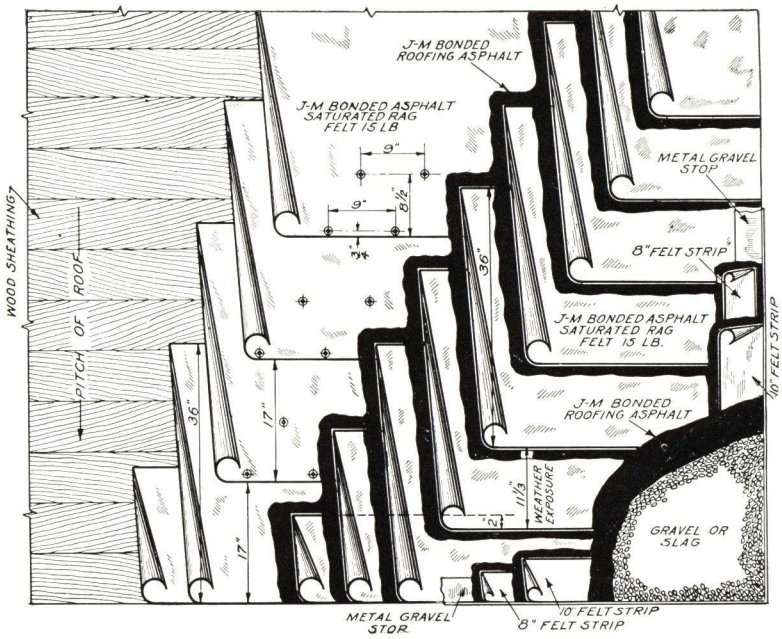
J-M 20-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 5 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	81 lb.
ASPHALT: J-M Bonded Roofing Asphalt	145 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical surfaces without cementing thereto. All nails shall be driven through flat metal disks.

Roofing—Lay two plies of the 15-lb. rag felt, lapping each sheet 19″ over the preceding one and nailing through the laps in two lines spaced 7¾″ apart, the first line to adjoin the edge of the sheet, the nails to be spaced at 9″ centers and staggered.

Over these felts lay three additional plies of the 15-lb. rag felt, lapping each sheet 24⅔″ over the preceding one, mopping the full width under each with the asphalt.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 304

J-M 15-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt	115 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay two plies of the 15-lb. rag felt, lapping each sheet 19″ over the preceding one and nailing through the laps in two lines spaced 7¾″ apart, the first line to adjoin the edge of the sheet, the nails to be spaced at 9″ centers and staggered.

Over these felts lay two additional plies of the 15-lb. rag felt, lapping each sheet 19″ over the preceding one, mopping the full width under each with the asphalt.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 301

J-M 10-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG **Waterproofing: ASPHALT**

Felts: RAG **Inclines: 2 in. to 4 in. per ft.**

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 5 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	81 lb.
ASPHALT: J-M Bonded Roofing Asphalt	150 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay five plies of the 15-lb. rag felt, lapping each sheet 29 1/5″ over the preceding one, mopping between plies with the asphalt to within 4″ of the back edge of the underlying felt and nailing at 12″ centers, 10″ from the back edge.

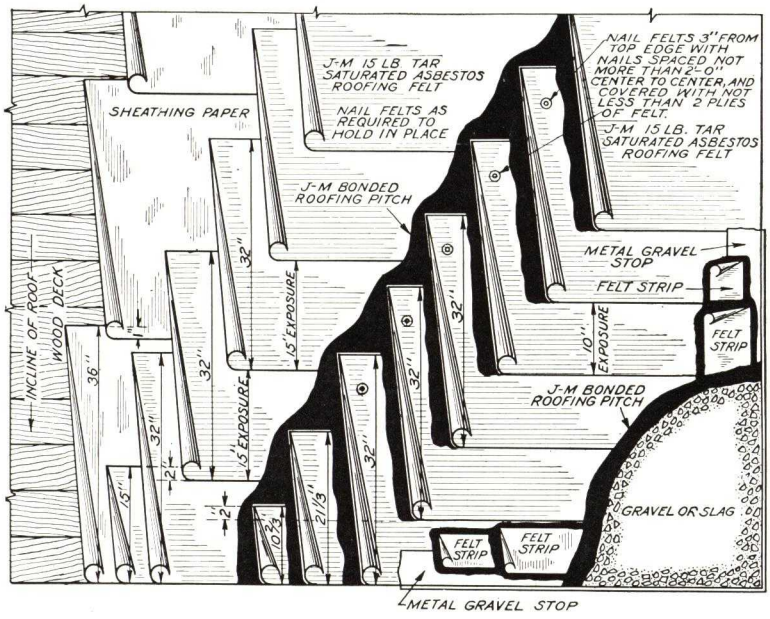
Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.



BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used on wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
***FELTS:** 5 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch	150 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical masonry surfaces and 4″ on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

SPECIFICATION No. 600*

J-M 20-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Inclines: ¼ in. to 2 inches per foot

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 700

Felts: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

Roofing—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1″.

Lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17″ over the preceding one and nailing sufficiently to hold in place.

Over these felts lay three additional plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22″ over the preceding one, mopping the full width under each with the pitch and nailing at 24″ centers, 3″ from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*SPECIFICATION No. 604**

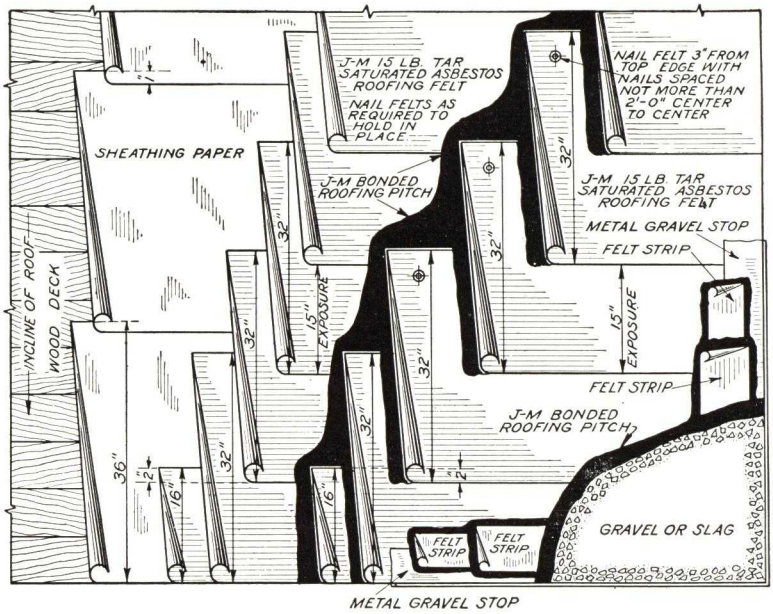
J-M 15-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL
Felts: ASBESTOS
Waterproofing: PITCH (TAR)
Inclines: ¼ in. to 2 inches per foot

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 704

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")



BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used on wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
***FELTS:** 4 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	125 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place.

Over these felts lay two additional plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

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*SPECIFICATION No. 601**

J-M 10-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG **Waterproofing: PITCH (TAR)**
Felts: ASBESTOS **Inclines: 2 in. to 6 in. per ft.**

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used on wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
***FELTS:** 5 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(*Copy from Specification No. 604, above.*)

INSTALLATION

General—(*copy from Specification No. 604, above.*)

Roofing—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay five plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 26" over the preceding one, mopping under each with the pitch to a width of 18" starting 2" from the exposed edge. Nail each sheet at 12" centers, 10" from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

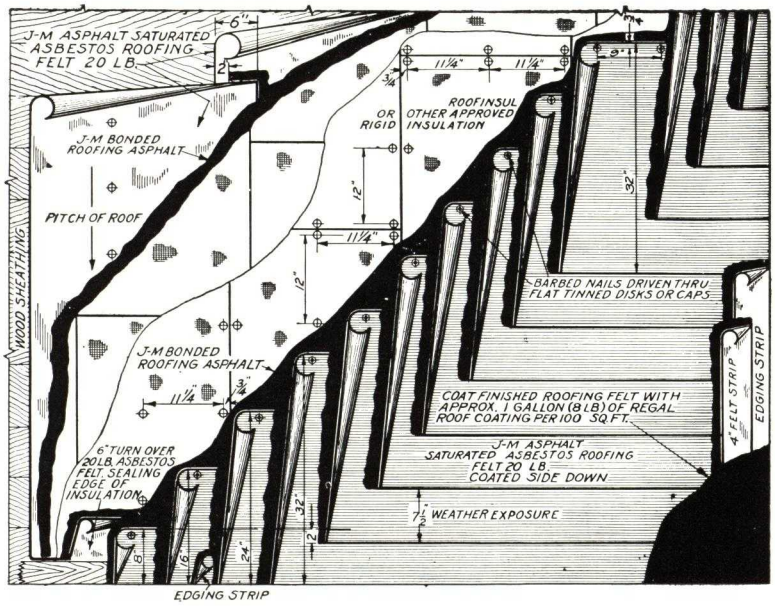
(*Copy from Specification No. 604, above, except change to* "Ten-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 701

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 104



J-M 20-YEAR ROOF OVER INSULATION ON WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asbestos Asphalt-Saturated Felt.. (An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 500. See page 31.)	80 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	120 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(*Copy from J-M Standard Specification No. 500, page 31.*)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24½" over the preceding one, mopping the full width under each with the asphalt and, if pitch of roof exceeds 3" to the foot, nailing at 9" centers adjacent to the back edge.

Coat the entire surface with roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 106

J-M 15-YEAR ROOF OVER INSULATION ON WOOD DECKS

Surface: SMOOTH **Waterproofing: ASPHALT**

Felts: ASBESTOS **Insulation: ROOFINSUL**

Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asbestos Roofing Felt..... (An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation in Specification No. 500. See page 31.)	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	90 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(*Copy from Specification No. 104, above.*)

INSTALLATION

General—(*Copy from Specification No. 104, above.*)

Insulation—(*Copy from J-M Standard Specification No. 500, page 31.*)

Roofing—Lay three plies of the 20-lb. asbestos felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt and, if pitch of roof exceeds 3" to the foot, nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 104, above, except change to* "Fifteen-Year".)

SPECIFICATION No. 606*

J-M 20-YEAR ROOF OVER INSULATION ON WOOD OR PRE-CAST GYPSUM DECKS

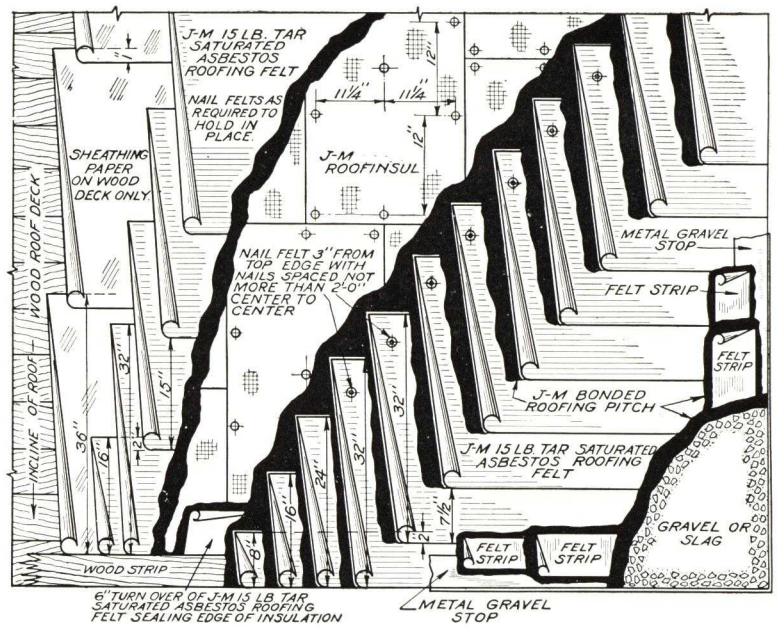
Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
***FELTS: (Under Insulation)** 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	32½ lb.
***FELTS: (For Built-Up Roof)** 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	175 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in a satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Felts Under Insulation—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place. These felts shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

Insulation—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 30' 0" square by path-strippings of one ply of the 15-lb. tar-saturated roofing felt, mopped the full width with the pitch, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid. Nail each sheet of the insulation at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center.

If the insulation is to be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer (*unless high humidity and condensation conditions do not exist, in which event the moppings between layers may be omitted*), the sheets of each layer to break joints with those of the preceding layer, wih all nailing done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

Insulation shall not be left exposed to the weather. No more insulation shall be laid down than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

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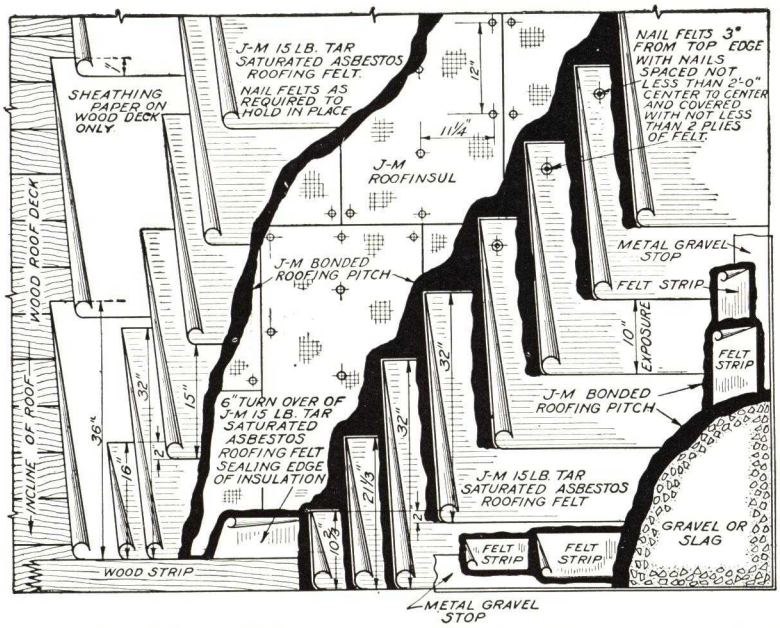
*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 706

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")



SPECIFICATION No. 608*

J-M 15-YEAR ROOF OVER INSULATION ON WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

Inclines: ¼ in. to 2 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 108 sq. ft.)	5 lb.
***FELTS: (Under Insulation)** 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	32½ lb.
***FELTS: (For Built-Up Roof)** 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	150 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(*Copy from Specification No. 606, opposite.*)

INSTALLATION

General—(*Copy from Specification No. 606, opposite.*)

Felts Under Insulation—(*Copy from Specification No. 606, opposite.*)

Insulation—(*Copy from Specification No. 606, opposite.*)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 606, opposite, except change to* "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 708

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 610*

J-M 10-YEAR ROOF OVER INSULATION ON WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

Inclines: 2 in. to 6 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 108 sq. ft.)	5 lb.
***FELTS: (Under Insulation)** 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	32½ lb.
***FELTS: (For Built-Up Roofs)** 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	105 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Slag	250 lb.

ROOF DECK

(*Copy from Specification No. 606, opposite.*)

INSTALLATION

General—(*Copy from Specification No. 606, opposite.*)

Felts Under Insulation—(*Copy from Specification No. 606, opposite.*)

Insulation—(*Copy from Specification No. 606, opposite.*)

Roofing—Lay four plies of the 15-lb. tar-saturated felt, lapping each sheet 24½" over the preceding one, mopping under each with the pitch to a width of 30" starting 2" from the exposed edge. Nail each sheet at 12" centers, 10" from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 606, opposite, except change to* "Ten-Year".)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 710

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 101

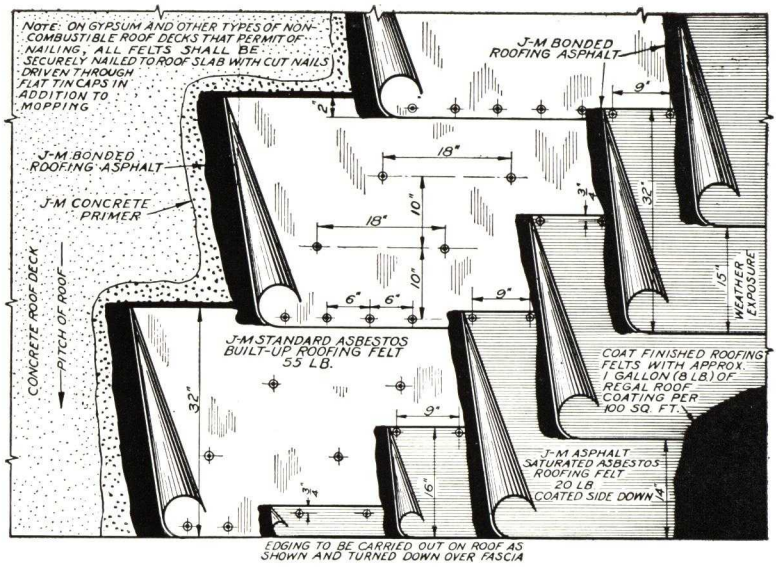
J-M 20-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-Up Roofing Felt	55 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3″ to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3″ to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2″, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 6″ centers through the laps and at 18″ centers through the longitudinal center of each sheet in two lines spaced 10″ apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17″ over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 9″ centers adjacent to the back edge.

With nailing strips provided as required, nail each sheet of the 55-lb. asbestos felt at 6″ centers at each nailing strip. Nail each sheet of the 20-lb. asbestos felt at each nailing strip ¾″ from the back edge.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 201

J-M 15-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH **Waterproofing: ASPHALT**

Felts: RAG **Inclines: ¼ in. to 9 ins. per ft.**

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt, 50 lb. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—(*Copy from Specification No. 101, above, except change* "55-lb. asbestos felt" *to* "50-lb. rag felt.")

Roofing—(*Copy from Specification No. 101, above, changing* "55-lb. asbestos felt" *to* "50-lb. rag felt," *and changing the spacing of the nails from* 10″ *to* 11″.)

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 203

J-M 10-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH **Felts: ASBESTOS and RAG**
Waterproofing: ASPHALT
Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt) Rag Felt, 33½ lb. per 108 sq. ft.)	33½ lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—(*Copy from Specification No. 101, opposite, except change* "55-lb. asbestos felt" *to* "33½-lb. rag felt.")

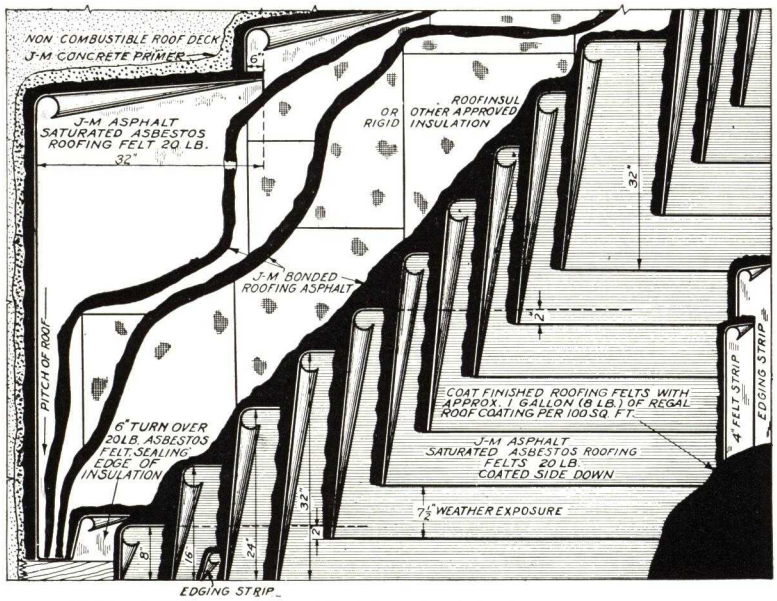
Roofing—(*Copy from Specification No. 101, opposite, changing* "55-lb. asbestos felt" *to* "33½-lb. rag felt," *and changing the spacing of the nails from* 10" *to* 11".)

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Bond.



SPECIFICATION No. 105

J-M 20-YEAR ROOF OVER INSULATION ON NON-COMBUSTIBLE DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	80 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 501. See page 32.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	120 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(*Copy from J-M Standard Specification No. 501, page 32.*)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24½" over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt, and over these felts lay two additional plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be placed so as to be covered by not less than two plies of felt.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(If a bond is required, add the following:)

GUARANTEE

(*Copy from Specification No. 101, opposite.*)

SPECIFICATION No. 107

J-M 15-YEAR ROOF OVER INSULATION ON NON-COMBUSTIBLE DECKS

Surface: SMOOTH **Waterproofing: ASPHALT**
Felts: ASBESTOS **Insulation: ROOFINSUL**
Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	60 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 501. See page 32.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	90 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(*Copy from J-M Specification No. 501, page 32.*)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be so placed as to be covered by not less than two plies of felt.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(If a bond is required, add the following:)

GUARANTEE

(*Copy from Specification No. 305, opposite.*)

SPECIFICATION No. 302

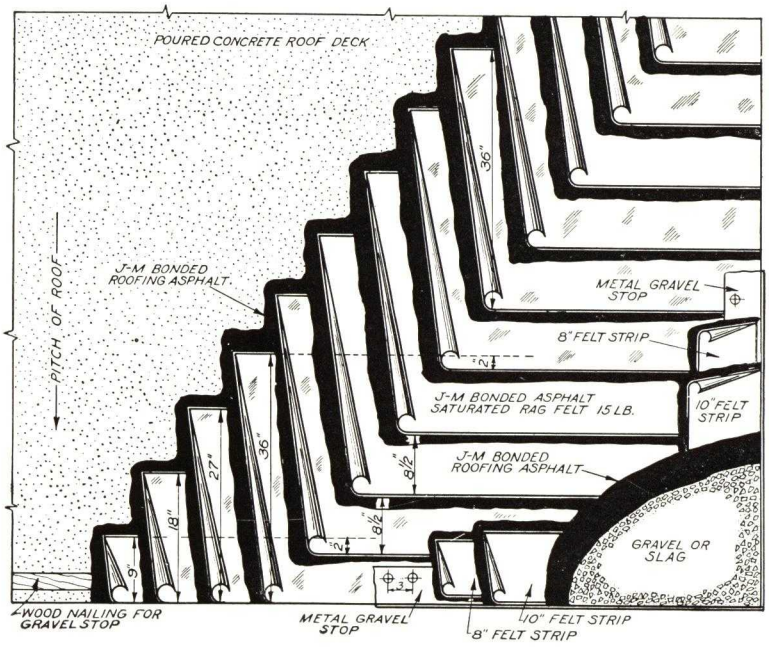
J-M 20-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27½" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and

embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 305

J-M 15-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

Surface: SLAG and GRAVEL **Felts: RAG**

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 in. per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	49 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	145 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General— All roofing felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay three plies of the 15-lb. rag felt, lapping each sheet 24⅔″ over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12″ centers, 3″ from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4″ each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 303

J-M 10-YEAR ROOF OVER POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

Surface: SLAG **Waterproofing: ASPHALT**

Felts: RAG **Inclines: 2 in. to 4 in. per ft.**

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PRIMER: J-M Concrete Primer (8 lbs. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	165 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27½″ over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12″ centers, 3″ from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4″ each side of all joints between the slabs.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8″ and 10″ respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

SPECIFICATION No. 602*

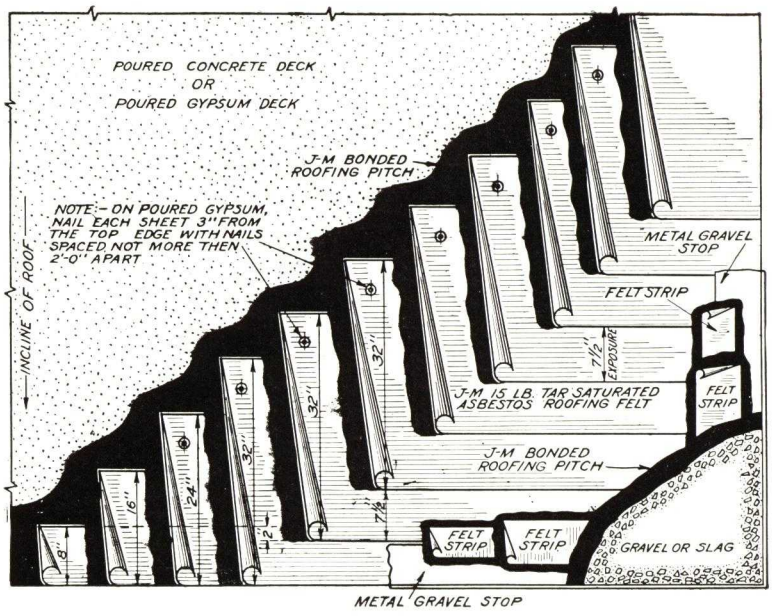
J-M 20-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

OVER POURED GYPSUM DECKS

Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL
Felts: ASBESTOS
Waterproofing: PITCH (TAR)



BILL OF MATERIALS PER 100 SQ. FT.

***FELTS:** 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2″ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½″ over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24″ centers, 3″ from the back edge.

If roof construction is of precast concrete, the pitch applied to the roof surface shall be omitted for a width of 4″ each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 702

Felts: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 605*

J-M 15-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

OVER POURED GYPSUM DECKS

Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL
Felts: ASBESTOS
Waterproofing: PITCH (TAR)

BILL OF MATERIALS PER 100 SQ. FT.

***FELTS:** 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch	150 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(*Copy from Specification No. 602, above.*)

INSTALLATION

General—(*Copy from Specification No. 602, above*).

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22″ over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24″ centers, 3″ from the back edge.

If roof construction is of precast concrete, the pitch applied to the roof surface shall be omitted for a width of 4″ each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 602, above, except change to* "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 705

Felts: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 603*

J-M 10-YEAR ROOF OVER POURED CONCRETE DECKS

Inclines: 1 in. to 6 inches per foot

OVER POURED GYPSUM DECKS

Inclines: 2 ins. to 6 inches per foot

Surface: SLAG

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(*Copy from Specification No. 602, opposite.*)

INSTALLATION

General—(*Copy from Specification No. 602, opposite.*)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one. These felts shall be cemented to the roof by path-moppings of the pitch, such moppings to be run parallel to the incline, to be not less than 12" nor more than 18" wide, the distance between to be not more than twice the width of such moppings. These felts shall also be cemented to each other continuously by mopping under each with the pitch to a width of 18", starting 2" from the exposed edge. If roof construction permits, nail each sheet at 12" centers, 10" from the back edge .

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

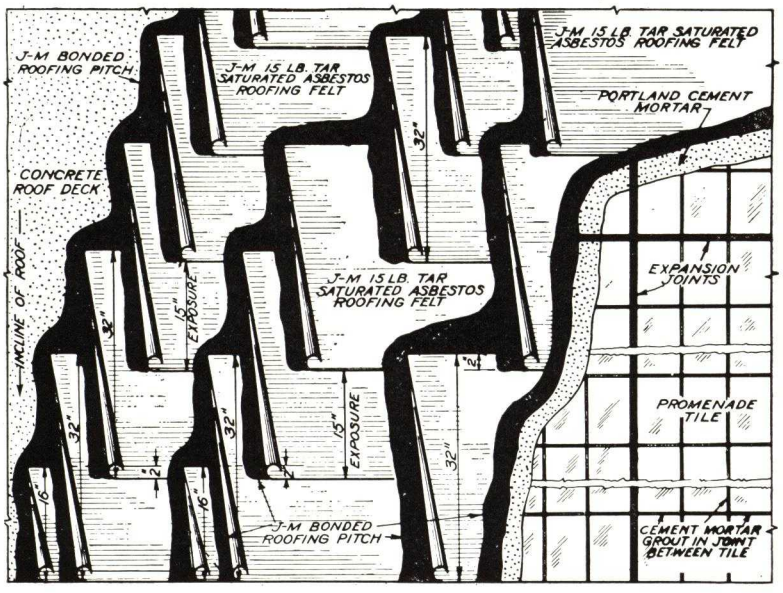
GUARANTEE

(*Copy from Specification No. 602, opposite, except change to* "Ten-Year".)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 703

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")



SPECIFICATION No. 612*

J-M BUILT-UP ROOF UNDER PROMENADE TILE OVER CONCRETE DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Inclines: ¼ in. to 1 inch per foot

BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 5 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch	200 lb.
FLASHING: Copper.	
SURFACING: 6" x 9" x 1" Promenade Tile.	

ROOF DECK

General—(*Copy from Specification No. 602, opposite.*)

INSTALLATION

General—(*Copy from Specification No. 602, opposite.*)

Roofing—Coat the roof deck with bonded pitch and lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one and mopping the full width under each with the pitch. Then apply two additional layers of the 15-lb. tar-saturated felts, cementing them to the roof surface and to each other in the same manner as the first two plies, and again coat the entire roof surface with the pitch.

Immediately preceding the laying of the tile, thoroughly clean the roof surface and mop with bonded pitch into which, while hot, embed one additional layer of the 15-lb. tar-saturated felt, lapping each sheet 2" over the previously laid sheet. Then coat the entire surface with bonded pitch.

Promenade Tile—On top of the Built-up Roof, lay the promenade tile in a bedding of portland cement mortar not less than 1" thick, with expansion joints in both directions on 20 ft. centers, and also at all walls, curbs and other vertical surfaces. Expansion joints shall be not less than 1" wide and shall extend through the tile and cement bed to the Built-up Roof, and shall be filled with J-M Expansion Joint Filler, poured while hot. All joints between the tile, other than expansion joints, shall be grouted with portland cement mortar.

(*If a bond is required, consult Johns-Manville.*)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 712

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 607*

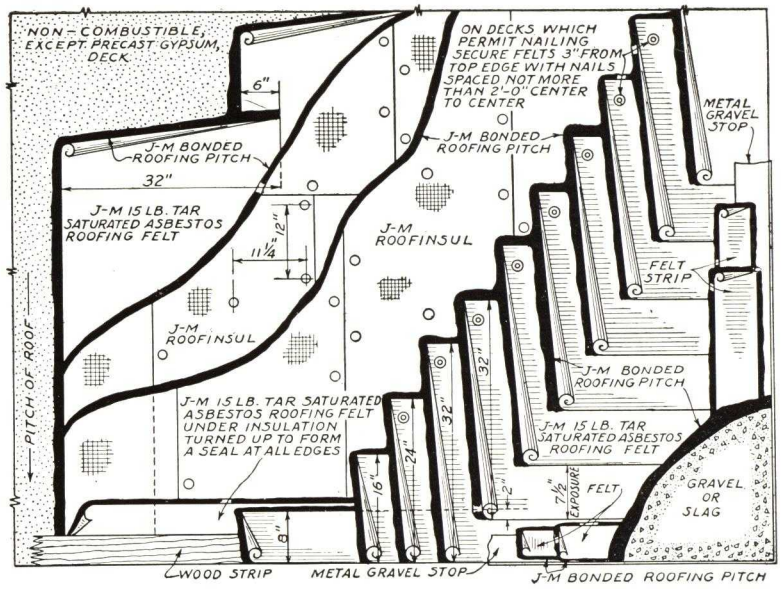
J-M 20-YEAR ROOF OVER INSULATION ON POURED CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

ON POURED GYPSUM DECKS

Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL
Felts: ASBESTOS
Waterproofing: PITCH (TAR)
Insulation: ROOFINSUL



BILL OF MATERIALS PER 100 SQ. FT.

***FELTS:** (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	16¼ lb.
***FELTS:** (In Built-Up Roof) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	175 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces, without being cemented thereto. All nails shall be driven through flat metal disks.

Felt Under Insulation—Lay one ply of the 15-lb. tar-saturated felt, lapping the sheets 6", mopping the full width under each with the pitch. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

Insulation—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 30' 0" square by path-strippings of one ply of the 15-lb. tar-saturated felt, mopped the full width with the pitch, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid.

If the roof construction is of poured gypsum, nail each sheet of the insulation at 12" centers, adjacent to the longitudinal edges and staggered through the longitudinal center.

If the insulation is to be applied in more than one layer, succeeding layers shall be applied and cemented in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer, with all nailing done through the top layer.

The overhanging felt at roof edges shall be turned over and mopped solidly to the insulation.

Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly to the insulation.

Roofing—Lay four plies of 15-lb. tar-saturated felt, lapping each sheet 24½" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Not less than 230 lbs. of the pitch shall be used per 100 sq. ft. of completed roof.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

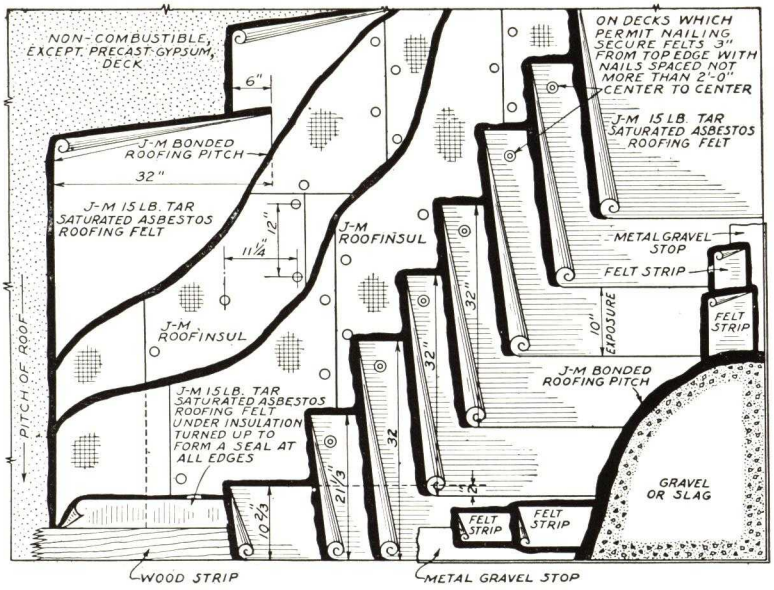
GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 707

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")



BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Roofing Felts (16¼ lb. per 108 sq. ft.)	16¼ lb.
*FELTS: (In Built-Up Roof) 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	150 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(*Copy from Specification No. 607, opposite.*)

INSTALLATION

Insulation—(*Copy from Specification No. 607, opposite.*)

Felt Under Insulation—(*Copy from Specification No. 607. opposite.*)

Insulation—(*Copy from Specification No. 607, opposite.*)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 607, opposite, except change to* "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 709

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 609*

J-M 15-YEAR ROOF OVER INSULATION

ON POURED CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

ON POURED GYPSUM DECKS

Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL
Felts: ASBESTOS
Waterproofing: PITCH (TAR)
Insulation: ROOFINSUL

SPECIFICATION No. 611*

J-M 10-YEAR ROOF OVER INSULATION

on Poured Concrete Decks

Inclines: 1 in to 6 inches per foot

on Poured Gypsum Decks

Inclines: 2 ins. to 6 inches per foot

Surface: SLAG
Felts: ASBESTOS
Waterproofing: PITCH (TAR)
Insulation: ROOFINSUL

BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	16¼ lb.
*FELTS: (In Built-Up Roof) 4 layers of J-M 15-lb Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	94 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick) For each layer of insulation	100 sq. ft.
SURFACING: Slag	250 lb.

ROOF DECK

(*Copy from Specification No. 607, opposite.*)

INSTALLATION

General—(*Copy from Specification No. 607, opposite.*)

Felts Under Insulation—(*Copy from Specification No. 607, opposite.*)

Insulation—(*Copy from Specification No. 607, opposite.*)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one, mopping under each with the pitch to a width of 30" starting 2" from the exposed edge.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

(*Copy from Specification No. 607, opposite, except change to* Ten-Year".)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 711

FELTS: (*Change name of felt to* "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 108

J-M 20-YEAR ROOF OVER INSULATION ON STEEL DECKS

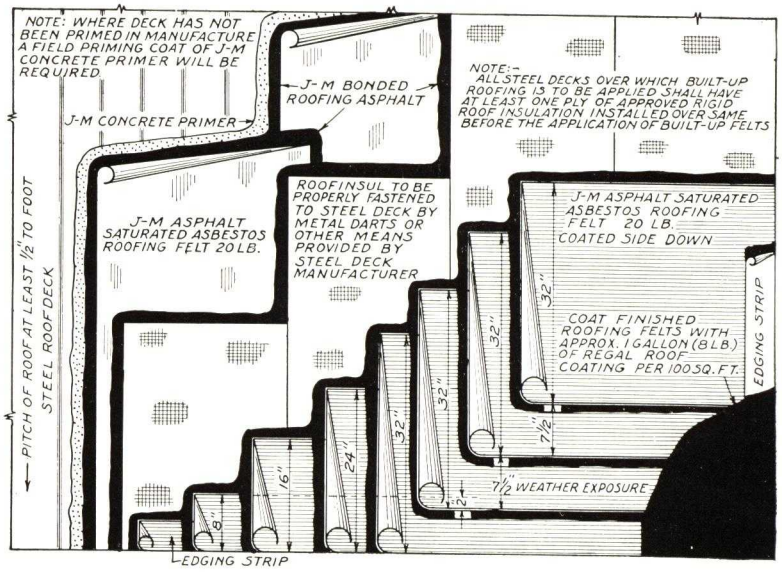
Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: ½ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt ..... 80 lb.
(An additional ply of 20-lb. asbestos felt is specified for application under the insulation, in Specification No. 502. See page 32.)
PRIMER (unless steel deck has been shop-coated): J-M Concrete Primer (8 lb. per gal.) ..... 1 gal.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts) ..... 120 lb.
For mopping felt to deck ..... 30 lb.
For mopping insulation over felt ..... 30 lb.
For mopping each additional ply of insulation ..... 30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)
For each layer of insulation ..... 100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.) 1 gal.

ROOF DECK

(a) Roof construction, including cants, covers or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto.

Insulation—(*Copy from J-M Standard Specification No. 502, page 32.*)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24½" over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt. Over these felts, lay two additional plies, applied in the same manner as the first two.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 109

J-M 15-YEAR ROOF OVER INSULATION ON STEEL DECKS

Surface: SMOOTH **Waterproofing: ASPHALT**

Felts: ASBESTOS **Insulation: ROOFINSUL**

Inclines: ½ in. to 9 ins. per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt ..... 60 lb.
(An additional ply of 20-lb. asbestos felt is specified for application under the insulation, in Specification No. 502)
PRIMER (unless steel deck has been shop-coated): J-M Concrete Primer (8 lb. per gal.) ..... 1 gal.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts) ..... 90 lb.
For mopping felt to deck ..... 30 lb.
For mopping insulation over felt ..... 30 lb.
For mopping each additional ply of insulation ..... 30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)
For each layer of insulation ..... 100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.) 1 gal.

ROOF DECK

(*Copy from Specification No. 108, above.*)

INSTALLATION

General—(*Copy from Specification No. 108, above.*)

Insulation—(*Copy from J-M Standard Specification No. 502, page 32.*)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt.

Coat the entire surface with the roof coating.

Flashing—(*Copy from J-M Standard Specification for Flashing, page 33.*)

(*If a bond is required, add the following:*)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

Protecting Insulated Roofs Against Humidity

For many years it has been generally recognized that wherever humid conditions may be encountered, it is essential that roof insulation be protected on the underside against the absorption of moisture. Specifications of architects and roofing manufacturers have, therefore, called for a membrane waterproofing course under the insulation wherever it was known at the time the roof was designed that the insulation would be subjected to such conditions.

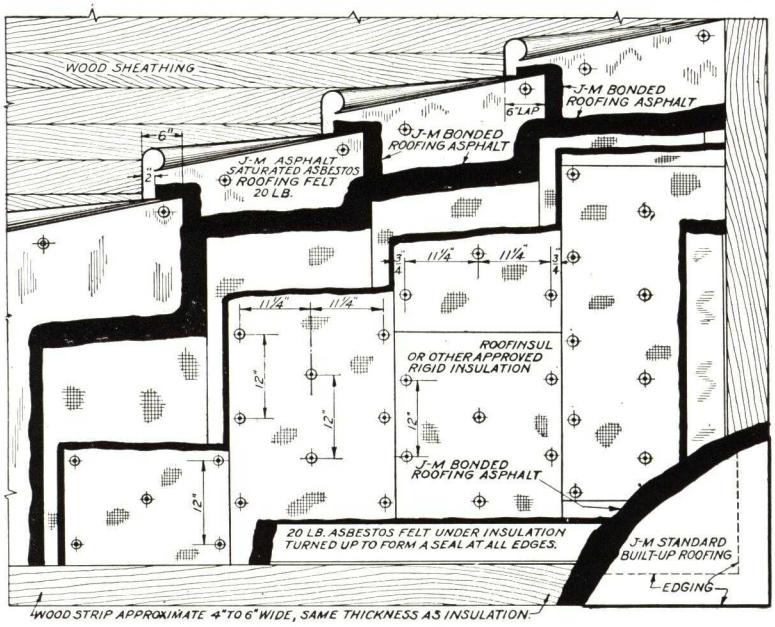
But there are occasions, after a relatively few years, where there is a change in the use to which a building is put. From an operation not in the least humid, the condition may change almost overnight into one which exposes the insulation to severe moisture conditions.

All types of roof insulation will absorb moisture. The very factor that makes the material effective as an insulation—porosity—is, of course, responsible for its absorption of moisture. When insulation on a roof becomes water-soaked, the results are:

(a) A serious reduction in insulating efficiency.
(b) Destruction of bond between insulation and roofing felts.
(c) Disintegration of the insulating material.
(d) Almost certain damage to the roof deck itself.
(e) Possible damage to the building contents.
(f) An expensive re-roofing and re-insulating job.

All Johns-Manville Roof Insulation Specifications call for the application of a layer of waterproofing roofing felt under the insulation.

JOHNS-MANVILLE ROOF INSULATION



SPECIFICATION No. 500

J-M ROOFINSUL

ON WOOD DECKS

TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

BILL OF MATERIALS PER 100 SQ. FT.

FELT (under insulation): 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt ..... 20 lb.

INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., ½" thick) For each layer of insulation ..... 100 sq. ft.

ASPHALT: J-M Bonded Roofing Asphalt For mopping each layer of insulation ..... 30 lb.

ROOF DECK

As J-M Roofinsul (rigid roof insulation) requires, and is designed to receive, built-up roofing directly over it, the following specification has been prepared to be appended to certain Standard Specifications for J-M Asphalt Built-Up Roofs. The specifications for such roofs, designed particularly for application over approved rigid insulation on wood decks are given on previous pages. The roof deck, before being considered satisfactory to receive the insulation, shall be in the condition outlined in the built-up roof specification.

INSULATION

(a) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6", mopping in the laps with the asphalt and nailing sufficiently to hold in place. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

(b) Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the asphalt. The edges of the sheets at the joints shall be thoroughly sealed with the asphalt.

(c) The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the 20-lb. asbestos felt, mopped the full width with the asphalt, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid.

NAILING

Each sheet of the insulation shall be nailed at 12" centers, adjacent to the longitudinal edges and staggered through the longitudinal center. If it be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer, with all nailing done through the top layer.

SEALING

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

PROTECTION

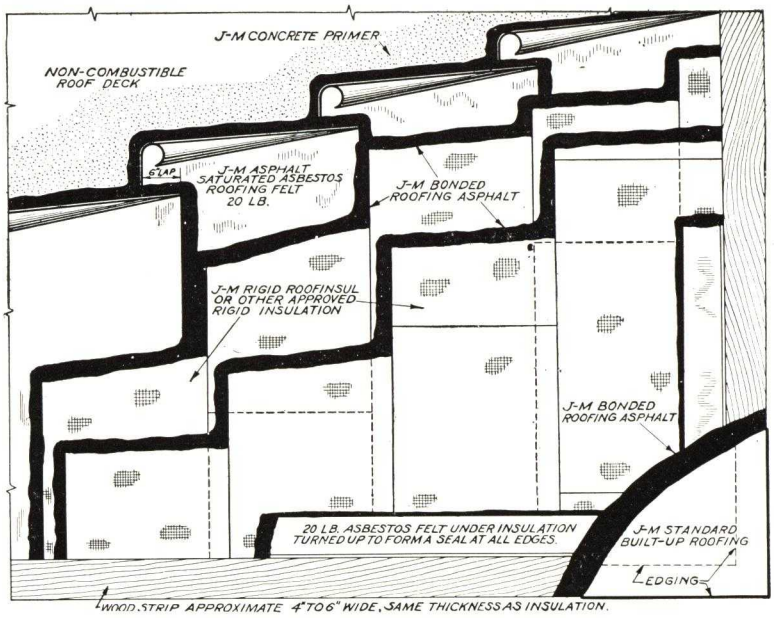
Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

SPECIFICATION No. 501

J-M ROOFINSUL
ON NON-COMBUSTIBLE DECKS
TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

BILL OF MATERIALS PER 100 SQ. FT.

FELT: 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt ..... 20 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., ½" thick) For each layer of insulation .....100 sq. ft.
PRIMER: J-M Concrete Primer (8 lb. per gal.):
Over Concrete ..... 1 gal.
Over Gypsum .....1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt
For mopping each layer of insulation ..... 30 lb.



ROOF DECK

(*Copy from Specification No. 500, on previous page.*)

INSULATION

(a) Coat all surfaces which are to receive the insulation with the asphalt primer and allow to dry.

(b) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6", mopping the full width under each with the asphalt. This felt shall be turned up on . . . (*Balance, same as paragraph (a) of Specification No. 500, on previous page.*)

(c) (*Copy paragraph (b) of Specification No. 500.*)

(d) (*Copy paragraph (c) of Specification No. 500.*)

NAILING

If roof construction permits, nail each sheet at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center. With nailing strips provided as required, each sheet shall be nailed at each strip at 12" centers.

SEALING

(*Copy from Specification No. 500, on previous page.*)

PROTECTION

(*Copy from Specification No. 500, on previous page.*)

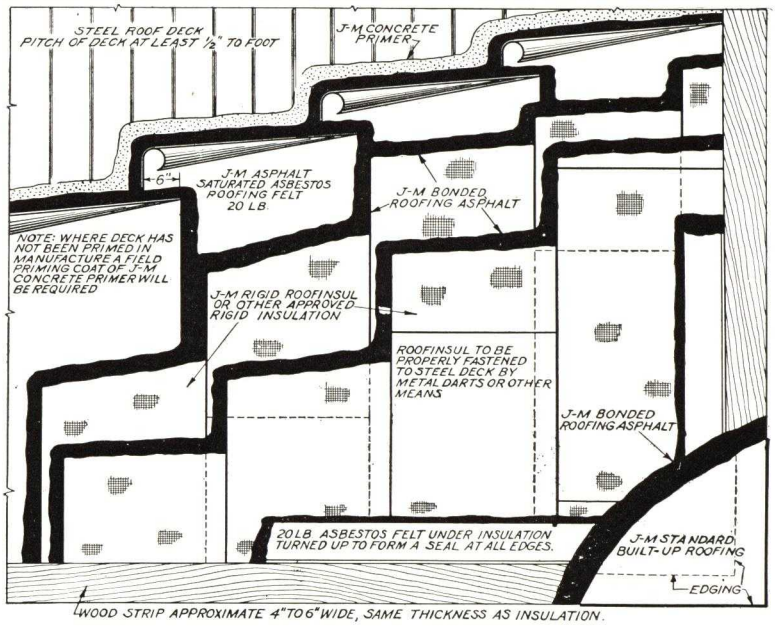
SPECIFICATION No. 502

J-M ROOFINSUL
ON STEEL DECKS
TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

Minimum Pitch: ½ inch per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELT (under insulation): 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt..... 20 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., ½" thick) For each layer of insulation .....100 sq. ft.
PRIMER (unless steel deck has been shop-coated): J-M Concrete Primer (8 lb. per gal.)..... 1 gal.
ASPHALT: J-M Bonded Roofing Asphalt
For mopping each layer of insulation..... 30 lb.



ROOF DECK

(*Copy from Specification No. 500, on previous page.*)

INSULATION

(a) If the steel deck has not been shop-coated with asphalt paint, or if such coating is incomplete or has been damaged, the entire deck or such uncoated areas shall be painted with the primer and allowed to dry.

(b) (*Copy paragraph (b) of Specification No. 501, above.*)

(c) (*Copy paragraph (b) of Specification No. 500.*)

(d) (*Copy paragraph (c) of Specification No. 500.*)

SECURING OF INSULATION

If the pitch of the roof deck is 3" per foot or greater, the insulation shall be secured by means of steel darts or other approved device. (*Follow with the second sentence under* "Nailing" *in Specification 500, changing word* "nailing" *to* "fastening."

SEALING AND PROTECTION

(*Copy from Specification No. 500, on previous page.*)

J-M ASBESTILE FLASHING SYSTEM (10-YEAR BOND)

Johns-Manville Flashing is constructed of the same basic materials as Johns-Manville Built-Up Roofs—asbestos felts, asphalt and Asbestile, a plastic asbestos-asphalt composition, being the main component parts. It may be installed to cover completely the top and inside face of parapet walls, to extend through walls, or to extend not less than 8″ high on the inside face only. J-M Flashing may also be used with a sheet metal cap flashing built into the walls, or it may be used in conjunction with raggle blocks. As Johns-Manville Flashing is used only in connection with Johns-Manville Built-Up Roofing, the following specification has been prepared to be appended to the Standard Specifications for such Built-Up Roofs:

The height of flashing on parapet walls shall be *state whether* (*"not less than* 8″) *or* (*"so as to cover completely entire inside face of wall and top of wall under coping to within* 2″ *of outside face"*) *or* (*"not less than* 8″ *with cap flashing built into and extended through wall to form a dampproof course."*) *If flashing is to be carried into raggle block, so state.*

The height of flashing on high walls shall be (*state whether "same height as on adjoining parapet walls"*) *or* (*"Not less than* 8″, *with cap flashing built into and extended through wall to form a dampproof course."*)

All masonry surfaces which are to receive the base or cap flashing shall be coated with J-M Concrete Primer and allowed to dry.

BASE FLASHING

(*See drawings on next page.*)

Lay one thickness of the 15-lb., or 20-lb. roofing felt to extend not less than 6″ high on the vertical surface to be flashed, and not less than 4″ on the roof, lapping the sheets 3″, mopping the full width under each with the asphalt, or, if applied with roofs employing pitch, either such pitch or asphalt may be used.

A base flashing composed of J-M Asbestos Base Flashing Material shall be applied directly over and entirely covering the 15-lb. or 20-lb. roofing felt, cemented to it with the asphalt or pitch.

The base flashing shall be nailed, adjacent to its upper and end edges, with large head nails spaced at 8″ centers driven into the brick joints or the nailing strip.

The edge of the base flashing on the roof shall be covered with a 4″ wide strip of 15-lb. Asbestos Felt, embedded in and coated over with asphalt or, if applied in connection with roofs employing pitch, such pitch shall be used.

The end joints shall be covered with Asbestile, as specified under "Cap Flashing." (*See page* 35.)

On skylight curbs, etc., the flashing shall extend the full height, and turn over on top the full width, of the curb.

If no nailing facilities have been provided for securing the upper edge of the base flashing, a five-course cap and base flashing will be acceptable, constructed of alternating layers of Asbestile and 15-*lb. Asbestos Felt. Such flashing shall be applied in a manner similar to that specified later for the application of cap flashing to full height of wall, repeating the operations described to provide three layers of Asbestile and two layers of felt. Such flashing shall extend on the vertical surfaces and on the roof the same distance as specified for the flashing method it displaces.*

BASE FLASHING WITH RAGGLE BLOCK

(*See drawing on page* 35.)

The groove in the raggle block shall be coated with J-M Concrete Primer and allowed to dry.

One thickness of the 15-lb. or 20-lb. roofing felt shall be applied to extend not less than 4″ on the roof, to cover the cant entirely, and to extend to the full depth of the groove in the raggle block. This felt shall be embedded in asphalt, (or, if applied with roofs employing pitch, either such pitch or asphalt may be used) on the roof and cant, and in a layer of Asbestile, approximately ⅛″ thick, in the groove in the raggle block.

One thickness of J-M Asbestos Base Flashing Material shall be applied directly over and entirely covering the 15-lb. or 20-lb. felt and similarly cemented to it with the asphalt or pitch and the Asbestile. The base flashing shall be nailed adjacent to the groove, into the joints between raggle blocks. At all joints of the base flashing material, and at 12″ centers between, wood wedges, primed and coated with Asbestile, shall be driven into the groove to prevent slippage of the flashing. Any remaining voids in the grooves shall be caulked with Asbestile and oakum. A layer of Asbestile, approximately ⅛″ thick, shall be troweled in place to extend not less than 3″ on the cant and 2″ on the face of the raggle block to cover entirely the groove in the raggle block.

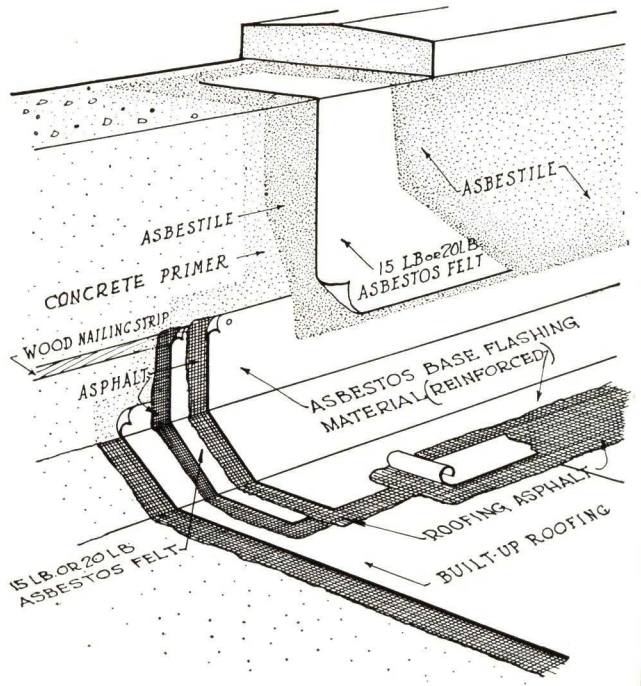
A strip of the 15-lb. or 20-lb. felt not less than 4″ wide shall be embedded therein and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the upper and lower edges.

The edge of the base flashing on the roof shall be covered with a 4″ wide strip of the 15-lb. felt embedded in and coated over with asphalt or pitch.

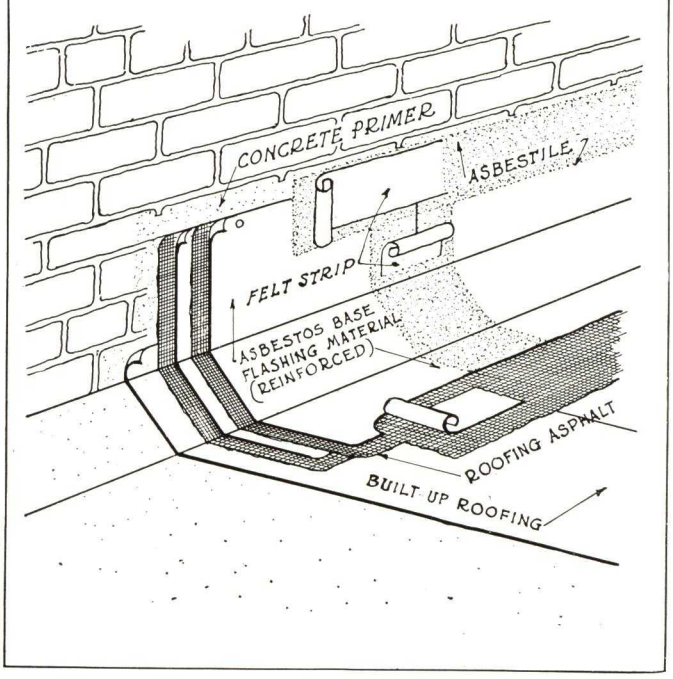
The end joints of the base flashing shall be covered with Asbestile as specified under "Cap Flashing." (*See page* 35.)

Details Showing Various Methods of Flashing Johns-Manville Bonded Built-up Roofs

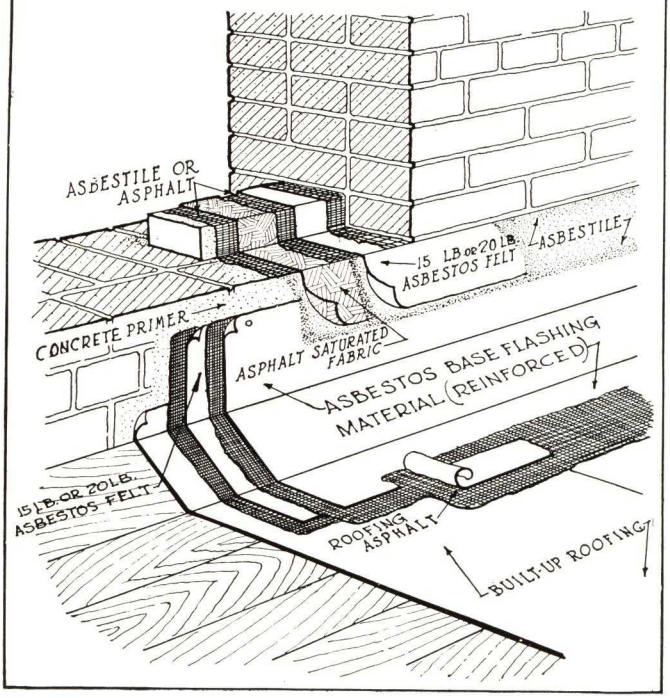
J-M Base and Cap Flashing
Full height of wall and under coping



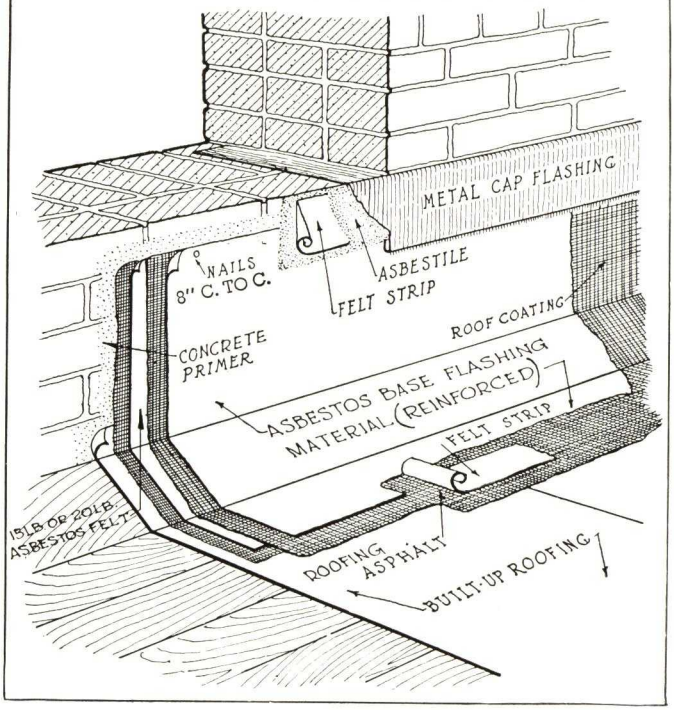
J-M Base and Cap Flashing
Not less than 8″ high



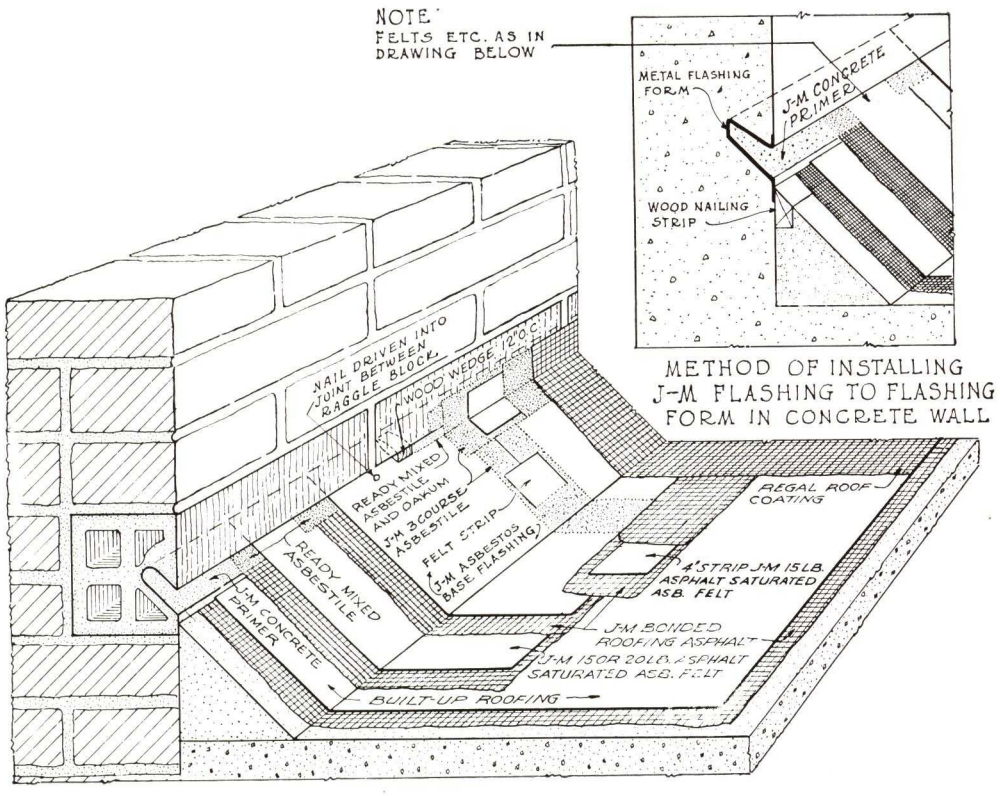
J-M Base and Cap Flashing
Cap flashing extended through the wall



J-M Base and Cap Flashing
Not less than 8″ high under metal cap flashing



BASE FLASHING WITH RAGGLE BLOCK (See page 33)



CAP FLASHINGS (See drawings on opposite page)

When J-M Flashing is specified to be not less than 8 ins. high or when sheet metal cap flashing is to be used with J-M Flashing

A layer of Asbestile, approximately 1/8" thick and not less than 5" wide, shall be troweled in place to cover the nail heads, the upper edge of the base flashing and the adjoining surface of the wall. A strip of 15-lb. Asphalt-saturated Asbestos Felt not less than 4" wide shall be embedded therein and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the upper and lower edges. If a sheet metal cap flashing is specified, the Asbestile cap flashing shall extend to the point where such metal flashing protrudes from the wall.

End laps in base flashing shall be similarly covered.

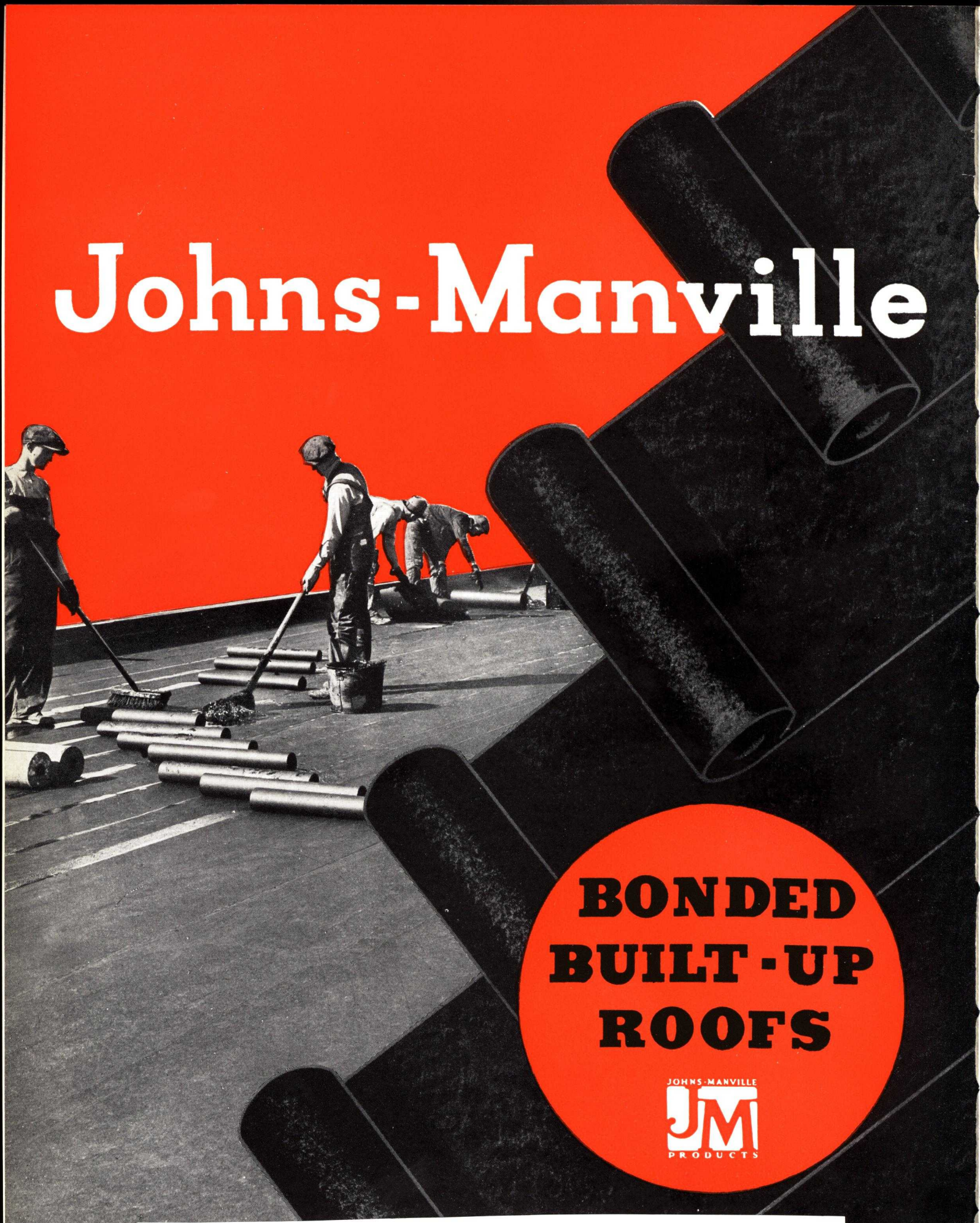
When J-M Flashing is specified to extend full height of wall under coping to within 2 ins. of outside face.

A layer of Asbestile, approximately 1/8" thick, shall be troweled in place to cover the nail heads and the upper edge of the base flashing not less than 4" and the entire inside face and top of the wall (under the coping) to within 2" of the outside face. One thickness of 15-lb. Asphalt-saturated Asbestos Felt shall be embedded therein, with the sheets lapped 3" and sealed with Asbestile, and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the lower edge.

When J-M Flashing is specified to be not less than 8 ins. high with cap flashing extended through wall

One ply of J-M Type B Asphalt-saturated Fabric shall be applied to the temporary top of the wall, to extend from within 2" of the outside face to the inside face and project so as to cover the base flashing not less than 4". This fabric shall be cemented to the top of the wall with the asphalt or Asbestile. One ply of 15-lb. Asphalt-saturated Asbestos Felt shall be applied directly over and entirely covering the fabric, cemented to it, and coated over, with the asphalt or Asbestile. The projecting felts shall be temporarily covered for protection during the completion of the wall. After the wall has been completed and the roofing and base flashing installed, the temporary protection shall be removed and a layer of Asbestile, approximately 1/8" thick, shall be troweled in place to cover the nail heads and the upper edge of the base flashing and the inside face of the wall to the underside of the projecting fabric and felt. The projecting fabric shall be embedded therein, over which shall be troweled a second layer of Asbestile, of the same thickness as the first, in which shall be embedded the projecting felt, over which shall be troweled a final layer of Asbestile of the same thickness as the preceding layers, finished to a feather edge and to a straight line at the lower edge and to the line of the projecting fabric and felt at the upper edge.

Johns-Manville



BONDED BUILT-UP ROOFS

JOHNS-MANVILLE JM PRODUCTS

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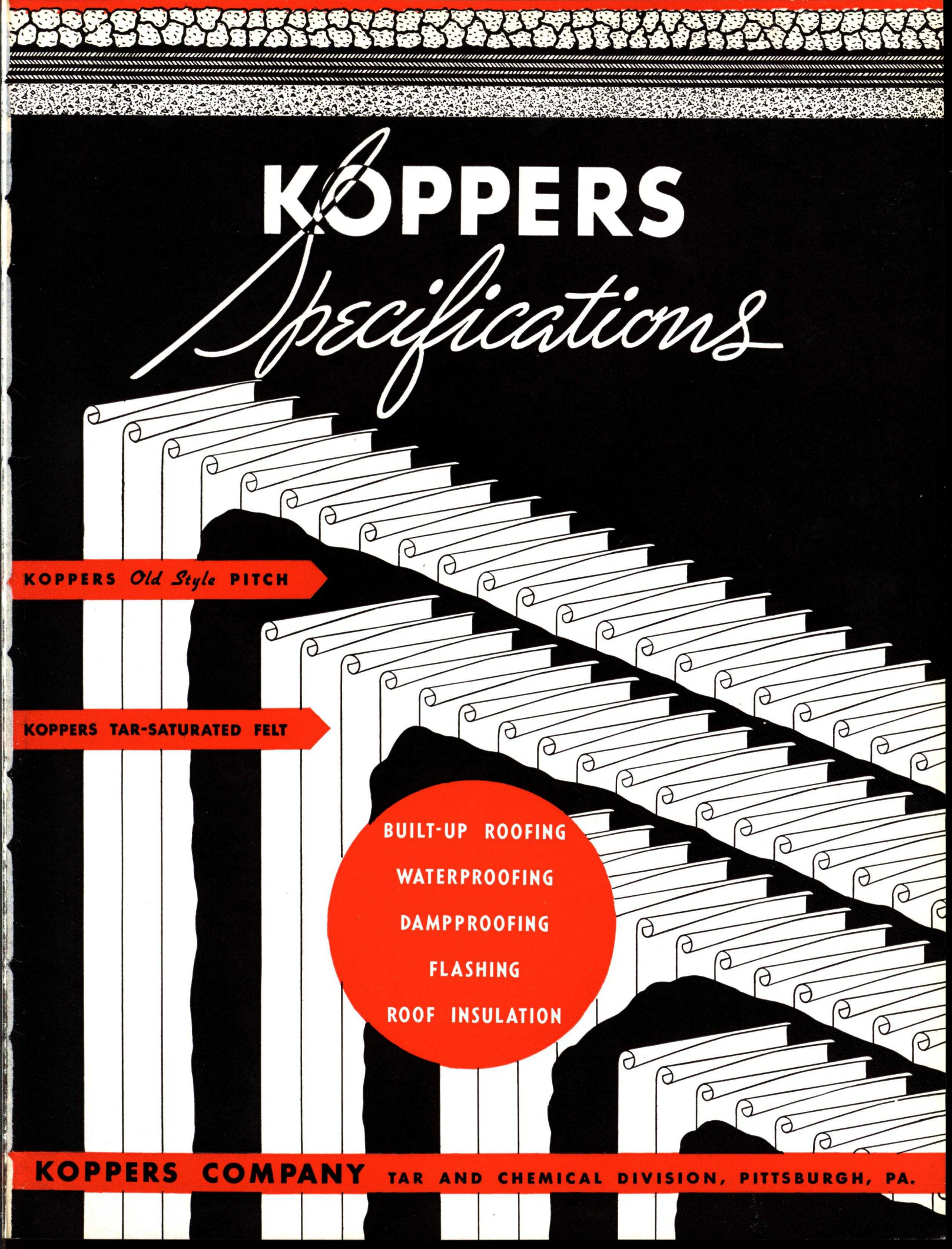
https://archive.org/details/buildingtechnologyheritagelibrary

KOPPERS *Specifications*



KOPPERS COMPANY TAR AND CHEMICAL DIVISION, PITTSBURGH, PA.

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ALL KOPPERS ROOFING SPECIFICATIONS ARE WRITTEN IN BLANK

In this catalog you will find complete standard specifications for all types of coal tar pitch and tarred felt roofs. *All these specifications are written in blank.* No manufacturer's materials are mentioned in the body of any one of them. The only reference to Koppers or to any Koppers products in the roofing specifications is in the section on materials where you will find the statement: "Materials shall be those as manufactured by the Koppers Company,.....Company,..... Company, or approved equal applied according to the above specifications."

You may safely turn any of these roofing specifications over to your stenographer and have her copy them for your master specifications. In compiling them, we have been guided by standard, accepted practices.

MATERIALS SPECIFICATIONS

KOPPERS APPROVED TARRED FELT meets the fifteen (15) pound tarred felt specifications indicated in this catalog. Koppers Approved Tarred Felt meets the following specifications: The Underwriters' Laboratories; Federal Specifications No. HH-F-201; and A.S.T.M. D-227-27.

KOPPERS OLD STYLE PITCH complies with the following standard specifications:

U. S. Government Master Specifications R. P.-381 (Federal Specifications Board)—"Coal Tar Pitch for Roofing."

A. S. T. M. D.-252-27—"High Bitumen Coal Tar Pitch for use in Constructing Built-up Roofs Surfaced with Slag or Gravel."

Underwriters' Laboratories.

THE ADVANTAGES OF THE FLAT DECK ROOFS

Flat roof decks are economical to construct and maintain and they are particularly useful on two or three-story buildings erected on foundations designed to carry additional stories. They are usually more pleasing architecturally; they often permit better ventilation and they make possible the high and low bay type of construction which delivers better light in industrial buildings.

THE ADVANTAGES OF COAL TAR PITCH FOR FLAT ROOFS

Two important questions should be asked about any roofing to be applied on flat decks:

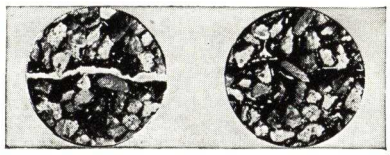
1. Can it resist prolonged contact with water without deteriorating?
2. Does it have the ability to heal itself automatically?

Roofs built with KOPPERS Coal Tar Pitch **do** resist water and they **do** heal themselves.

Many Koppers Roofs like this, where water lies constantly or intermittently as part of the air-conditioning system, prove the ability of Koppers Coal Tar Pitch and Tarred Felt to resist deterioration in the presence of water

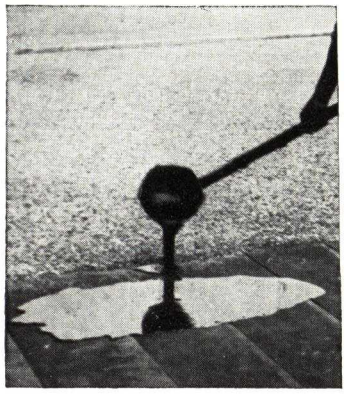
1. RESISTANCE TO WATER. Prolonged contact with water is a condition almost impossible to avoid on flat roofs. Poor drainage, low spots, or settlement of the building may cause it. Service records of 15 to 50 years by coal tar pitch roofs with little or no attention prove the resistance of tar to water. KOPPERS Coal Tar Pitch is practically insoluble in water. None of its constituents has more than a slight water solubility. It contains no added fillers that would induce water absorption or emulsification.

2. THE SELF-HEALING PROPERTY. Weathering and rapid changes in atmospheric conditions can cause cracks in the top surfaces of some types of roofing. However, the vital consideration is whether these cracks are permanent if they do appear. Coal tar pitch has a property technically known as "cold flow" and even at ordinary temperatures cracks in the surface heal themselves. This can clearly be seen in photomicrographs which show the sides of the cracks moving slowly together until complete fusion takes place and the pitch again forms a continuous layer. Coal tar pitch roofs readily conform to slight irregularities in the deck and yet remain waterproof.

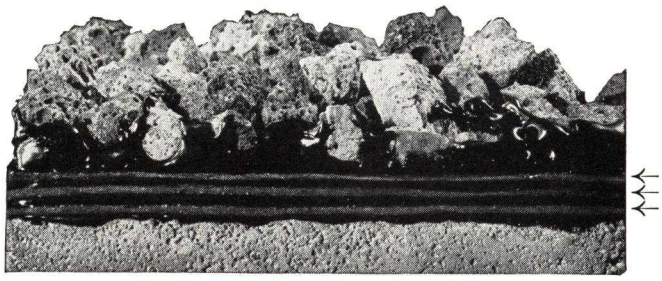


Broken (for Test) **Self-healed at Ordinary Summer Roof Temperature**

These photomicrographs show how a Koppers Coal Tar Pitch Roof self-heals any small breaks which occur



THE EXTRA-HEAVY TOP POURING. Additional protection is given a KOPPERS Roof by the extra-heavy top of roofing pitch which is poured on (not mopped). This pouring amounts to approximately 70 pounds for pitch for every 100 square feet of roof surface.



Enlarged Photograph of a Cross-Section of a Koppers Roof Over a Concrete Roof Deck

Arrows indicate layers of Koppers Approved Tarred Felt. Other layers are Koppers Old Style Pitch

THE GRAVEL OR SLAG SURFACE. The gravel or slag surface on a KOPPERS Roof provides an armor against hail, driving rain, sleet and snow. It also provides additional wearing surface which protects the roof against foot traffic. Roofs with gravel or slag surfaces cling to the deck even in severe wind storms.

THE EXTRA SATURATION OF THE FELT. The tarred felt used in KOPPERS Roofs absorbs one and one-half times its own weight of coal tar pitch during saturation. This large proportion of saturant insures high strength and maximum durability.

PRESERVATIVE AND NON-CORROSIVE ACTION. KOPPERS Old Style Pitch contains coal tar creosote, which is unsurpassed as a preservative for wood, felt or other materials which are used in roofing construction. It contains no mineral acids, alkalies, or corrosive substances and therefore cannot corrode metal surfaces with which it may come in contact.

WEIGHTS, CONTAINERS, ETC. KOPPERS Old Style Pitch is sold in barrels or metal containers, 450 to 500 lbs.

KOPPERS Tarred Felts are sold in standard size rolls, 32 inches wide and containing 432 square feet, except when otherwise specified. KOPPERS Approved Tarred Felt, the highest grade of roofing and waterproofing felt and the grade used in KOPPERS Bonded Roofs, has an approximate average weight of 15 lbs. per 100 sq. ft., or 65 lbs. per roll.

BOND. Maintenance Bonds on KOPPERS Roofing and Flashings are issued by Koppers Company and the National Surety Corporation on roofs constructed according to Koppers specifications and when applied by roofing contractors approved in writing by Koppers Company. When KOPPERS Bonded Roofing with KOPPERS Bonded Flashings are specified, this company will have an inspector on the job to see that it is constructed according to the specifications. The bond protects the building owner against any roofing maintenance expense due to leakage for the period of the bond. It is issued for 10, 15 or 20 years.

Note—*Koppers Company will issue Guarantee Roofing Bonds in such portions of the United States as are covered by its inspection service.*

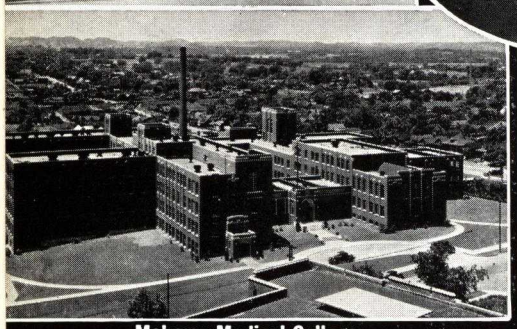
PROMINENT BUILDINGS ON WHICH KOPPERS ROOFING

Apartment—895 Park Avenue, New York City

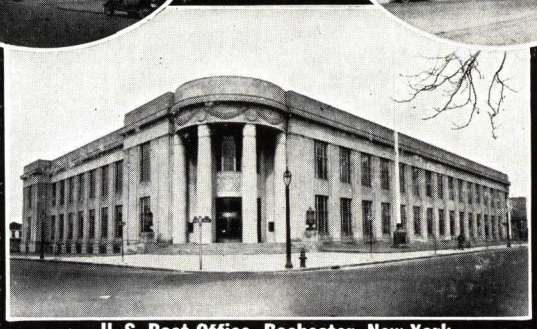
Ward Baking Company Cleveland, Ohio

Sears, Roebuck & Co. Building, Memphis, Tennessee

Western Union Building 230 Congress St., Boston

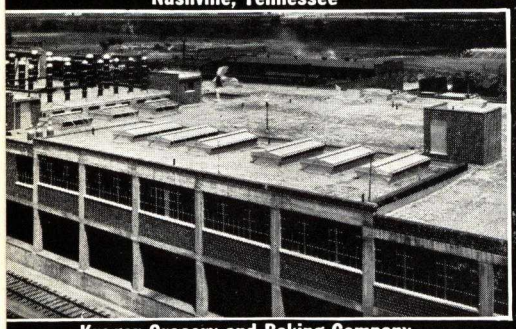


Meharry Medical College Nashville, Tennessee



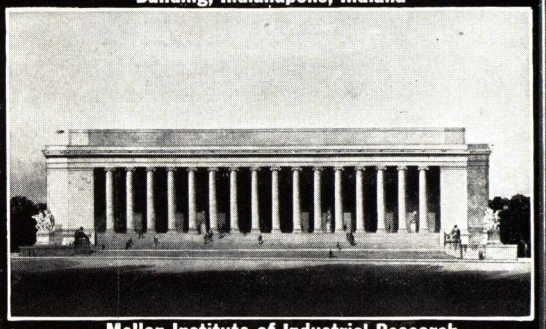
U. S. Post Office, Rochester, New York

Indiana State Library and Historical Building, Indianapolis, Indiana



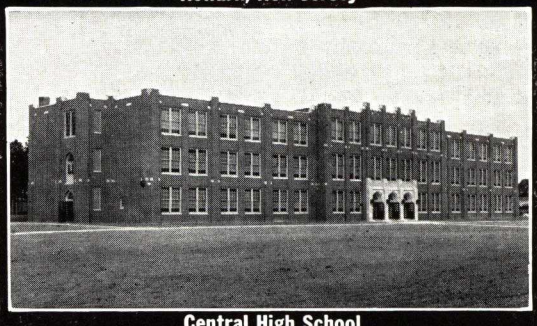
Kroger Grocery and Baking Company Cincinnati, Ohio

Westinghouse Electric & Mfg. Co. Newark, New Jersey

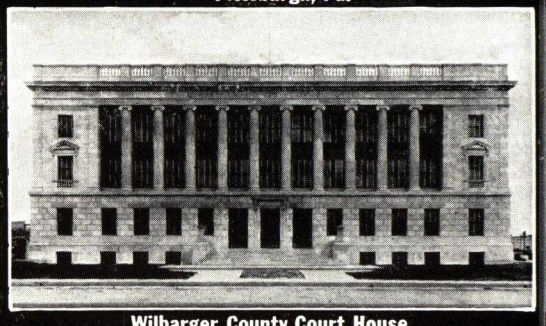


Mellon Institute of Industrial Research Pittsburgh, Pa.

United States Rubber Co., Passaic, New Jersey

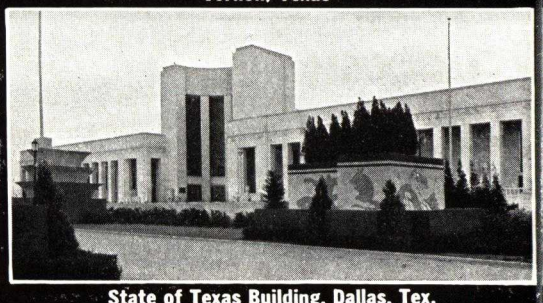


Central High School Greensboro, North Carolina



Wilbarger County Court House Vernon, Texas

Pennsylvania Railroad Freight Station, Chicago, Ill.

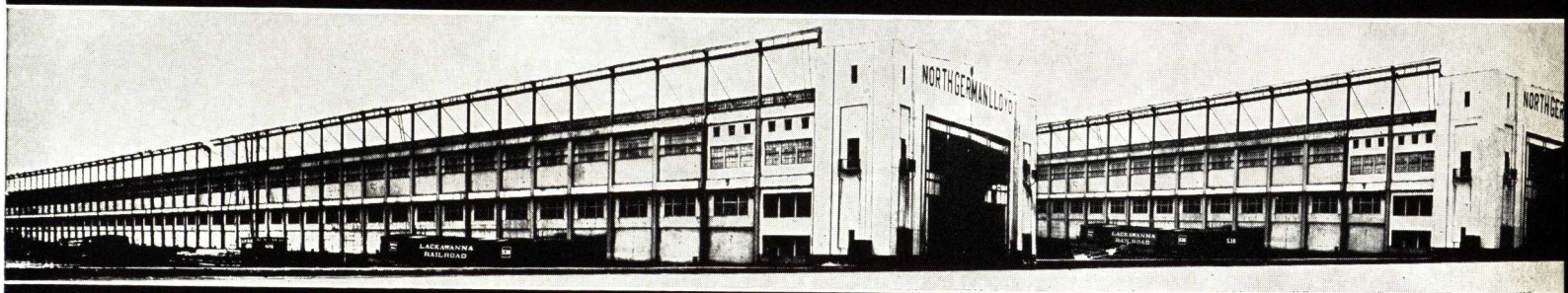


State of Texas Building, Dallas, Tex.

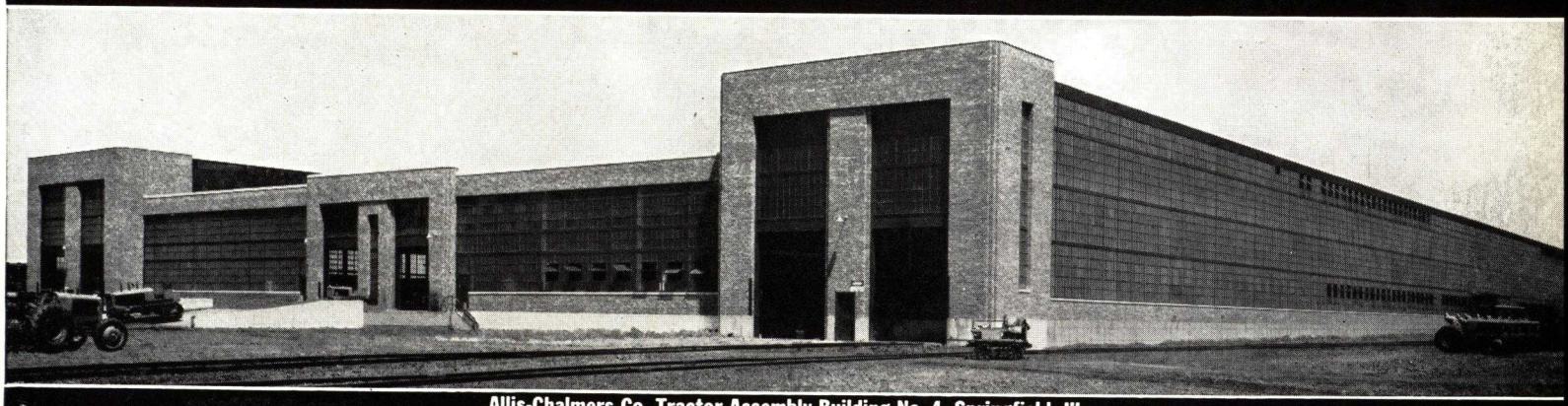
KOPPERS ROOFING SPECIFICATIONS

OR WATERPROOFING MATERIALS HAVE BEEN APPLIED

Navy and Munitions Building, Seventeenth and B, Southwest, Washington, D. C.



U. S. Shipping Board Merchant Fleet Corp., Brooklyn, N. Y.



Allis-Chalmers Co. Tractor Assembly Building No. 4, Springfield, Ill.

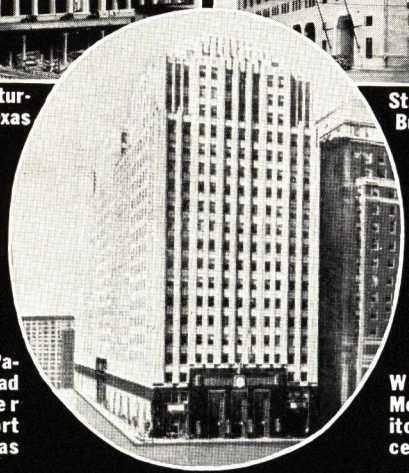
Coca-Cola Building
Atlanta, Georgia

Merchants & Manufacturers Bldg., Houston, Texas

St. Louis Globe Democrat Building, St. Louis, Mo.

Long-Lewis Hardware Company, Birmingham, Alabama

Texas and Pacific Railroad Passenger Station, Fort Worth, Texas



Pennsylvania Railroad Office Building, Philadelphia, Pa.

Worcester Memorial Auditorium, Worcester, Mass

KOPPERS ROOFING SPECIFICATIONS

Name	Location	Roofer	Architect
	ALABAMA		
Thomas Jefferson Hotel	Birmingham	Hahn Roofing and Heating Co.	D. O. Whilden
West End High School	Birmingham	Birmingham Fur. and Rfg. Co.	Warren Knight & Davis
B. F. Goodrich Tire Co. Building	Birmingham	Hahn Roofing and Heating Co.	Owner
Lanett Cotton Mills & Bleachery	Lanett	O. A. Smith Co.	J. E. Sirrine Co.
	ARKANSAS		
North Little Rock High School	N. Little Rock	Williams Roofing Co.	Mann Wanger & King
State A. M. and N. School	Pine Bluff	Williams Roofing Co.	Thompson Sanders & Ginnochio
	COLORADO		
A. T. & S. F. Ry. Co., Roundhouse	La Junta	Lydick Roofing Co.	Company Engineer
	CONNECTICUT		
United States Coast Guard Academy	New London	Johnson Rfg. & Sht. Mt. Wks.	U. S. Government
Norwich State Hospital	Norwich	Johnson Rfg. & Sht. Mt. Wks.	Cudworth & Thompson
Grosvenor Dale Co., Building No. 5, Mill No. 2	No. Grosvenordale	Eagle Cornice Co.	P. W. Dalrymple
	DELAWARE		
Laurel High School	Laurel	Roofing and Improve. Co.	Guilbert & Bettelle
	DISTRICT OF COLUMBIA		
Potomac Electric Power Co.	Bennings	Ironclad Roofing Co.	Stone & Webster
Southern Railway Office Building	Washington	Ironclad Roofing Co.	Waddy B. Wood
Navy and Munitions Building	Washington	W. F. Overly	U. S. Government
	GEORGIA		
Goodyear Tire & Rubber Co., Inc.	Rockmart	Birmingham Fur. & Rfg. Co.	Owner
Lucky Operating Co., Canda Dry Co.	Atlanta	O. A. Smith Co.	E. C. Seiz
Uxbridge Worsted Co.	Macon	J. Roy Martin	J. E. Sirrine Co.
University Hospital	Augusta	Acme Rfg., Htg. & Mtl. Co.	Scroggs & Ewin
	ILLINOIS		
Allis-Chalmers Co., Tractor Assembly Building No. 4	Springfield	Chicago Roofing & Supply Co.	Helmle & Helmle
Sanitary District of Chicago	Chicago	Luse Stevenson Co.	Owner
Peoples Gas Light and Coke Co.	Chicago	F. D. Renaud	Owner
Jackson-Franklin Building	Chicago	Luse Stevenson Co.	Alfred S. Alschuler
John Hill Junior High School	Decatur	B. M. Dennis and Son	Brooks Bramhall
Pennsylvania R. R. Freight Station	Chicago	Luse Stevenson Co.	Owner
Standard Brands Vinegar House	Chicago	Jacobson Roofing Co.	W. C. Bennett
	INDIANA		
Lever Bros. Co.	Hammond	Chicago Rfg. and Sup. Co.	Chas. T. Main, Inc.
Kraft-Phenix Cheese Corp.	Sullivan	J. J. Dunne Roofing Co.	Owners
Schenley Distillery Warehouse	Lawrenceburg	Warren Ehret Co.	Carl. J. Keifer
	KENTUCKY		
C. & O. R R, Roundhouse	Stevens	W. F. Overly & Sons	Owner
Martin Brown Building	Louisville	Samuel F. Troxell Co.	Owner
Eastern Kentucky State Teachers College (Addition to Library Building)	Richmond	Robert B. Pace	C. C. & S. K. Weber, Inc.
Louisville Gas & Electric Co.	Louisville	Samuel F. Troxell Co.	Byllesby Engineering & Management Corp.
	LOUISIANA		
Lake Charles Harbor & Terminal Co.	Lake Charles	Louisiana Western Lumber Co.	Owner
Pittsburgh Plate Glass Co., Warehouse	New Orleans	J. J. Clarke Co.	Favrot & Livaudais
New Orleans Compress Co., Warehouse	New Orleans	Clifford Favrot Supply Co.	J. F. Coleman Engr. Co.
	MAINE		
Boys' Club	Portland	M. B. Bourne & Son	J. C. & J. H. Stevens
	MARYLAND		
United States Parcel Post Building	Baltimore	Ehret Rfg. and Mfg. Co.	Bishop Knowlton & Carson
Pangborn Corp., New Warehouse	Hagerstown	Tri-State Roofing Co.	Owner
Merchants Terminal Corp., Cold Storage Warehouse	Baltimore	J. O. White Co.	J. H. Wilkersham
	MASSACHUSETTS		
Western Union Telegraph Co.	Boston	Finnegam Roofing Co.	Stone & Webster
Boston Consolidated Gas Co.	Jamaica Plain	Columbia Cornice Co.	Rust Engineering Co.
Bigelow-Sanford Carpet Co.	Clinton	Eagle Cornice & Skylight Wks.	G. H. Hayter
New England Tel. & Tel. Co.	Lynn	Eagle Cornice & Skylight Wks.	Densmore, LeClair & Robbins
Commonwealth of Massachusetts Industrial Building	Norfolk	Atlas Roofing & Skylight Wks.	McLaughlin & Burr
Pepperell Mfg. Co.	Fall River	Farber Sht. Metl. & Rfg. Co.	Owner
	MICHIGAN		
Detroit House of Correction	Detroit	John D. Busch	Albert Kahn, Inc.
Springwell Filtration Plant	Detroit	C. R. Woolensack	City of Detroit
Grace Hospital Memorial Building	Detroit	Michigan Roofing & Cornice Co.	Albert Kahn, Inc.
S. S. Kresge Co.	Flint	Edwin Sterner Co.	Owners
Linde Air Products Co. Building	Detroit	Schreiber Bros., Inc.	Owner
	MINNESOTA		
International Harvester Company	St. Cloud	W. S. Nott Company	Owner
	MISSISSIPPI		
Standard Life Insurance Co.	Jackson	Ray Wright Rfg. & Sht. Mtl. Wks.	N. W. Overstreet
	MISSOURI		
Washington University Power House	St. Louis	St. Louis Roofing Co.	Baumes-McDevitt Co.
Sears, Roebuck & Co.—2 Stores	St. Louis	Biebel Bros. Roofing Co.	Nimmons Carr & Wright
Monsanto Chemical Co. Building	St. Louis	Swift Roofing Co.	Mauran Russell & Crowell
M. K. Goetz Brewing Co.	Kansas City	Sellers & Marquis	Geo. L. Lehle
Webster Groves Junior High School	Webster Groves	P. W. Finger Roofing Co.	Wm. B. Ittner
International Harvester Co.	St. Louis	St. Louis Roofing Co.	Owner
	NEBRASKA		
Morton School	Hastings	J. H. Still & Co.	M. L. Evans
	NEW HAMPSHIRE		
Union Leader Publishing Co.	Manchester	M. J. Murphy	Lockwood, Greene, Inc.
Gulf Refining Co., Service Station	Hanover	The A. C. Hathorne Co.	
	NEW JERSEY		
General Motors Corporation	Linden	M. H. Donovan & Co.	Albert Kahn
New York Central Railroad	Weehawken	Cooper & Co.	Owner
United States Rubber Co.	Passaic	T. F. Sloan Co.	Lockwood, Greene, Inc.
Lehigh Warehouse Trans. Co.	Newark	J. Steinberg & Son	Fletcher-Thompson Co.
Aluminum Co. of America, Factory Building	Edgewater	Cunningham Roofing Co.	Owners
Hudson County Tuberculosis Hospital	Jersey City	Jacob Ringle & Sons, Inc.	John T. Rowland
National Bearing Metals Corp.	Jersey City	A. Ratner & Co.	Leroy Cowan

Name	Location	Roofer	Architect
	NEW YORK		
General Railway Signal Co.	Rochester	Flesch & Schmitt, Inc.	Gordon & Kaelber
Riverside High School	Buffalo	Rademacher Bros.	F. J. & W. A. Kidd
Jewish Y. M. & W. Association Building	Rochester	Flesch & Schmitt, Inc.	S. Firestone
City of Albany Filtration Building	Albany	United Roofing Co.	W. H. Emory, Jr.
Jefferson High School	New Rochelle	Kay Roofing Co.	Starrett & Van Vleck
Kings County Hospital	Brooklyn	Sobel & Krause	Leroy P. Ward
Creedmore State Hospital	Creedmore, L. I.	Bushwick Cornice Wks.	State of New York
United States Post Office	Brooklyn	A. Ratner Co.	U. S. Government
Pilgrim State Hospital	Brentwood, L. I.	Bushwick Cornice Wks.	State of New York
New York State Hospital for Insane	Central Islip	Supreme Sheet Metal Wks.	State of New York
Board of Transportation	New York	New York Roofing Co.	Owner
Brooklyn Court House	Brooklyn	Chrystie Cornice Wks.	Collens & Collens
Brooklyn Borough Gas Co.	Brooklyn	Thos. Flanagan, Jr.	Black & Heas
Sing Sing Prison	Ossining	Bushwick Cornice Wks.	State of New York
Pier 21—North River	New York	Jacob Ringle & Son	Owner
Sheffield Farms Co., Inc.	New York	Sheridan Roofing Co.	Owner
Bronx Terminal Market	Bronx	Bushwick Cornice Wks.	Louis, Chandler & Mills
Continental Can Co.	Syracuse	Sheridan Roofing Co.	Owner
United States Shipping Board	Brooklyn	Bushwick Cornice Wks.	Cass Gilbert
Boulevard Garden Apartments	Woodside, L. I.	Bushwick Cornice Wks.	Theo. Englehart
News Syndicate Co.	Brooklyn	J. J. Fisher Co.	Lockwood, Greene, Inc
United States Military Academy	West Point	Chrystie Cornice & Skylight Wks.	Owners
Carborundum Co., Buildings No. 10, 11, and 12	Niagara Falls	Jos. A. Sanders, Inc.	Owner
Distilled Liquors Corp.	Lyons	Flesch & Schmitt, Inc.	Henri Vallet
Monroe County Home—Unit No. 4	Brighton	George Ballard	S. Firestone
	NORTH CAROLINA		
Junior High School	High Point	S. O. Peebles	Harry Barton
Lucky Strike Factory	Durham	Budd-Piper Roofing Co.	Owner
McEwen Knitting Co. Mill	Burlington	F. B. Ingold	J. E. Sirrine
	OHIO		
DeVilbiss High School	Toledo	Schreiber Roofing Co.	Edwin Gee
Seiberling Rubber Co.	Barberton	Akers & Harpham	Owner
The May Co.	Cleveland	A. L. Sacheroff	Graham, Anderson, Probst & White
Loose-Wiles Baking Co.—Carton Plant	Dayton	Schriber Sheet Metal & Roofers	Owner
American Tobacco Co.	Dayton	Schriber Sheet Metal & Roofers	Owner
Carnation Co.—Condenser House	Coshocton	Akers & Harpham	Owner
	OKLAHOMA		
J. C. Penney Co., Inc.	Tulsa	Corson Roofing Co.	Owner
Prest-O-Lite Co.	Oklahoma City	Swanda Bros.	Owner
Frisco Union Depot	Oklahoma City	C. C. Cooke Co.	Owner
	PENNSYLVANIA		
Wm. Penn Hotel Addition	Pittsburgh	Chas. H. Hahn	Jannsen & Cocken
State Farm Show Buildings	Harrisburg	W. F. Overly & Sons	Lowrie & Green
H. J. Heinz Auditorium	Pittsburgh	Warren-Ehret Co.	Albert Kahn
New Allegheny General Hospital	Pittsburgh	East Liberty Coal & Supply Co.	York & Sawyer
University of Pittsburgh—Cathedral of Learning	Pittsburgh	Chas. H. Hahn	Owen D. Stephens
Allegheny County Home	Woodville	Warren-Ehret Co.	J. Lawrence Hopp
United States Bureau of Mines	Pittsburgh	Tri-State Roofing Co.	Lawrence Wolf
State Highway Garage	Mercer	Warren-Ehret Co.	Owner
Pittsburgh & Lake Erie R. R.—Train Sheds	Pittsburgh	Warren-Ehret Co.	Owner
Gotham Silk Hosiery Mill	Philadelphia	Joseph Rammacher	Owner
Westinghouse Electric & Manufacturing Co., Warehouse	Pittsburgh	Warren-Ehret Co.	Owner
Hookless Fastener Co., Building "D"	Meadville	Warren-Ehret Co.	Owner
Jos. S. Finch Co., Warehouse No 11	Schenley	Tri-State Roofing Co.	Carl Keifer
Middletown Air Depot	Harrisburg	Louis Ruger	Owner
	RHODE ISLAND		
United Electric Railways Co.	Providence	Maguire Roofing Co.	Owners
Providence Journal Building	Providence	M. N. Cartier & Sons	Albert Kahn
	SOUTH CAROLINA		
Gaffney Mfg. Co., Cotton Mill	Gaffney	Builders Roofing Co.	Lockwood, Green, Inc.
S. H. Kress Co.	Charleston	Charleston Sheet Metal Wks.	Owner
Gluck Mill	Anderson	J. Roy Martin	J. E. Sirrine Co.
Aragon Baldwin Mills	Chester	F. B. Ingold Co.	J. E. Sirrine Co.
Kendall Mills	Newberry	J. Roy Martin	Lockwood, Green, Inc.
	TENNESSEE		
United States Aluminum Co.	Alcoa	W. F. Overly & Sons	Owner
Central Hospital for Insane	Nashville	Taylor Roofing Co.	Marr & Holman
McHarry Medical College Hospital	Nashville	Taylor Roofing Co.	Gordon & Kaebler
American Bakeries	Knoxville	Jay Roehl Co.	Bauman & Bauman
	TEXAS		
South Junior High School	Beaumont	Gulf Coast Roofing Co.	Livesay & Wiederman
Harlandale Junior High School	San Antonio	Joe Dean Sheet Metal Wks.	Morris & Noonan
Southwestern Bell Telephone Co.	Dallas	Rogers Asbestos Co.	Lang & Witchell
Federal Bank Building	Houston	Rogers Asbestos Co.	Hedrick & Gottlieb
Thomas Jefferson Senior High School	San Antonio	Samuel Dean	Adams & Adams
Texas & Pacific Railway Co.	Brownsville	Guarantee Roofing Co.	None
University of Texas	Austin	Parker Roofing Co.	Greene, LaRoche & Dahl
	VERMONT		
Gulf Refining Co., Lubritorium	Barre	The A. C. Hathorne Co.	Owner
	VIRGINIA		
Norfolk & Western Railway Co.	Lamberts Point	T. B. Dornin-Adams Co., Inc.	Owner
Sternheimer Bros., Warehouse	Richmond	Piper Roofing Co.	J. Binford Walford
Industrial Rayon Corp.	Covington	Warren-Ehret Co.	Christian-Schwartzberger & Gaede
	WISCONSIN		
Wisconsin Telephone Co.	Milwaukee	F. J. A. Christiansen	Eschweiler & Eschweiler
Milwaukee County Court House	Milwaukee	F. J. A. Christiansen	Albert Randolph Ross
Lake Bluff School	Shorewood	Cream City Roofing Co.	Eschweiler & Eschweiler
Addition to Milwaukee Hospital	Milwaukee	F. J. A. Christiansen	Clas & Clas
Seaman Body Corp., Unit No. 14	Milwaukee	F. J. A. Christiansen	Owner
The Plankington Trust Dept. Store	Milwaukee	F. J. A. Christiansen	Kirchoff & Rose
Blatz Brewing Co., Case Storage Building	Milwaukee	F. J. A. Christiansen	Geo. L. Lehly
Rufus King High School	Milwaukee	F. J. A. Christiansen	School Board
	WEST VIRGINIA		
Chesapeake & Ohio Railway Co.	Huntington	West Virginia-Kentucky Hardware & Supply Co.	Owner
Carbide & Carbon Chemicals Corp.	So. Charleston	J. E. Harris Co.	Owner

5 PLY OVER WOOD DECKS

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 1

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks, and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the twenty-two (22) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart. All nails shall be covered by not less than two (2) plies of Tarred Felt.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. Nailing of all felt shall be done with simplex flat head roofing nails or with seven-eighths (⅞) inch galvanized roof nails driven through flat tin discs.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and fifty (150) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.

4 PLY OVER WOOD DECKS

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 2

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. Nailing

of all felt shall be done with simplex flat head roofing nails or with seven-eighths (⅞) inch galvanized roof nails driven through flat tin discs.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and twenty-five (125) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the roofing manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 200 and No. 201.

STEEP SLAG 5 PLY OVER WOOD DECKS

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 3

Maximum Incline Six (6) Inches per Foot and Not Less Than Two (2) Inches Per Foot

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be of seasoned or treated lumber.

APPLICATION OF ROOFING MATERIAL. First—Lay one thickness of sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheet one inch. The sheathing paper shall be nailed sufficiently to hold it in place during application of the roofing.

Second—Lay over the entire surface five (5) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding sheet. Each sheet shall be nailed with one inch barbed roofing nails through flat tin discs, each eight (8) inches from the upper edge. Nails shall be spaced not more than one foot apart.

Third — Each sheet shall be mopped for a distance of twenty-four (24) inches with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that the pitch moppings are even with lower edge of each overlying sheet, and that the finished felt surface is free of pitch drippage.

Fourth—Over the entire surface, spread with a mop a uniform coating of Steep Roofing Pitch into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth (¼) inch to five-eighths (⅝) inch in size, shall be dry and free from dirt. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

For each one hundred (100) square feet of completed roofing surface there shall be not less than eighty (80) pounds of pitch for felt moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied. Slag stops at gutters shall extend one and one-half (1½) inches above the roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to above specifications.

BOND. (If a 20-year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-year Surety Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.

STEEP MINERAL SURFACED ROOFING OVER WOOD DECKS

KOPPERS 10-YEAR BUILT UP ROOFING SPECIFICATION NO. 4

(For Inclines Exceeding Four (4) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The lumber shall be seasoned or treated.

APPLICATION OF ROOFING MATERIAL. First—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. The felt shall be laid across and not up and down the slope of the roof. Nail each sheet with one (1) inch barbed roofing nails through flat tin discs two (2) inches from the lower edge. Nails shall be spaced not more than eighteen (18) inches apart.

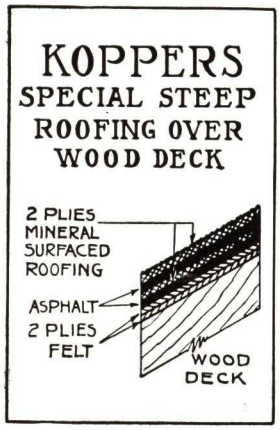
Second—Spread with a mop over the surface thus prepared a uniform coating of Steep Asphalt into which, while hot, embed a sheet of Mineral Surfaced Roofing, lapping each sheet the full nineteen (19) inch selvage. Sheets of mineral surfaced roofing shall be laid across and not up and down the slope of the roof, and shall be securely fastened in place along the selvage side with a double course of one (1) inch barbed roofing nails through flat tin discs, nails in each course to be spaced twelve (12) inches apart and courses staggered. Nailing course nearest the longitudinal center of the sheet shall be held back from the mineral surfacing two inches.

Third—Over the full width of the nineteen (19) inch selvage spread with a mop a uniform coating of Steep Asphalt into which, while hot, thoroughly embed the following sheet of Mineral Surfaced Roofing.

Fourth—There shall be a six (6) inch end lap between adjoining sheets. The underlying sheet of each end lap shall be nailed with eight (8) one (1) inch barbed roofing nails through flat tin discs. Nails to be spaced four (4) inches apart starting two (2) inches from the lower edge of each sheet. Coat the underside of six (6) inch end lap with Steep Asphalt and firmly embed the overlapping sheet.

All edges and end laps shall be carefully rubbed down.

GENERAL. Mineral surfaced roofing shall be cut in strips not exceeding twenty (20) feet in length and shall be stacked flat.



All felts and mineral surfaced roofing shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than fifty (50) pounds of Steep Asphalt. Asphalt shall not be heated above three hundred, seventy-five (375°) degrees F.

Where the steep roof joins the flat roof, the roofing in the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied. Special Steep Bonded Roofing is to be applied in connection with Bonded Flat Roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 10-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 10-Year Surety Maintenance Bond to the owner.

FLASHING. For 10-Year Flashing refer to Specifications No. 101 and No. 103.

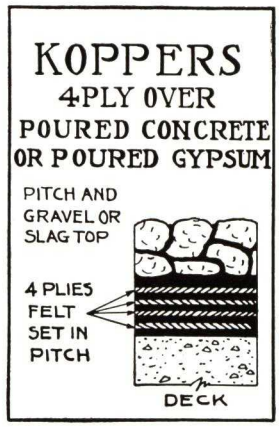
4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 5

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean, and if inclined shall be properly sloped to outlets.

Decks or inclines exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing, or creosoted wood nailing strips must be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof.



APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch to the deck.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt.

When nailing is necessary nails should be placed not less than three (3) inches from the upper edge of each sheet and not more than three (3) feet apart. All nails shall be covered by not less than three (3) plies of felt.

All felts shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 6

(Maximum Incline One-Quarter (¼) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry firm and clean.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch to the deck.

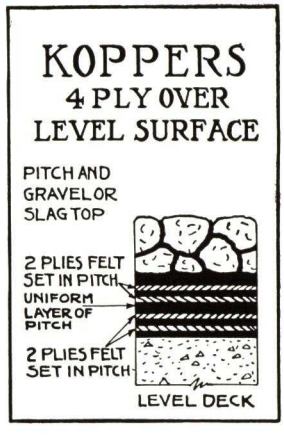
Second—Lay over the entire surface two (2) plies of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Third—Apply a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) plies of Tarred Felt lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing there



shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

3 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 7

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean, and if inclined shall be properly sloped to outlets.

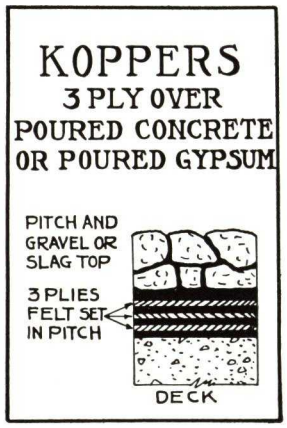
Decks or inclines exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing or creosoted wood nailing strips must be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and shall be placed up and down and not across the slope of the roof.

APPLICATION OF ROOFING MATERIAL—First—Apply a uniform coating of Coal Tar Pitch to the deck.

Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shell felt touch felt.

When nailing is necessary nails shall be placed not less than three (3) inches from the upper edge of each sheet and not less than three (3) feet apart. All nails shall be covered by not less than two (2) plies of felt.

All felts shall be laid without wrinkles or buckles.



Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 203.

STEEP SLAG 4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 8

(Maximum Incline Six (6) Inches Per Foot and Not Less Than Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm, clean and should be suitable for nailing. If the Poured Concrete or Poured Gypsum deck does not permit nailing, creosoted wooden nailing strips shall be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Steep Roofing Pitch to the deck.

Second—Lay over the entire surface four full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-four and one-half (24½) inches over preceding sheet. Each sheet shall be nailed with one inch barbed roofing nails through flat tin discs, eight inches from the upper edge, and nails shall be spaced not more than one foot apart. Where nailing strips are used, the felt shall be nailed with two nails through flat tin discs (at each nailing strip) placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

Third—Each sheet shall be mopped the full distance of the twenty-four and one-half (24½) inch lap with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet and that the finished felt surface is free from pitch drippage.

Fourth—Over the entire surface spread with a mop a uniform coating of Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth (¼) to five-eighths (⅝) inches in size, shall be dry and free from dirt. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded in the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred (100) pounds of pitch for felt and deck moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied.

Slag stops at gutters shall extend one and one-half (1½) inches above roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the Owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

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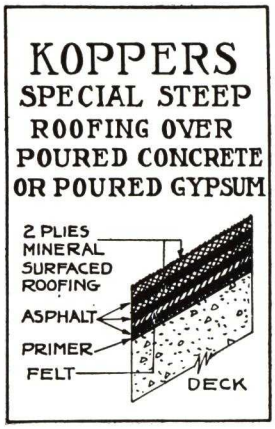
STEEP MINERAL SURFACED ROOFING OVER POURED CONCRETE OR POURED GYPSUM DECK

KOPPERS 10-YEAR BUILT UP ROOFING SPECIFICATION NO. 9

(For Inclines Exceeding Four (4) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and suitable for nailing. If the Poured Concrete or Poured Gypsum deck does not permit nailing, creosoted nailing strips shall be set flush with the deck, such strips to be spaced three (3) feet apart and placed up and down the slope of the roof.

APPLICATION OF ROOFING MATERIAL. First—Apply over the deck surface a priming coat of Asphalt Primer which shall be allowed to dry for at least one (1) hour.



Second—Coat the entire surface of the deck with a uniform mopping of Steep Asphalt into which, while hot, embed one (1) ply of Tarred Felt, lapping each sheet six (6) inches over the preceding sheet. The felt shall be laid across and not up and down the slope of the roof. The six (6) inch lap shall be thoroughly mopped with Steep Asphalt so that in no place shall felt touch felt. Nail each sheet two (2) inches from the lower edge with barbed roofing nails driven through flat tin discs and spaced not more than eighteen (18) inches on center.

When nailing strips are used the felt shall be nailed with three (3) nails through flat tin discs, eight (8) inches apart and starting two (2) inches from the lower edge of each sheet at each nailing strip.

Third—Spread with a mop over the surface thus prepared a uniform coating of Steep Asphalt, into which, while hot, embed a sheet of Mineral Surfaced Roofing, lapping each sheet the full nineteen (19) inch selvage. Sheets of Mineral Surfaced Roofing shall be laid across and not up and down the slope of the roof and shall be securely fastened in place along the selvage side with a double course of one (1) inch barbed roofing nails through flat tin discs, nails in each course to be spaced twelve (12) inches apart and courses staggered. Nailing occurring nearest the longitudinal center of each sheet shall be held back from the mineral surfacing two (2) inches. When nailing strips are used the sheets shall be nailed along the selvage side with three (3) nails driven through flat tin discs, spaced five (5) inches apart at each nailing strip. All nails to be held back two (2) inches from the mineral surfacing.

Fourth—Over the full width of the selvage mop a uniform coating of Steep Asphalt into which, while hot, embed the following sheet of Mineral Surfaced Roofing.

There shall be a six (6) inch end lap between adjoining sheets. The underlying sheet of each end lap shall be nailed with eight (8) one (1) inch barbed roofing nails through flat tin discs. Nails to be spaced four (4) inches apart starting two (2) inches from the lower edge of each sheet. Coat the underside of the six (6) inch end lap with Steep Asphalt and firmly embed the overlapping sheet.

All edges and end laps shall be carefully rubbed down.

Mineral Surfaced Roofing shall be cut in strips not exceeding twenty (20) feet in length and shall be stacked flat for sufficient time to permit these strips to become perfectly flat before starting application.

GENERAL. All felts and mineral surfaced roofing shall be laid without wrinkles or buckles. All tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred (100) pounds of Steep Asphalt. Asphalt shall not be heated above 375 degrees Fahrenheit.

Where steep roof joins flat roof, the roofing in the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before steep roofing is applied. Special Steep Bonded Roofing is to be applied in connection with Bonded Flat Roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. If bond is required, insert same paragraph as under "Bond" in Specification No. 4.

FLASHING. For 10-Year Flashing refer to Specifications No. 101 and No. 103.

4 PLY OVER PRECAST CONCRETE SLAB

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 10

(Maximum Incline One (1) Inch Per Foot)

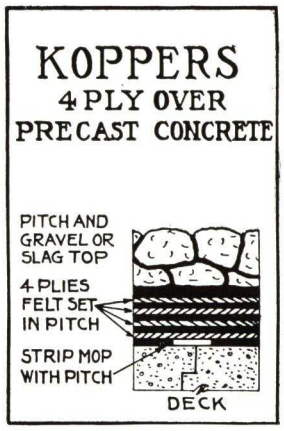
PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, firm, dry and clean. If roof deck is inclined, it shall be properly sloped to the outlets. The incline shall not exceed one (1) inch to the foot.

APPLICATION OF ROOFING MATERIAL. First—Each slab shall be spot or strip mopped with Coal Tar Pitch. The pitch moppings shall be held back four (4) inches from edge of each joint.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet. In no place shall felt touch felt. Tarred Felt shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing surface there shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.



Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. If Bond is required, insert same paragraph as under "Bond" in Specification No. 12.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

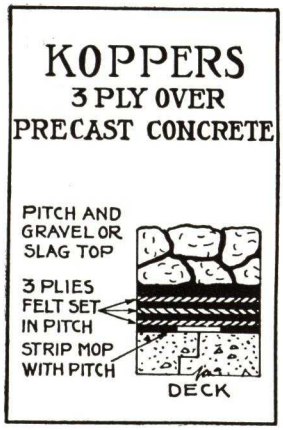
3 PLY OVER PRECAST CONCRETE SLAB

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 11

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, firm, dry and clean. If the roof deck is inclined it shall be properly sloped to the outlets. In such cases the incline shall not exceed one (1) inch to the foot.

APPLICATION OF ROOFING MATERIAL. First—Each slab shall be spot or strip mopped with Coal Tar Pitch; the moppings shall be held back four (4) inches from the edge of each joint.



Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt lapping each sheet, twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches so that in no place shall felt touch felt. All felts shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a KOPPERS 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 203 and No. 202.

5 PLY OVER PRECAST GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 12

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined, it shall be properly sloped to the outlets. All joints between the precast gypsum slabs shall be properly pointed.

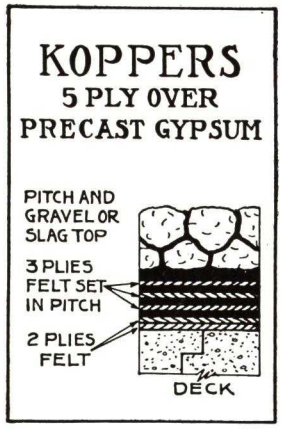
APPLICATION OF ROOFING MATERIAL. First—Two (2) full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as may be necessary to hold the sheets in place until the remaining felt is laid.

Second—Apply a uniform coating of Coal Tar Pitch.

Third—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, and mopping with Coal Tar Pitch the full width of the twenty-two (22) inch lap, so that in no place shall felt touch felt. Nail six (6) inches from the upper edge of each sheet and not more than two (2) feet apart. Nails shall not exceed seven-eighths (⅞) inch in length and shall be driven through flat tin discs which shall be not less than one (1) inch in diameter.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth (¼) to five-eighths (⅝) inch in size.

GENERAL. All tarred felts shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and fifty (150) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.



MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications

BOND. (If a KOPPERS 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 201.

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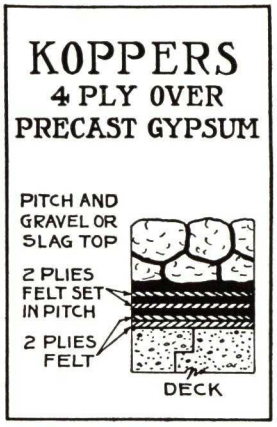
4 PLY OVER PRECAST GYPSUM

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 13

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined it shall be properly sloped to the outlets. All joints between the precast gypsum slabs shall be properly pointed.

APPLICATION OF ROOFING MATERIAL. First—Two (2) full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet and nailing as often as may be necessary to hold the sheets until the remaining felt is laid.



Second — Apply a uniform coating of Coal Tar Pitch.

Third—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap so that in no place shall felt touch felt. Nail six (6) inches from the upper edge of sheet and not more than two (2) feet apart. Nails shall not exceed seven-eighths (⅞) inch in length and shall be driven through flat tin discs which shall not be less than one (1) inch in diameter.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and twenty-five (125) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., ——Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 201.

STEEP SLAG 5 PLY OVER PRECAST GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 14

(Maximum Incline Six (6) Inches Per Foot and Not Less Than Two (2) inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. All joints between the precast gypsum slabs shall be properly pointed.

APPLICATION OF ROOFING MATERIAL. First—Lay over the entire surface five (5) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding sheet. Each sheet shall be nailed with one and one-half inch barbed roofing nails, through flat tin discs, eight (8) inches from the upper edge. Nails to be spaced not more than one (1) foot apart.

Second—Each sheet shall be mopped for a distance of twenty-four (24) inches with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet, and that the finished felt surface shall be free of drippage.

Third—Over the entire surface spread with a mop a uniform coating of Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth (¼) to five-eighths (⅝) inch in size, shall be dry and free from dirt. If roofing is applied during cool weather or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than eighty (80) pounds of pitch for

felt moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied.

Slag stops at gutters shall extend one and one-half (1½) inches above the roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 201.

4 PLY OVER BOOK TILE

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 15

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The book tile shall be surfaced with not less than one (1) inch of Portland Cement Mortar or Gypsum, finished smooth, firm, dry and clean and properly bonded to the underlying tile. If the roof deck is inclined, it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIALS. Roofing shall be applied according to Koppers Roofing Specification No. 5.

3 PLY OVER BOOK TILE

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 16

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The book tile shall be surfaced with not less than one (1) inch of Portland Cement Mortar or Gypsum, finished smooth, firm, dry and clean and properly bonded to the underlying tile. If the roof deck is inclined, it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIALS. Roofing shall be applied according to Koppers Roofing Specification No. 7.

OVER STEEL DECK

4 PLY OVER STEEL DECK WITH INSULATION

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 17

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The Steel Deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. If the deck is inclined it shall be properly graded to the outlets.

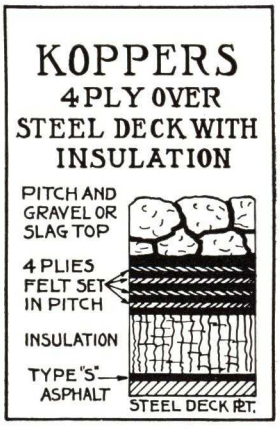
APPLICATION OF MATERIAL. First—Mop the steel deck with Steep Asphalt into which, while hot, embed the insulation pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. When more than one (1) layer of insulation is used the top surface of each layer shall be coated with Coal Tar Pitch into which, while hot, embed the succeeding layer. (This is optional because layers may be laid dry if desired.) All joints shall be broken between the layers of insulation. All layers of insulation shall be parallel to preceding layers. Edges shall be brought closely together and shall not be forced into place. No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes. Cut-offs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

Second—Apply a uniform coating of Coal Tar Pitch over the insulation.

Third—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt. All tarred felts shall be laid without wrinkles or buckles.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel, or three hundred (300) pounds of slag, for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.



GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than two hundred (200) pounds of Coal Tar Pitch and not less than thirty-five (35) pounds of Coal Tar Pitch for moppings between each layer of insulation. Approximately thirty-five (35) pounds of Steep Asphalt shall be required for the deck mopping. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Asphalt shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit.

Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

Koppers Company will not be responsible for any damage to or below the built-up roofing caused by or as the result of the use of insulation.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 204.

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3 PLY OVER STEEL DECK WITH INSULATION

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 18

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The Steel Deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. If the deck is inclined it shall be properly graded to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Mop the steel deck with steep Asphalt into which, while hot, embed the insulation, pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. When more than one (1) layer of insulation is used the top surface of each layer shall be coated with Coal Tar Pitch into which, while hot, embed the succeeding layer. (This is optional because all layers may be laid dry if desired.) All joints shall be broken between layers of insulation. All layers of insulation shall be parallel to preceding layers. Edges shall be brought closely together and shall not be forced into place. No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes. Cutoffs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

Second—Apply a uniform coating of Coal Tar Pitch over the insulation.

Third—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt. All tarred felts shall be laid without wrinkles or buckles.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch and not less than thirty-five (35) pounds of Coal Tar Pitch for moppings between each layer of insulation. Approximately thirty-five (35) pounds of Steep Asphalt will be required for deck mopping. Asphalt shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

Koppers Company will not be responsible for any damage to or below the built-up roofing caused by or as the result of the use of insulation.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required) The roofing must be appplied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING.—For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 204.

STEEP 4 PLY SLAG OVER STEEL DECK WITH INSULATION

KOPPERS 20-YEAR ROOFING SPECIFICATION NO. 19

(Maximum Incline Six (6) Inches Per Foot and Not Less Than One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The steel deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. The deck shall be properly graded to the outlets.

APPLICATION OF INSULATION. First—Mop the steel deck with Steep Asphalt into which, while hot, embed the insulation pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. Insulation shall be securely fastened to the deck by means of approved screws, expanding nails or cleats which shall be placed at each corner and in the center of each sheet of insulation. When more than one (1) layer of insulation is applied fasteners shall be driven after the top layer has been applied. The top surface of each layer of insulation shall be coated with Steep Pitch into which embed the succeeding layer. (This is optional because insulation sheets may be laid dry if desired.) All joints shall be broken between layers of insulation. All layers of insulation shall be parallel to succeeding layers.

Edges shall be brought closely together and shall not be forced into place.

No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes.

Cutoffs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

(Continued next page)

APPLICATION OF ROOFING MATERIALS. First — Apply a uniform coating of steep roofing pitch to the insulation.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet. Nail each sheet with soft nose nails of sufficient length to completely penetrate the insulation but which will not puncture the steel deck. Nails to be through flat tin discs eight (8) inches from the upper edge and to be spaced not more than one (1) foot apart.

Third—Each sheet shall be mopped the full distance of the twenty-four and one-half (24½) inch lap with steep roofing pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that the pitch moppings are even with the lower edge of each overlying sheet and that the finished felt surface is free from pitch drippage.

Fourth—Over the entire surface spread with a mop a uniform coating of steep roofing pitch into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth (¼) to five-eighths (⅝) inch in size and shall be dry and free from dirt. If roofing is applied during cool weather or slag is damp, slag shall be heated and dried so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be applied not less than thirty-five (35) pounds of Steep Asphalt for deck moppings and not less than thirty-five (35) pounds of Steep Roofing Pitch for moppings between each layer of insulation. For each one hundred (100) square feet of completed roofing surface above insulation there shall be used not less than one hundred (100) pounds of steep roofing pitch for felt and insulation moppings, and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not more than twenty-four (24) inches before the steep roofing is applied.

Slag stops at gutters shall extend one and one-half (1½) inches above roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the Owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 204.

UNDER PROMENADE TILE

5 PLY OVER POURED CONCRETE UNDER PROMENADE TILE

KOPPERS PROMENADE TILE BUILT UP ROOFING SPECIFICATION NO. 20

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The deck shall be concrete and shall be smooth, dry, firm, clean and properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First— Apply a uniform coating of Coal Tar Pitch.

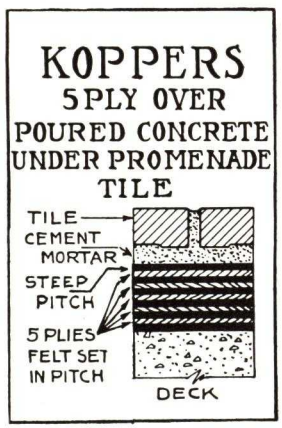
Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Third—Apply a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Fifth—Before laying the tile, the surface of the roofing shall be thoroughly cleaned and the roofing mopped with Coal Tar Pitch into which, while hot, embed one (1) layer of Tarred Felt lapping each sheet two (2) inches over the preceding sheet. Over this surfacing and immediately preceding the laying of the tile spread a heavy uniform coating of Steep Roofing Pitch. Only part of the roof surface shall be covered with the last ply of felt and mopping of pitch at a time, the tile then being laid over that portion at once.

Sixth—The vitrified clay tile shall be set in not less than three-fourths (¾) inch of Portland Cement Mortar (1 to 3 mix). The joints shall be grouted full with Portland Cement Mortar (1 to 2 mix). The tile shall be laid to show three-sixteenths (3/16) inch to one-fourth (¼) inch joints. Expansion joints three-fourths (¾) inch wide filled with plastic mixture, which must be approved by the architect, shall be provided between the tile and all flashings. Either metal or mastic expansion joints shall be provided throughout the roof surface as may be necessary. Expansion joints shall extend through to the roofing and shall be spaced not more than twenty (20) feet apart in any direction. They shall also be installed at all walls, skylights, curbs, etc.



GENERAL. All tarred felts shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there should be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

All end laps between sections of tarred felt shall be staggered at least six (6) inches.

Notice — The Koppers Company will not be responsible or liable for leaks due to the installation, contraction or expansion of Promenade Tile and will not be responsible for the taking up and replacing of tile in order to locate leaks through the roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

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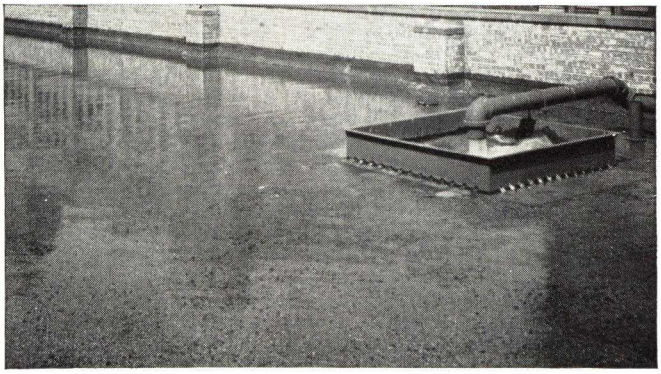
KOPPERS SPRAY POND AND WATER-COOLED ROOFING SPECIFICATIONS

Air conditioning is increasing and will greatly increase the amount of water used in many buildings. In some instances it is economical to spray the water onto the roofing, thus cooling it for re-use in the air conditioning equipment. The use of sprays is not always required and the water may flow onto the roofing at one point as shown in the photograph on this page. Maintaining two inches of water on the roofing also cools the building, because 1000 BTU are dissipated by the evaporation of each pound of water. Cooling the roof by water cuts down the refrigeration costs in an air conditioned building and it makes the upper floors of any building more habitable during the summer.



Water from Air-Conditioning System Flowing on to Roof

SPRAY POND OR WATER-COOLED ROOF OVER WOOD DECK OR PRECAST GYPSUM SLAB

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 21

(Preferably Dead Level. Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet. If Precast Gypsum Slab is used, sheathing paper may be omitted.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth (¼) inch to five-eighths (⅝) inch in size, and shall be dry and free from dirt.

Sixth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

All felts shall be turned up not less than four (4) inches at vertical surfaces.

There shall be used not less than two hundred and twenty-five (225) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.

SPRAY POND OR WATER-COOLED ROOF OVER WOOD DECK OR PRECAST GYPSUM SLAB

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 22

(Preferably Dead Level. Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED.—The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. **First**—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet. If Precast Gypsum Slab is used, sheathing paper may be omitted.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth (¼) to five-eighths (⅝) inch in size, and shall be dry and free from dirt.

Sixth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

All Felts shall be turned up not less than four (4) inches at vertical surfaces.

There shall be used not less than two hundred (200) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND.—(If a 15-Year Guarantee Maintenance Bond is required.)

The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 200 and No. 201.

SPRAY POND OR WATER-COOLED ROOF OVER POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE SLAB OR BOOK TILE

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 23

(Preferably Dead Level. Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean.

APPLICATION OF ROOFING MATERIAL. **First**—Apply a uniform coating of Coal Tar Pitch to the deck. If precast concrete slab is used, the surface shall be spot or strip mopped; and if Book Tile is used, deck shall be covered with not less than a one (1) inch thickness of Gypsum or Portland Cement Mortar before application of Coal Tar Pitch.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt. All felts shall be turned up not less than four (4) inches at vertical surfaces.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth (¼) inch to five-eighths (⅝) inch in size, and shall be dry and free from dirt.

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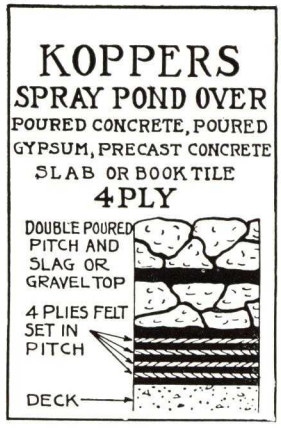
Fourth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be used not less than two hundred and seventy-five (275) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.



BOND. (If a 20-Year Guaranteed Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

SPRAY POND OR WATER-COOLED ROOF OVER POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE SLAB OR BOOK TILE

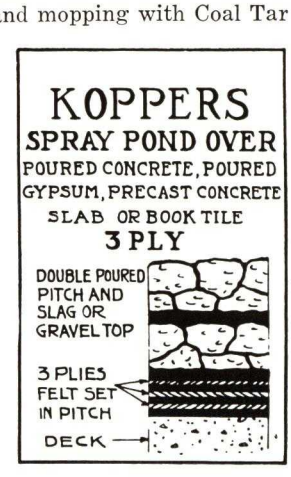
KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 24

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean

APPLICATION OF ROOFING MATERIAL. First — Apply a uniform coating of Coal Tar Pitch to the deck. If Precast Concrete Slab is used, the surface shall be spot or strip mopped; and if Book Tile is used, deck shall be covered with not less than a one (1) inch thickness of Gypsum or Portland Cement Mortar before application of Coal Tar Pitch.

Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt lapping each sheet twenty-two (22) inches over the preceding sheet, and mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt. The felt shall extend up all vertical surfaces not less than four (4) inches.



Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth (¼) inch to five-eighths (⅝) inch in size, and shall be dry and free from dirt.

Fourth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be used not less than two hundred and fifty (250) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by the Koppers Company, —— Co., —— Co., —— Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 203 and No. 202.

GENERAL. The roofing insulation must be kept dry both before and after application.

The following specifications for the installation of insulation are recommended so as to provide and insure the owner the maximum effect and life of the insulation.

KOPPERS COMPANY GUARANTEE BOND COVERING BUILT UP ROOFING AND FLASHING DOES NOT COVER ROOF INSULATION NOR WILL KOPPERS COMPANY BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY OR THE RESULT OF THE USE OF INSULATION.

WOOD NAILING STRIPS. The general contractor shall provide wood nailing strips which shall form a nailing base under all metal flashing aprons and flanges. Strips shall be the full thickness of the insulation and shall extend not less than one (1) inch beyond the apron or flange and shall be securely fastened to the roof deck.

CANT STRIPS. Cant Strips on wood decks shall be set on top of the insulation and secured by nailing through the insulation to the deck. On incombustible decks where the cant is formed with Gypsum or concrete, a square shoulder the full thickness of the insulation at the bottom of the cant shall be formed.

NAILS. Nails shall be galvanized roofing nails driven through flat tin discs, or Simplex flat head roofing nails.

Nails for use with insulation shall be of sufficient length to pass through the insulation and penetrate into, but not through, the deck construction, with the exception that on steel decks where nailing is necessary, the nails shall be soft-nosed roofing nails which shall not penetrate the steel deck.

CUT-OFFS. Cut-offs consisting of two (2) plies of tarred felt and moppings of Coal Tar Pitch or Asphalt extending onto the deck at least six (6) inches and four (4) inches on top of the insulation, shall be applied at the end of each day's work over exposed edges of insulation. WHEN CORK INSULATION IS USED, CUT-OFFS SHOULD BE REMOVED WHEN WORK IS RESUMED.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Pitch or Asphalt.

GENERAL APPLICATION OF INSULATION. Insulation must be thoroughly dry and of approved type, and must be able to retain nails.

No more insulation shall be laid at any one time than can be protected by pitch and felt in case of sudden weather changes.

Edges of insulation shall be brought closely together and shall not be forced into place. Where insulation joins vertical surfaces, the insulation shall be cut in a neat manner allowing at least one-half (½) inch clearance.

When more than one (1) layer of insulation is used, joints between layers shall be broken. All layers shall be parallel to preceding layers.

INSULATION SPECIFICATIONS

The following methods of installing insulation are those recommended by Koppers Company.

OVER WOOD DECKS FOR LOW HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 200

APPLICATION OF MEMBRANE BELOW INSULATION. The roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet. Sheathing paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

Sheathing paper may be omitted when insulation is laid in two (2) layers providing there are no pitch moppings between the layers.

The insulation shall be secured in place to the deck by nailing. The nails are to be spaced one (1) foot apart and shall penetrate the deck at least three-fourths (¾) of an inch and shall be placed along the edge and stagger nailed through the longitudinal center of each sheet of insulation. Nailing of two layers of insulation shall be through the lower layer only and not into the deck.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Specifications No. 1, No. 2 and No. 3, with the exception that the red rosin paper may be omitted.

OVER WOOD AND PRECAST GYPSUM DECKS FOR HIGH HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 201

APPLICATION OF MEMBRANE BELOW INSULATION. First—The roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet. The sheathing paper shall be lapped two (2) inches and secured to the deck by occasional nailing. On precast gypsum, sheathing may be omitted.

Second—Two full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet and nailing as often as may be necessary to hold the sheets in place.

Extend all felts up vertical surfaces not less than eight (8) inches. After the insulation has been laid, turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Coal Tar Pitch when installing flat roofs, and steep pitch when installing steep roofs.

Third—Mop the entire surface with a uniform coating of Coal Tar Pitch into which, while hot, firmly embed the insulation. When roofs have an incline of from two (2) inches to six (6) inches per foot, use Steep Roofing Pitch.

Fourth—Each sheet of insulation shall be secured in place by nailing. Nails shall be spaced one (1) foot apart and shall be placed along the edge and stagger nailed through the longitudinal center of each sheet. Nailing of two layers of insulation shall be through the second or top layer only—do not nail through the first layer.

When insulation is laid in two layers, mop the entire surface of the first layer with Coal Tar Pitch on flat roofs and Steep Pitch on Steep Roofs into which, while hot, embed the second layer of insulation.

APPLICATION OF ROOFING ABOVE INSULATION. Roofing shall be applied according to Koppers Specifications No. 1, 2, 3, 12, 13 and 14.

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OVER POURED CONCRETE, GYPSUM AND PRECAST SLAB FOR LOW HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 202

FOR FLAT ROOFS. First—Apply a uniform coating of coal tar pitch to the deck.

If precast concrete slab or tile deck, strip or spot mop with coal tar pitch up to four (4) inches from the edge of each joint. While the pitch is hot immediately embed the insulation.

Second—If there are two (2) layers of insulation, mop the entire first layer with coal tar pitch into which, while hot, embed the second layer of insulation.

FOR STEEP ROOFING HAVING AN INCLINE OF TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of steep roofing pitch to the deck into which, while hot, embed the insulation.

On precast tile or slab deck, spot or strip mop with steep roofing pitch up to four (4) inches from the edge of each joint.

Second—If there are two (2) layers of insulation, the entire first layer shall be coated with steep roofing pitch into which, while hot, embed the second layer of insulation. Each sheet of insulation shall be secured in place by nailing. If two (2) layers of insulation are used nailing shall be through the first layer only. Nails shall be spaced one (1) foot apart and shall penetrate the deck at least three-quarters (¾) of an inch and shall be spaced along the edge and stagger nailed through the longitudinal center of each sheet of insulation.

When the deck will not permit nailing, which necessitates in nailing strips, insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Company's specifications 5, 6, 7, 8, 10, 11, 20, 23 and 24.

OVER POURED CONCRETE, GYPSUM AND PRECAST CONCRETE SLAB FOR HIGH HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 203

APPLICATION OF MEMBRANE BELOW INSULATION FOR FLAT ROOFS. First—Apply a uniform coating of Coal Tar Pitch to the deck. On precast concrete slab or tile deck, spot or strip mop with Coal Tar Pitch up to four (4) inches from the edge of each joint.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound tarred felt, lapping each sheet seventeen (17) inches over the preceding sheet—mopping with Coal Tar Pitch the full seventeen (17) inches so that in no place shall felt touch felt.

FOR STEEP ROOFS HAVING AN INCLINE FROM TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of Steep Roofing Pitch to the Deck. On precast concrete or tile, spot or strip mop with Steep Pitch up to four (4) inches from the edge of each joint.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound Tarred Felt at right angles to the incline of the roof lapping each sheet seventeen (17) inches over the preceding sheet.

Each sheet shall be nailed with one (1) inch barbed roofing nails through flat tin discs eight (8) inches from the upper edge and nails shall be spaced not more than one (1) foot apart. Where nailing strips are used the felt shall be nailed with two (2) nails through flat tin discs at each nailing strip placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

Third—(For both Flat and Steep) Extend all plies of felt up vertical surfaces not less than eight (8) inches and after insulation has been installed turn this eight (8) inch extension down over the exposed edge of insulation and thoroughly mop with coal tar pitch. (Steep Pitch for Steep Roofing.)

APPLICATION OF INSULATION FOR FLAT ROOFS. First—Apply a uniform coating of Coal Tar Pitch over the entire surface into which, while hot, embed the insulation. If there are two (2) layers of insulation mop the entire surface of the first layer with Coal Tar Pitch into which, while hot, embed the second layer of insulation.

FOR STEEP ROOFS HAVING A SLOPE OF FROM TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of Steep Roofing Pitch over the entire surface into which, while hot, embed the insulation. Each sheet of insulation shall be secured in place by nailing. Nails shall be spaced approximately one (1) foot apart and shall penetrate the deck at least three-fourths (¾) of an inch and shall be placed along edge and stagger nailed through the longitudinal center of each sheet of insulation.

When the deck will not permit nailing, which necessitates in providing nailing strips, insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart. Nailing of two layers of insulation shall be through the top layer only. Do not nail the first layer.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Company's Specifications No. 5, 6, 7, 8, 10, 11, 20, 23 and 24.

OVER STEEL DECKS FOR HIGH HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 204

Koppers Company Will Not Bond Roofing Over Steel Decks Unless the Steel Deck Is Insulated

APPLICATION OF MEMBRANE BELOW INSULATION. First—Mop the steel deck with Steep Asphalt.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound Asphalt Felt, lapping each sheet seventeen (17) inches over the preceding sheet.

Extend all felts up on vertical surfaces not less than eight (8) inches. After the insulation has been laid turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Coal Tar Pitch when installing flat roofs and Steep Pitch when installing Steep Roofs.

APPLICATION OF INSULATION. First—Apply a uniform coating of Steep Asphalt into which, while hot, embed the insulation.

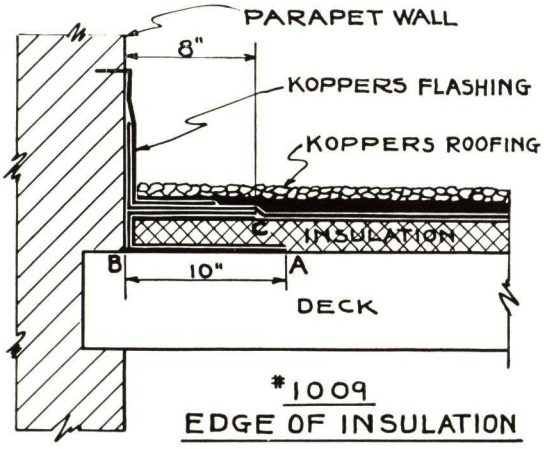
When more than one (1) layer of insulation is applied, the top surface of each layer shall be coated with Steep Asphalt into which, while hot, embed the succeeding layer.

When the incline of the roof exceeds one (1) inch per foot, the insulation shall be secured to the deck through the top layer with the proper devices provided by the deck manufacturer.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be installed according to Koppers Company's Specifications Nos. 17, 18 or 19 above insulation.

METHOD OF WATERPROOFING INSULATION

WITHOUT WATERPROOFING UNDER INSULATION



*1009
EDGE OF INSULATION

WHEN INSULATION IS APPLIED WITHOUT WATERPROOFING ON UNDERSIDE, EDGES OF INSULATION SHALL BE PROTECTED BY THE APPLICATION OF 2 PLIES OF TARRED FELT. THIS FELT TO EXTEND UNDER INSULATION AT LEAST 10" AND OVER INSULATION AT LEAST 8"

WITH WOOD OR PRECAST GYPSUM DECKS MOP FELT WITH PITCH FROM POINTS "B" TO "C" AND NAIL TO DECK FROM POINTS "A" TO "B".

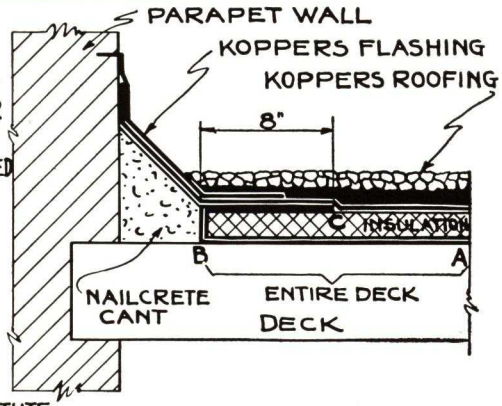
WITH POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE & BOOK TILE DECKS MOP FELT WITH PITCH FROM POINTS "A" TO "C".

WITH STEEL DECKS MOP FELT WITH STEEP ASPHALT FROM POINTS "A" TO "B" AND WITH PITCH FROM POINTS "B" TO "C".

WITH WATERPROOFING UNDER INSULATION

WHEN INSULATION IS APPLIED WITH WATERPROOFING ON UNDERSIDE, EDGES OF INSULATION SHALL BE PROTECTED BY EXTENDING THE UNDERSIDE PLIES OF TARRED FELT UP EDGES AND OVER INSULATION AT LEAST 8".

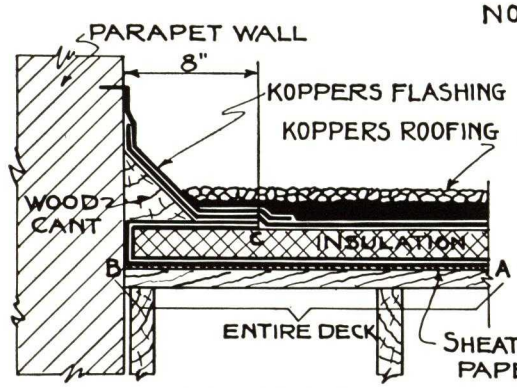
MOPPING OF FELT TO BE THE SAME AS DESCRIBED ABOVE FOR DIFFERENT TYPES OF DECKS, EXCEPT THAT POINTS "A" TO "B" WILL INDICATE THAT THE ENTIRE SPAN OF THE DECK WILL BE TREATED.



POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE BOOK TILE OR STEEL DECKS.

NOTE:-

WHEN ROOFS HAVE AN INCLINE OF FROM 2" TO 6" PER FOOT, SUBSTITUTE PITCH WITH STEEP PITCH WHEREVER PITCH IS CALLED FOR ABOVE.



WOOD DECK

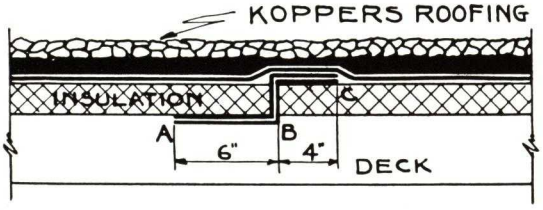
WHEN USING NAILCRETE CANT IT SHALL BE CONSTRUCTED WITH A SHOULDER THE FULL THICKNESS OF THE INSULATION. WOOD CANTS SHALL BE NAILED TO DECK AFTER INSULATION HAS BEEN INSTALLED.

*1010
EDGE AND UNDER INSULATION

METHOD OF INSTALLING INSULATION CUT-OFFS

AT THE END OF EACH WORKING DAY, EDGE OF INSULATION SHALL BE PROTECTED WITH 2 PLIES OF TARRED FELT IN A MANNER SO THAT WHEN THE NEXT DAYS WORK IS RESUMED, THERE SHALL BE A COMPLETED JOINT AS HERE SHOWN. WHEN CORK INSULATION IS USED, CUT-OFFS SHOULD BE REMOVED WHEN WORK IS RESUMED.

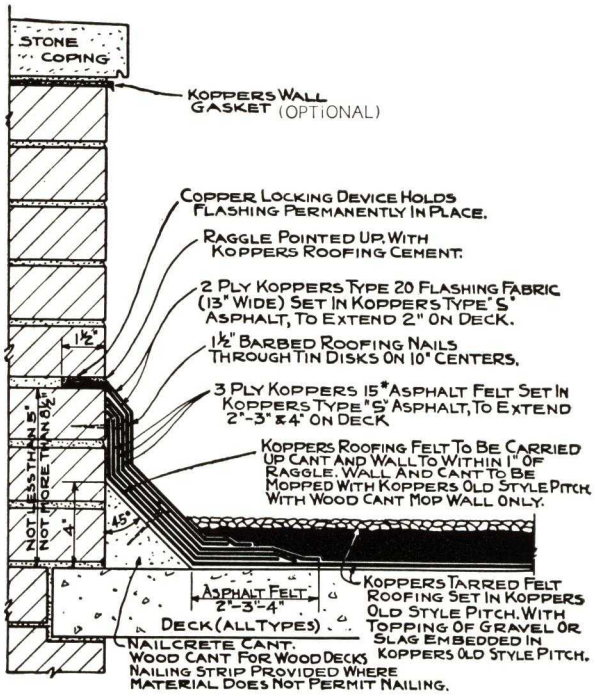
MOPPING OF FELT TO BE THE SAME AS DESCRIBED ABOVE FOR DIFFERENT TYPES OF DECKS.



*1008
END OF DAYS WORK

GENERAL. All Flashing Fabric and Asphalt Felt shall be free from wrinkles and buckles.

BOND. If a Koppers 10, 15 or 20-Year Guarantee Flashing Bond is required the flashing must be installed in connection with a Koppers Bonded Roof, the Flashing Bond being for no greater period than the Roofing Bond. Flashing and Roofing shall be installed by a roofing contractor approved by Koppers Company who shall apply Roofing and Flashing in strict accordance with the specifications and requirements of Koppers Company, and subject to their inspection and approval.



Koppers 20-Year Bonded Flashing Specification No. 104

KOPPERS 20-YEAR BONDED FLASHING SPECIFICATION No. 104

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 20-Year Type, Specification No. 104.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of pitch up the wall to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt, extending from the raggle not less than two (2) inches on to the roof deck. On top of this Flashing strip apply another uniform coating of KOPPERS Type S Asphalt and another Flashing strip, this application being repeated until a three (3) ply reinforcement has been completed. Each strip shall extend on to the deck roofing one (1) inch beyond preceding strip. Felt reinforcement Flashing strips shall not exceed ten (10) feet three (3) inches in length, and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Each Flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

The top ply of Flashing reinforcement shall be nailed in the middle of the cant and half-way between the top of the cant and raggle every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS 20-Year Type Flashing Fabric securely into the raggle by means of the copper locking device riveted to the flashing and press the flashing fabric into the coating of

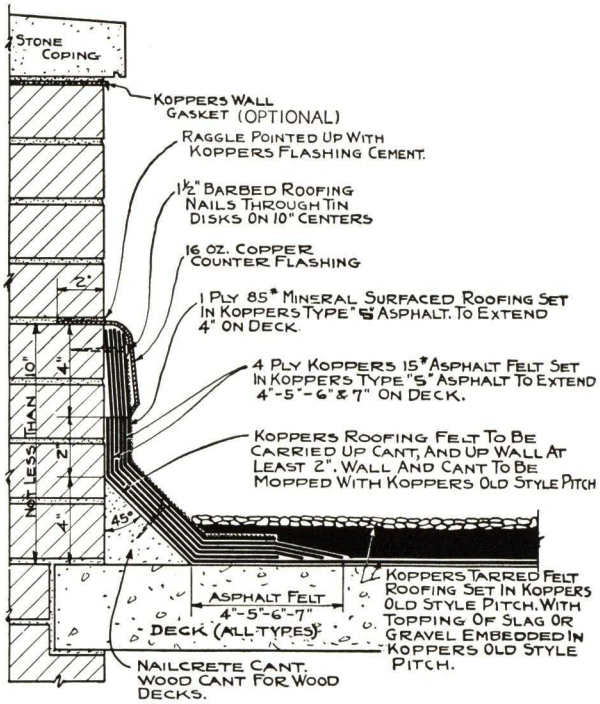
(Continued in next column)

KOPPERS Type S Asphalt on the reinforcement plies. Apply a uniform coating of KOPPERS Type S Asphalt between the first and second plies of KOPPERS Flashing Fabric, pressing the top ply securely into the Type S Asphalt. All fabric Flashing strips are ten (10) feet three (3) inches long, and each strip shall overlap the preceding strip three (3) inches.

A uniform coating of KOPPERS Type S Flashing shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.



Koppers 20-Year Bonded Flashing Specification No. 107

KOPPERS 20-YEAR BONDED FLASHING SPECIFICATION No. 107

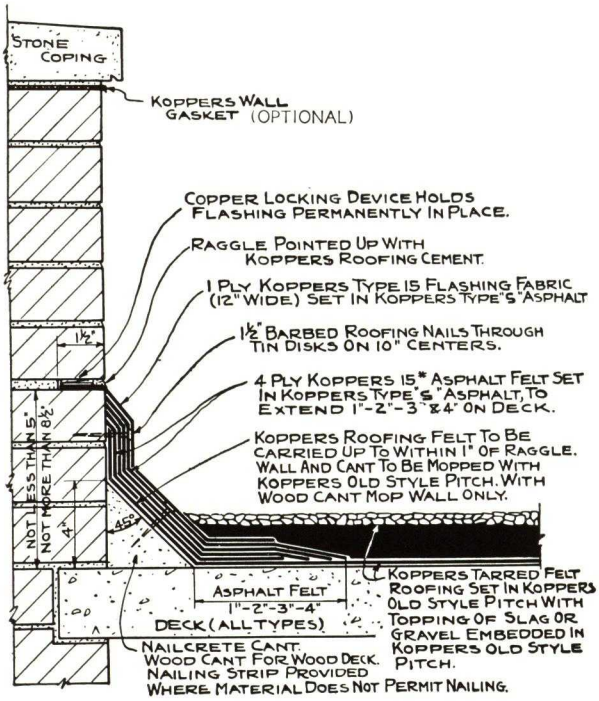
BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 107.

DETAILED SPECIFICATIONS

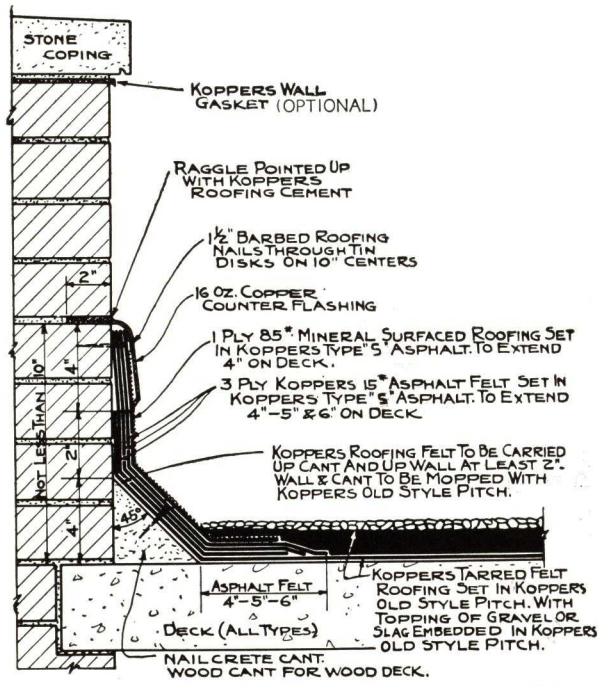
APPLICATION. Application shall be the same as flashing specification No. 106 except that four (4) plies of 15-Lb. Asphalt Felt shall be installed as reinforcing plies.

METAL CAP FLASHING FOR SPECIFICATIONS Nos. 101, 106 AND 107. Metal cap flashing shall be installed immediately so as to prevent seepage of water behind the base flashing. We recommend that 14 oz. cold rolled copper be used for 15 and 20-year flashing specifications.

Metal cap flashing shall extend into the raggle not less than two (2) inches and shall have a four (4) inch exposed apron extending down over the base flashing. After the metal cap flashing has been installed completely fill the raggle groove with KOPPERS Roof Cement.



Koppers 15-Year Bonded Flashing Specification No. 105



Koppers 15-Year Bonded Flashing Specification No. 106

KOPPERS 15-YEAR BONDED FLASHING SPECIFICATION No. 105

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 15-Year Type Specification No. 105.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of pitch up the wall to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt, extending from the raggle to not less than two (2) inches on the roof deck. On top of this Flashing Strip apply another uniform coating of KOPPERS Type S Asphalt and other Flashing Strip, this application being repeated until a four (4) ply reinforcement has been completed. Each strip shall extend on to the deck roofing one (1) inch beyond preceding strip. Felt reinforcement Flashing Strips shall not exceed ten (10) feet three (3) inches in length, and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Each Flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

The top ply of Flashing reinforcement shall be nailed in the middle of the cant and half-way between the top of the cant and raggle every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS 15-Year Flashing Fabric securely into the raggle by means of the copper locking device riveted to the flashing and press the flashing fabric into the coating of KOPPERS Type S Asphalt on the reinforcement plies. All Fabric Flashing strips are ten (10) feet three (3) inches long and each strip shall overlap the preceding strip three inches. A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. (Specifications Nos. 103, 104 and 105). Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.

KOPPERS 15-YEAR BONDED FLASHING SPECIFICATION No. 106

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 106.

DETAILED SPECIFICATIONS

APPLICATION. Extend all plies of roofing felt and moppings of pitch up the wall to within 1 inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt extending from the raggle to not less than two (2) inches on to the roof deck. On top of this flashing strip apply another uniform coating of KOPPERS Type S Asphalt and another flashing strip. Repeat this application until a three-ply reinforcement has been completed. Each flashing strip shall extend on to the deck roofing one (1) inch beyond the preceding strip.

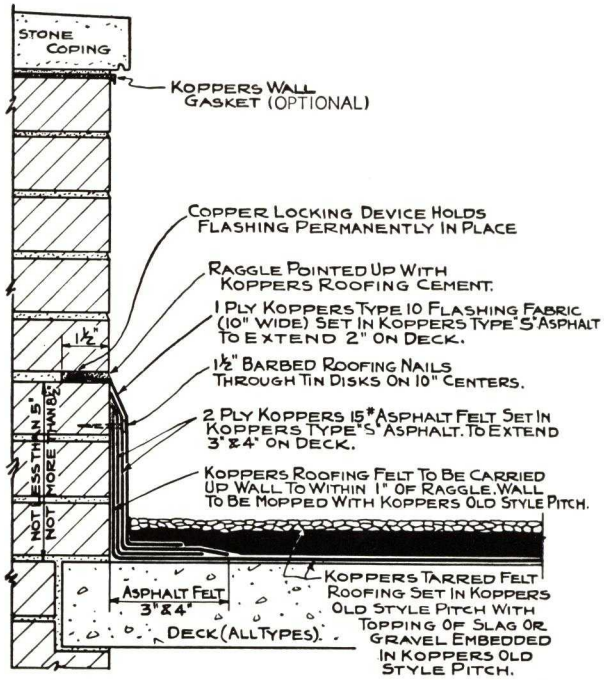
The top ply of flashing reinforcement shall be nailed in the middle of the cant every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Coat the entire surface of the asphalt felt flashing reinforcement strip uniformly with KOPPERS Type S Asphalt and embed immediately one (1) layer of eighty-five (85) pound mineral surfaced roofing cut so as to extend from the raggle to the deck angle. Reinforcing felt and mineral surfaced roofing shall be securely fastened at the top with one and one-half (1½) inch barbed roofing nails through flat tin discs to prevent slipping, nails to be spaced every ten (10) inches in the vertical mortar joints or nail strips.

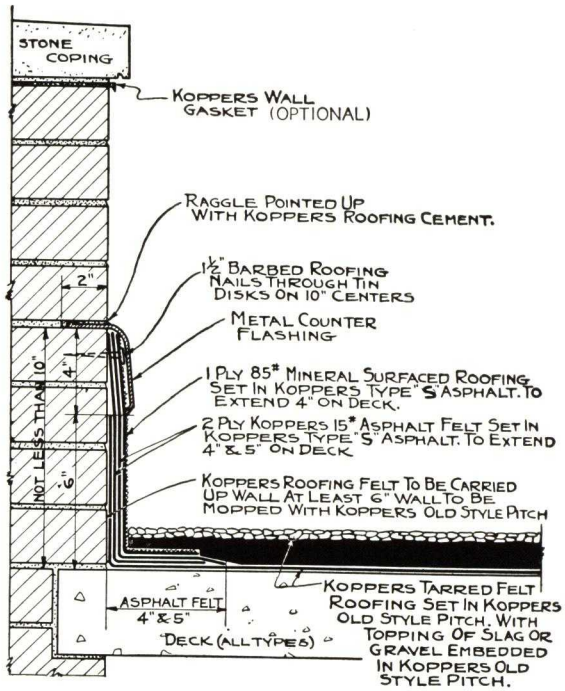
All end joints of felt reinforcement strips shall break joints with underlying strip.

All felt reinforcement and mineral surface roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

METAL CAP FLASHING. Refer to details explained following Specification No. 107.



Koppers 10-Year Bonded Flashing Specification No. 103



Koppers 10-Year Bonded Flashing Specification No. 101

KOPPERS 10-YEAR BONDED FLASHING SPECIFICATION No. 103

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 10-Year Type, Specification No. 103.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of Pitch to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt extending from the raggle to not less than two (2) inches on to the roof deck. On top of this Flashing Strip apply another uniform coating of KOPPERS Type S Asphalt and another Flashing Strip, this application being the same as the first application strip. Each strip shall extend on to the deck roofing one (1) inch beyond the preceding strip. Felt reinforcement Flashing Strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Each flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

Nail through top of felt reinforcement strips and roofing felts every ten (10) inches in horizontal or vertical mortar joints with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS Type 10 Flashing Fabric securely into the raggle by means of the copper locking device riveted to the Flashing and press the flashing fabric into the coating of KOPPERS Type S Asphalt on the reinforcement plies. All fabric flashing strips are ten (10) feet three (3) inches long and each strip shall overlap the preceding strip three (3) inches. A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.

KOPPERS 10-YEAR BONDED FLASHING SPECIFICATION No. 101

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 101.

DETAILED SPECIFICATIONS

APPLICATION. All plies of roofing felt and moppings of pitch shall be carried up perpendicular surfaces at least six (6) inches.

Apply a uniform coating of KOPPERS Type S Asphalt to a height of not less than ten (10) inches on the perpendicular surface and four (4) inches out on the deck roofing into which embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt cut so as to completely cover the coating of KOPPERS Type S Asphalt.

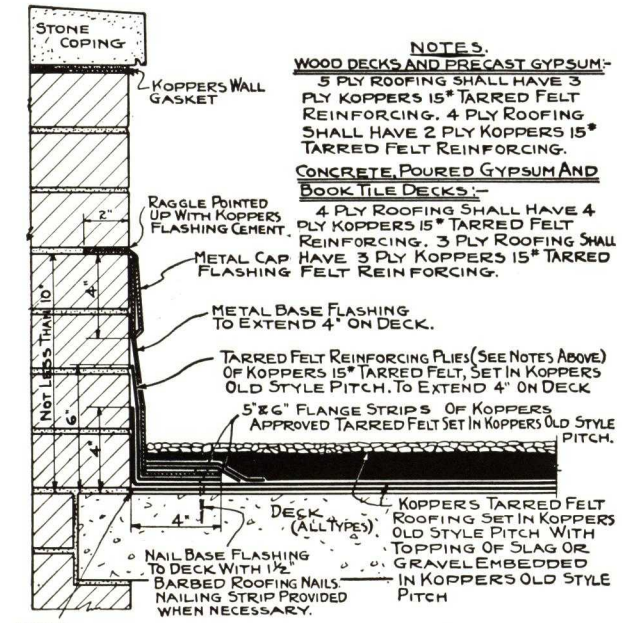
Coat this reinforcing strip of felt uniformly with KOPPERS Type S Asphalt and install another reinforcing ply of KOPPERS 15-Lb. Asphalt Felt. This strip to extend on to the deck roofing one (1) inch beyond the edges of the preceding strip.

Coat the entire surface of the asphalt felt flashing reinforcement strip uniformly with KOPPERS Type S Asphalt and embed immediately one (1) layer of eighty-five (85) pound mineral surfaced roofing cut so as to extend from the raggle to the deck angle. Reinforcing felt and mineral surfaced roofing shall be securely fastened at the top with one and one-half (1½) inch barbed roofing nails through flat tin discs to prevent slipping, nails to be spaced every ten (10) inches in the vertical mortar joints or nail strips.

All end joints of felt reinforcement strips shall break joints with underlying strip.

All felt reinforcement and mineral surface roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

METAL CAP FLASHING. Refer to details explained following Specification No. 107.



Koppers Flashing Specification No. 100 (Not Bonded)

METAL CAP AND BASE FLASHING—KOPPERS SPECIFICATION No. 100

BRIEF SPECIFICATION (For Architects and Engineers)

The flashing shall be installed according to KOPPERS Specification No. 100.

DETAILED SPECIFICATIONS

APPLICATION. When a metal base flashing is used, felt reinforcement at all wall angles, skylight curbs and other vertical surfaces shall be installed as follows:

BOARD AND PRECAST GYPSUM DECKS. The felt in the first two plies of the roof shall be carried up perpendicular surfaces at least four (4) inches, and the remaining plies cut off at the angle of the roof deck and perpendicular surfaces.

(*) Felt reinforcing plies shall then be set in separately, all cemented solidly together and to the underlying surface with pitch. The first ply shall extend out on the deck roofing at least four (4) inches, each ply extending one (1) inch beyond the preceding ply, and up the perpendicular surface at least six (6) inches; the last ply to be mopped with pitch before the metal base flashing is set in place. All end joints shall be broken with the underlying reinforcing strip.

CONCRETE, POURED GYPSUM, BOOK TILE DECKS. All plies of felt used in the roofing shall be cut off at the angle of the roof deck and perpendicular surfaces.

(**) Felt reinforcing plies shall then be set in separately, all cemented solidly together and to the underlying surface with pitch. The first ply shall extend out on the deck roofing at least four (4) inches, each ply extending one (1) inch beyond the preceding ply, and up the perpendicular surface at least six (6) inches; the last ply to be mopped with pitch before the metal base flashing is set in place. All end joints shall be broken with the underlying reinforcing strip.

INSTALLATION OF METAL BASE FLASHING. The metal base flashing shall extend up the wall not less than ten (10) inches and on the deck not less than four (4) inches. The base flashing shall be nailed to the deck, and if deck does not permit nailing a creosoted wood nailing strip must be provided. Nails shall be spaced not more than four (4) inches apart and within one (1) inch from the outer edge of the metal base flange.

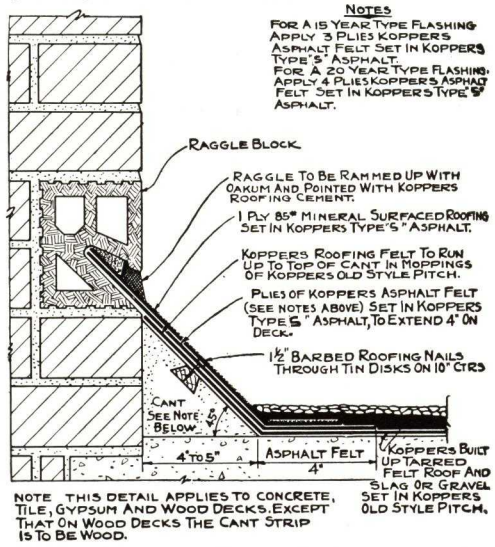
Two (2) tarred felt strips shall then be applied over the entire metal base flange which extends on to the roof, the top strip extending two (2) inches beyond the lower strip,

(Continued top of next column)

these strips to be not less than double the width of the flange and cemented solidly together and to the flange with pitch. Apply over the surface a mopping of pitch.

Cap Flashing shall be installed immediately so as to prevent seepage of water behind the base flashing.

* 5 Ply roofing shall have three (3) reinforcing plies.
4 Ply roofing shall have two (2) reinforcing plies.
** 4 Ply roofing shall have four (4) reinforcing plies.
3 Ply roofing shall have three (3) reinforcing plies.



Koppers Raggle Block Flashing Specification No. 102

KOPPERS RAGGLE BLOCK FLASHING SPECIFICATION No. 102

BRIEF SPECIFICATION (For Architects and Engineers)

The flashing shall be Raggle Block Type installed according to KOPPERS Specification No. 102.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of pitch up the cant to the wall angle.

See that the flashing groove in the raggle block is free of all foreign material. Then apply a uniform coating of KOPPERS Type S Asphalt over the roofing and extend it full depth into the flashing groove. Next insert one (1) ply of KOPPERS 15-Lb. Asphalt Felt full depth into the Raggle Groove and extend it two (2) inches on to the roof deck. On top of the flashing reinforcement strip apply another uniform coating of KOPPERS Type S Asphalt and another flashing strip, this strip to extend on to roofing deck felts one (1) inch beyond the preceding strip. Repeat this application until a three (3) ply 15-Year Type or four (4) ply 20-Year Type reinforcement has been completed.

Felt reinforcement flashing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips. A uniform coating of KOPPERS Type S Asphalt shall be applied between laps.

Each flashing reinforcement strip shall be set in separately and joints must be broken with the underlying flashing reinforcement strip.

The top of flashing reinforcement shall be nailed in the middle of the cant every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip, and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt, into which embed one (1) layer of eighty-five (85) pounds Mineral Surfaced Roofing extending from the full depth of the raggle groove not less than three (3) inches on to the roof deck.

Mineral surfaced roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch lap between adjoining strips. A uniform coating of KOPPERS Type S Asphalt shall be applied between laps.

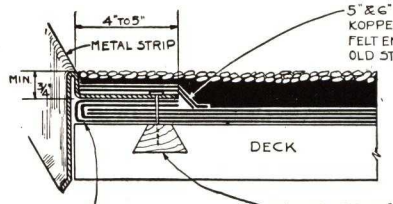
Insert oakum into the full depth of the raggle groove, pressing firmly into place, then fill the raggle completely with KOPPERS Roof Cement.

GENERAL. All asphalt felt and mineral surfaced roofing shall be free from wrinkles and buckles.

TYPICAL METAL FINISHING STRIPS

FOR GRAVEL AND SLAG ROOFING WITHOUT INSULATION

EAVE # 1000

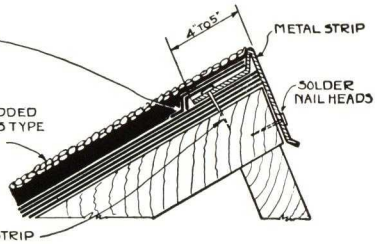


5" & 6" FLANGE STRIPS OF KOPPERS APPROVED TARRED FELT EMBEDDED IN KOPPERS OLD STYLE PITCH.

NAILS, SPACE 1" FROM EDGE OF METAL STRIP AND 3" APART. CREOSOTED WOOD NAILING STRIP FURNISHED WHEN DECK DOES NOT PERMIT NAILING.

2 LOWER PLIES OF ROOFING FELT ARE TO BE TURNED UP OVER TOP PLIES OF FELT AND RUN BACK ON DECK AT LEAST FIVE INCHES.

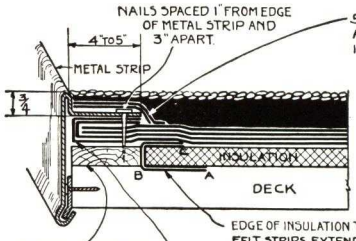
RIDGE # 1001



SLAG, EMBEDDED IN KOPPERS TYPE 5 ASPHALT

FOR GRAVEL AND SLAG ROOFING. WITH INSULATION

EAVE # 1002



NAILS SPACED 1" FROM EDGE OF METAL STRIP AND 3" APART.

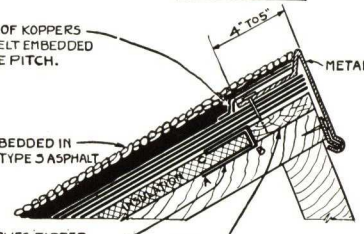
5" & 6" FLANGE STRIPS OF KOPPERS APPROVED TARRED FELT EMBEDDED IN KOPPERS OLD STYLE PITCH.

CREOSOTED EDGING STRIP. SEE NOTE OPPOSITE.

2 LOWER PLIES OF ROOFING FELT ARE TO BE TURNED UP OVER TOP PLIES OF FELT AND RUN BACK ON DECK AT LEAST 5 INCHES

EDGE OF INSULATION TO BE SEALED WITH 2 PLIES TARRED FELT STRIPS, EXTENDING 6" UNDER INSULATION AND 5" OVER INSULATION.
WITH CONCRETE, POURED GYPSUM, PRECAST CONCRETE AND BOOK TILE DECKS MOP WITH PITCH FROM POINTS A TO C. ON STEEL DECKS WITH KOPPERS TYPE 5 ASPHALT.
WITH WOOD AND PRECAST GYPSUM DECKS MOP WITH PITCH FROM POINTS B TO C AND NAIL FELT STRIPS SECURELY TO DECK.
WHEN THERE IS WATERPROOFING UNDER INSULATION EXTEND WATERPROOFING PLIES OF FELT AND MOPPINGS OF PITCH SO THAT THEY CAN BE TURNED BACK OVER THE TOP OF INSULATION 5".

RIDGE # 1003

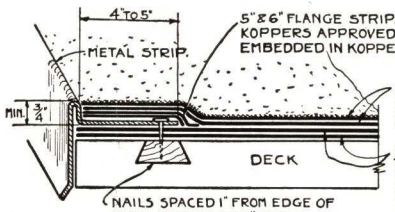


SLAG EMBEDDED IN KOPPERS TYPE 5 ASPHALT

NOTE: CREOSOTED WOOD EDGING STRIP SECURELY FASTENED TO DECK CUT TO THE SAME WIDTH AS METAL FLANGE AND THE THICKNESS OF THE INSULATION.

FOR MINERAL SURFACED ROOFING WITHOUT INSULATION

SIDE EAVE # 1004



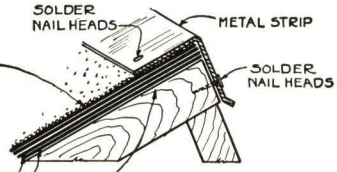
5" & 6" FLANGE STRIPS OF KOPPERS APPROVED TARRED FELT EMBEDDED IN KOPPERS TYPE 5 ASPHALT.

MINERAL SURFACED ROOFING EMBEDDED IN KOPPERS TYPE 5 ASPHALT

2 PLY KOPPERS APPROVED TARRED FELT NAILED TO DECK IN THE CASE OF WOOD OR PRECAST GYPSUM DECKS. 1 PLY FELT EMBEDDED IN KOPPERS TYPE 5 ASPHALT IN THE CASE OF CONCRETE, POURED GYPSUM, STEEL DECK & ETC.

NAILS SPACED 1" FROM EDGE OF METAL STRIP AND 3" APART. CREOSOTED WOOD NAILING STRIP FURNISHED WHEN DECK DOES NOT PERMIT NAILING.

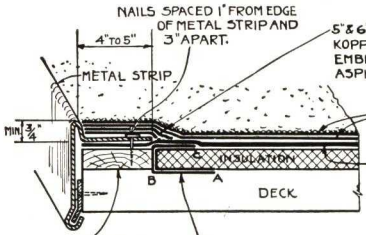
RIDGE # 1005



CREOSOTED WOOD NAILING STRIP FURNISHED WHEN DECK DOES NOT PERMIT NAILING.

FOR MINERAL SURFACED ROOFING WITH INSULATION

SIDE EAVE # 1006



NAILS SPACED 1" FROM EDGE OF METAL STRIP AND 3" APART.

5" & 6" FLANGE STRIPS OF KOPPERS APPROVED TARRED FELT EMBEDDED IN KOPPERS TYPE 5 ASPHALT.

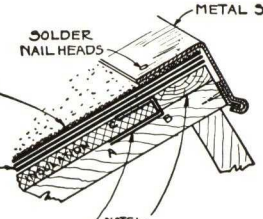
MINERAL SURFACED ROOFING EMBEDDED IN KOPPERS TYPE 5 ASPHALT.

1 PLY KOPPERS APPROVED TARRED FELT EMBEDDED IN KOPPERS TYPE 5 ASPHALT WHEN DECK IS CONCRETE, POURED GYPSUM OR STEEL & ETC. 2 PLY KOPPERS FELT NAILED TO DECK. WHEN DECK IS WOOD OR PRECAST GYPSUM.

CREOSOTED EDGING STRIP. SEE NOTE OPPOSITE.

EDGE OF INSULATION TO BE SEALED WITH 2 PLIES TARRED FELT STRIPS EXTENDING 6" UNDER INSULATION AND 5" OVER INSULATION.
WITH POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE, BOOK TILE AND STEEL DECKS MOP WITH KOPPERS TYPE 5 ASPHALT FROM POINTS A TO C.
WITH WOOD OR PRECAST GYPSUM DECKS MOP WITH TYPE 5 ASPHALT FROM POINTS B TO C AND NAIL FELT STRIPS SECURELY TO DECK.
WHEN THERE IS WATERPROOFING UNDER INSULATION EXTEND WATERPROOFING PLIES OF FELT AND MOPPINGS OF ASPHALT SO THAT THEY CAN BE TURNED BACK OVER THE TOP OF INSULATION 5"

RIDGE # 1007



NOTE:- CREOSOTED WOOD EDGING STRIP SECURELY FASTENED TO DECK CUT TO THE SAME WIDTH AS METAL FLANGE AND THE THICKNESS OF THE INSULATION.

KOPPERS WALL WATERPROOFING

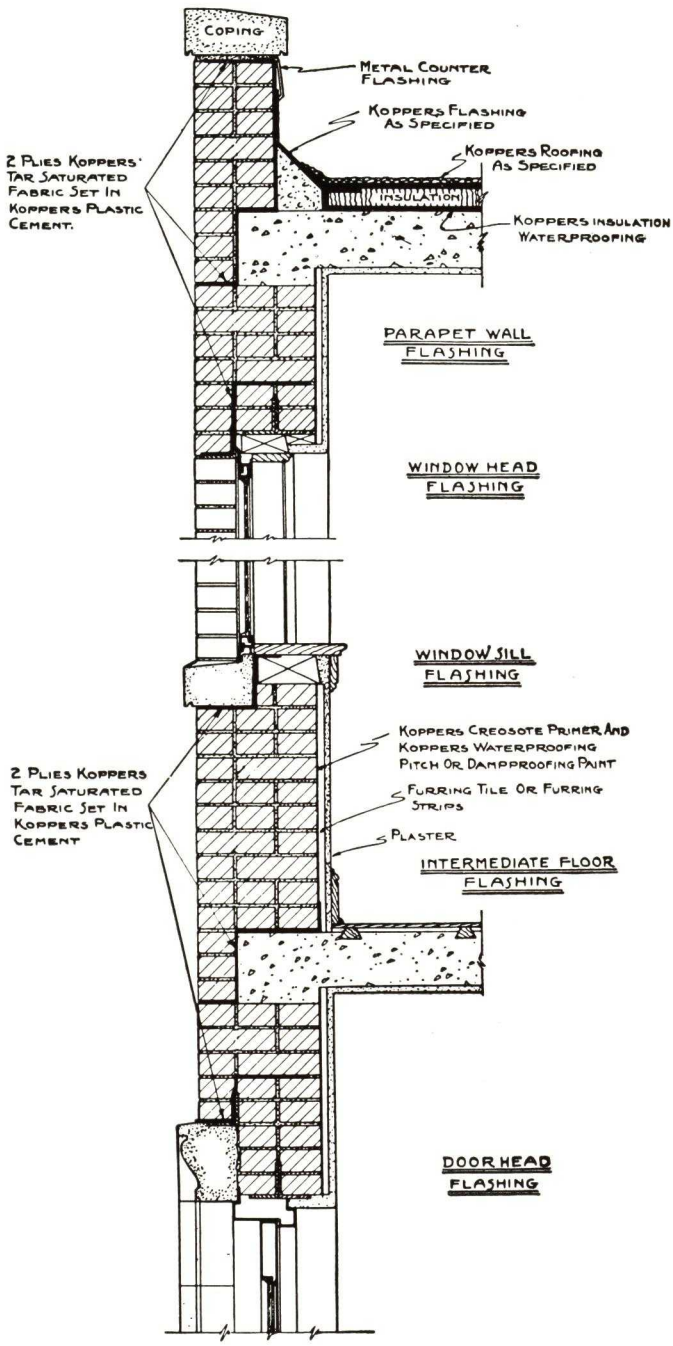
Every building of masonry construction should have adequate flashings built in the walls to impede the movement of moisture through inter-connecting voids in the masonry. These flashings protect spandrel beams, reinforcing steel, steel window and door frames against corrosion. Coating the interior surfaces of all exterior walls with Koppers Waterproofing Pitch or Koppers Dampproofing Paint produces a moisture-repellent film between the structural walls and furring.

Specification—Install flashings as shown on detail. In all places two (2) plies of Koppers Tarred Fabric set in three (3) trowel coatings of Koppers Plastic Cement shall be constructed. All flashing shall terminate one-half (½) inch from wall exteriors.

The interior surfaces of all exterior walls shall be brushed or sprayed with Koppers Concrete Priming Oil, using one (1) gallon for each two hundred (200) square feet. Eight (8) to twenty-four (24) hours later the well primed surfaces shall be mopped with Koppers Waterproofing Pitch. Two (2) coatings using a total of thirty (30) pounds of pitch for each one hundred (100) square feet shall be applied, permitting the first coating to cool before applying the second.

Alternate—(To be used in place of pitch moppings.).

Two coatings of Koppers Dampproofing Paint shall be applied by brush or spray using not less than one (1) gallon for each one hundred and fifty (150) square feet of surface and permitting the first coating to dry for not less than three (3) hours before making the second application.



KOPPERS
WALL WATERPROOFING

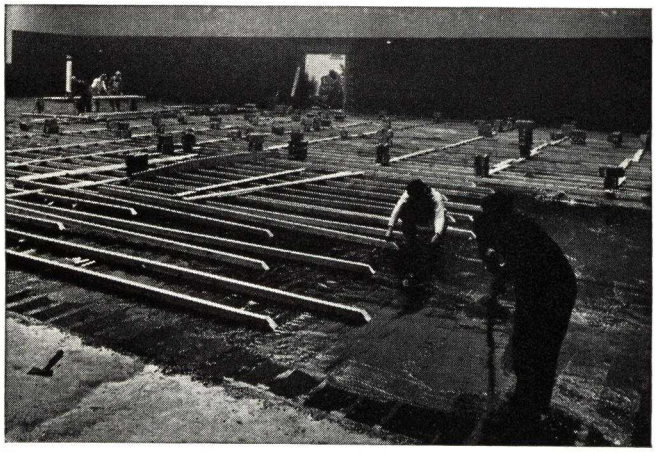
DAMPPROOFING AND WATERPROOFING FLOORS OF SUPERSTRUCTURES

Dampproofing—Paint Method

The concrete floor slab shall be given a smooth finish. As soon as the cement finish has taken its initial set, one spray or brush coating of Koppers Dampproofing Paint shall be applied. Six (6) to twenty-four (24) hours later a second application shall be made. Painting shall be continued up the walls for not less than four (4) inches. One gallon of paint shall be used for each one hundred (100) square feet of surface. Green concrete which has been painted with Koppers Dampproofing Paint does not require sprinkling with water for curing. But if desired, the two coatings of paint can be applied after the concrete is dry. The wood sub-floor or finished cement floor shall be laid eight (8) to twenty-four (24) hours after the second application of paint.

Membrane System—Wood Floors

Lay over the entire surface two (2) thicknesses of red rosin paper (weighing not less than five (5) pounds per one hundred (100) square feet) lapping each sheet nineteen (19) inches over the preceding sheet. Nail to hold in place. Lay one (1) thickness of Approved Tarred Felt with two (2) inch side laps and six (6) inch end laps and nail as required to hold in place. Mop the entire surface with Old Style Pitch and into the pitch lay one (1) ply of Approved Tarred Felt with side laps of two (2) inches and end laps of six (6) inches. All laps shall be mopped so that in no place does felt touch felt. The entire surface shall then be mopped with pitch and the floor plank shall be embedded in the hot pitch. At corners and angles two additional plies of felt shall be installed, alternately mopped and run up the walls, etc., not less than three (3) inches above the level of the finished flooring, where they shall be fastened securely and protected. The finished flooring shall be nailed to the embedded plank immediately. Nails of suitable length shall be used to avoid penetrating through planks into the waterproofing.



Koppers Membrane Waterproofing Applied on Concrete Floor of Indoor Tennis Courts at Allegheny Country Club, Sewickley, Pa.

Membrane System—Poured Concrete Floors

Lay over the entire surface two (2) thicknesses of Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping the full width of the lap with Old Style Pitch so that in no place does felt touch felt. Then coat the entire surface with Old Style Pitch. Not less than seventy (70) Pounds of pitch shall be used for completing the waterproofing on each one hundred (100) square feet of surface. At all corners and angles two additional plies of felt shall be installed and mopped similarly and these shall be carried up the walls, etc., not less than three (3) inches above the level of the finished flooring where they shall be fastened securely and protected. The finished flooring shall be installed immediately.

KOPPERS DAMPPROOFING AND TERMITE PROOFING—PITCH METHOD

USES. For all brick or concrete foundations and abutments where back-fill will be used.

DETAILED SPECIFICATIONS

APPLICATION. Note—The surfaces should be free from all dirt. All cracks should be thoroughly wetted with water and then filled with Portland Cement Mortar.

First—Over the entire surface to be dampproofed apply a uniform brush coat of KOPPERS Concrete Priming Oil. Approximately one (1) gallon should be used for each one hundred (100) square feet.

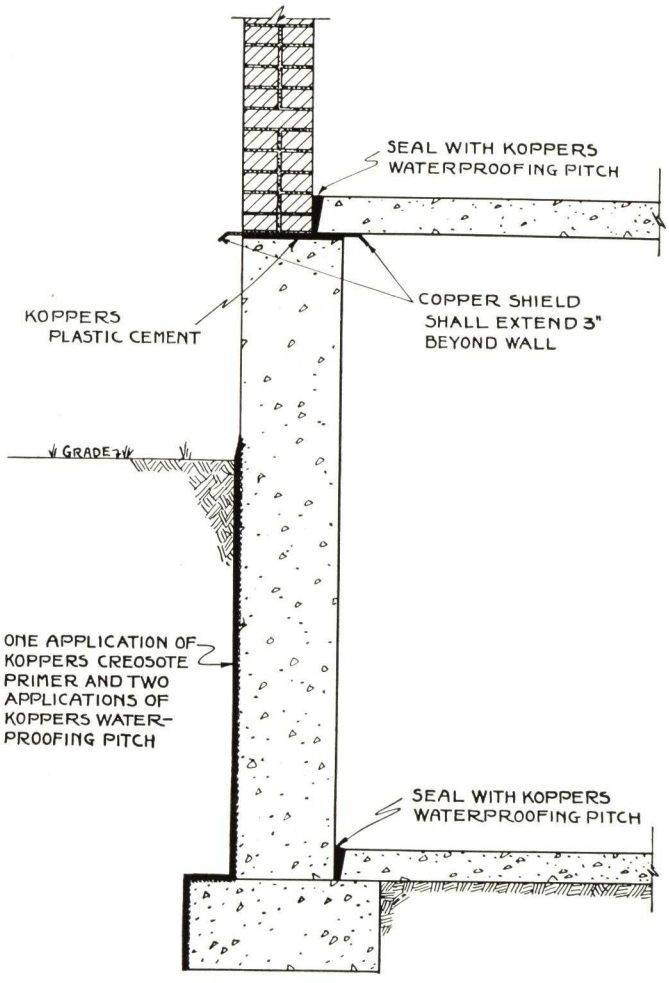
Second—Apply a mopping of KOPPERS Waterproofing Pitch. Approximately twenty-five (25) pounds per one hundred (100) square feet shall be used and the pitch shall be heated to a temperature at which it is entirely liquid, but this temperature shall not exceed three hundred and seventy-five (375) degrees Fahrenheit.

Third—A second mopping of Waterproofing Pitch shall then be applied over the entire surface of the first mopping. Approximately twenty-five (25) pounds per one hundred (100) square feet shall be used so that the entire amount of pitch applied shall amount to a total of approximately fifty (50) pounds per one hundred (100) square feet.

Fourth—The permanent back-fill shall be tamped into place immediately after the last mopping is applied.

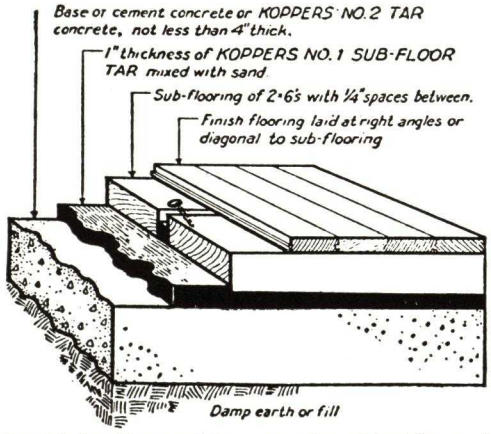
Fifth—For additional protection against termites, coal tar pitch seals shall be provided at all places where floor slabs join foundation walls and between adjacent slabs. Seals shall be completely filled with KOPPERS Waterproofing Pitch. Also 20 oz. copper shields set in KOPPERS Plastic Cement shall be installed on top of all foundation walls as detailed.

Note—Use KOPPERS Membrane Waterproofing when a head of water is encountered. See Page 32.



KOPPERS
DAMP AND TERMITE PROOFING
PITCH METHOD

KOPPERS SUB-FLOOR TAR DAMPPROOFING



In basements where the ground is damp and it is desired to use a wood finish floor, an effective dampproofing is necessary. The earth should be leveled off to proper grade. If earth or cinder fill is used it should be puddled and rolled or tamped to thoroughly compact it. The sub-base may be either a cement-concrete slab installed in the usual way, or a slab of KOPPERS No. 2 SUB-FLOOR TAR concrete. A cubic yard of crushed stone or gravel passing a 2¼" sieve but retained on a ¼" sieve is mixed with approximately 10 gallons of KOPPERS No. 2 SUB-FLOOR TAR which has been heated. This should be thoroughly rolled or tamped and brought to accurate grade.

Over the slab the dampproofing course is placed. One cubic yard of clean torpedo sand is heated (210° to 250° F.) and mixed with 25 to 30 gallons of KOPPERS No. 1 SUB-FLOOR TAR at the same temperature. The mixture is spread evenly over the slab to a thickness of from 1¼" to 1½" and leveled with a straight edge.

Well dried or treated planks are laid on this soft mixture before it cools and bedded by hammering, so that the coating compacts to a thickness of 1". If any plank is hammered below level, it is raised and more of the mixture applied beneath it. After the planks have been brought to proper level they are toenailed together. The sub-floor planks are preferably pressure treated with coal tar creosote meeting the Grade 1 specifications of the American Wood Preservers' Association. In food factories, creameries, etc., where the odor of creosote might be objectionable, the planks should be treated with a suitable salt preservative such as zinc chloride or Wolman salts. Planks to be creosoted should be dried before treatment. When a salt preservative is used, the planks should be dried after treatment, whether or not they were dried before treatment.

The finish floor is then laid at right angles or diagonal to the planks in the usual manner.

KOPPERS produces creosote, and treats wood with creosote, zinc chloride and Wolman salts. Complete information about creosote or treated lumber sent on request.

KOPPERS DAMPPROOFING—HIGH PENETRATION METHOD

USES. KOPPERS HP Primer is used with KOPPERS Seal Coat for protecting cement concrete against the disintegrating action of water. Concrete is permanent only when it is protected from the alkalies and sulphates often found in ground, lake, and sea waters. Continued contact with water also changes the structure of some of the chemical constituents of cement concrete, thus causing the concrete to lose some of its inherent strength. KOPPERS HP Primer penetrates the surface of the concrete making it water-repellent. KOPPERS Seal Coat seals the surface thus protecting it from erosion. This treatment is used particularly for dampproofing foundations, bridge abutments, basement and retaining walls, culverts, reservoirs, dams, sumps, pits, vats, tanks, and sewage disposal plants. On reinforced concrete this treatment also gives added protection to the reinforcing steel.

KOPPERS High-Penetration Primer and Seal Coat meet the United States Bureau of Public Roads, Specification TW-1-X and TR-1-25.

DETAILED SPECIFICATION

POURED CONCRETE

APPLICATION. Note—The concrete need not be thoroughly dry. Application of the HP Primer can begin as soon as forms are removed.

First—Apply with a brush, or spray a uniform coating of KOPPERS High-Penetration Primer over the entire surface to be protected. This first coating usually is absorbed as applied.

Second—Immediately apply in the same manner another coating of KOPPERS High-Penetration Primer over the first coating, allowing this coating to penetrate into the concrete.

Third—Repeat the same application as described under No. 2 until four (4) coatings have been applied. The last coatings may require one (1) or two (2) hours to be absorbed.

Fourth—Apply over the entire surface with a brush one (1) application of KOPPERS Seal Coat. This material shall be applied at a temperature from about eighty (80) to one hundred (100) degrees Fahrenheit. Allow the KOPPERS Seal Coat to dry thoroughly before disturbing the job.

Note—The application according to this specification will require about two (2) gallons of KOPPERS High-Penetration Primer and approximately one-half (½) gallon of KOPPERS Seal Coat per one hundred (100) square feet.

Superstructures—On Masonry superstructure exteriors, such as parapet walls, walls of buildings, etc., KOPPERS Lumino is used over HP Primer to give the surface an aluminum finish. Send for the Lumino folder.

PRECAST CONCRETE

Note—The precast piles or slabs shall be reasonably dry.

First—Prepare a bath of KOPPERS High-Penetration Primer large enough to accommodate the precast units and completely immerse these units for at least thirty (30) minutes, then remove the units from the bath and allow to drain and dry thoroughly.

Second—Apply a coating of KOPPERS Seal Coat, brushing thoroughly into the surfaces. The Seal Coat shall be applied at a temperature of from eighty (80) to one hundred (100) degrees Fahrenheit. Allow the Seal Coat to dry before disturbing the job.

6/7

KOPPERS MEMBRANE WATERPROOFING

KOPPERS Membrane Waterproofing is constructed in place by mopping plies of KOPPERS Tar Saturated Open Mesh Cotton Fabric and/or KOPPERS Approved Tarred Felt with KOPPERS Waterproofing Pitch. This produces a strong, elastic, continuous waterproofing blanket.

USES. KOPPERS Membrane Waterproofing below ground excludes moisture and water under head from basements, cellars, tunnels, shafts, sidewalk vaults, storage pits, sumps, etc.,—and the loss of water is prevented through reservoir walls, concrete or masonry storage tanks, swimming pools, basins, etc. Above ground it is recommended to prevent the passage of water through railroad and highway bridge decks, elevated highways, stadiums, masonry standpipes, swimming pools, shower baths, and the floors of dairies, abattoirs, and hotel kitchens.

GENERAL SPECIFICATIONS

The number of plies of KOPPERS Tar Saturated Fabric and/or KOPPERS Tarred Felt to be used depends upon the maximum hydrostatic head. Three (3) plies, and four (4) moppings of pitch (total 140 pounds of pitch for each 100 sq. ft.) are used on floors, bridge decks, shower baths, etc., not exposed to excessive heads of water. Water reservoirs, deep foundations, etc., require additional plies and moppings of pitch. Membrane waterproofings constructed with tarred fabric are tougher and stronger than those constructed with tarred felts, but otherwise are not superior to the latter. Tarred fabric is recommended particularly for use on bridges, roadways, tunnels, railroad track and machine isolation, under heavily loaded columns and where the waterproofing is exposed to vibration. On some projects it is economical to use tarred felt in the lower plies and tarred fabrics in the outermost ply adjacent to the protection course.

PREPARATION OF SURFACE. All surfaces which are to be waterproofed shall be reasonably smooth and free from projections or holes which might cause puncture of the membrane. The surface shall be dry so as to prevent the formation of steam when the hot pitch is applied and, immediately before the application of the waterproofing, the surface shall be thoroughly cleaned of dust and loose materials. No waterproofing shall be applied in wet weather or when the air temperature is below 35° F. unless vertical surfaces are heated and dried by salamanders, and horizontal surfaces are heated for one to two hours with a two-inch layer of hot sand. After the concrete is warm and thoroughly dry, the sand shall be swept back as work progresses.

APPLICATION OF WATERPROOFING. First—Beginning at the low point of the surface thoroughly mop a strip of concrete with KOPPERS Waterproofing Pitch. This mopping and all succeeding moppings on the concrete surface shall cover the concrete so that in no place shall gray spots be visible. Immediately following the first mopping, press the first strip of fabric into the hot pitch so that it is smoothly and firmly bonded to the concrete.

Second—Mop the edge of the first strip of fabric and the adjacent strip of concrete with KOPPERS Waterproofing Pitch, and into the hot pitch press a strip of fabric so that it forms a two (2) inch side lap with the first strip.

Third—Repeat the above application until one ply of fabric with two (2) inch laps has been laid over that portion of the surface designated by the waterproofing engineer.

Fourth—Again starting at the low point of the surface mop the first layer of fabric with hot pitch so that all threads of the fabric are completely hidden by pitch and into this press a strip of fabric which has been cut so as to break joints at the middle, one-third (⅓) or other portion of the width of the first ply of fabric, depending on the number of plies to be used.

Fifth—Repeat the above application using full width fabric until two plies of fabric have been laid over the surface.

Sixth—Apply the third and succeeding plies of fabric in the same way, making sure that fabric does not touch fabric in any place.

Seventh—Mop the entire top with KOPPERS Waterproofing Pitch. The completed waterproofing shall be firmly bonded membrane, and fabric shall not be exposed in any place.

Eighth—As soon as any portion of the waterproofing has been completed it shall be covered by the specified protection course—concrete, brick, tile or other suitable material.

GENERAL. Laps—Each sheet of fabric shall overlap the preceding sheet not less than two (2) inches at the sides. End laps shall be staggered at least twenty-four (24) inches from the end lap of the preceding ply.

End laps shall be not less than ten (10) inches wide.

The waterproofing shall be applied so that the direction of the flow of water is over and not against the laps.

Laps which have been exposed for any length of time shall be carefully examined for defects before connecting with other fabric and where any defects or insufficient lap areas are found the protection course shall be cut back sufficiently to give a proper lap between the membrane in place and the new work which is being applied.

DETAILS. All plies of fabric shall be rolled or pressed firmly into the hot pitch and shall be laid without wrinkles, buckles or kinks.

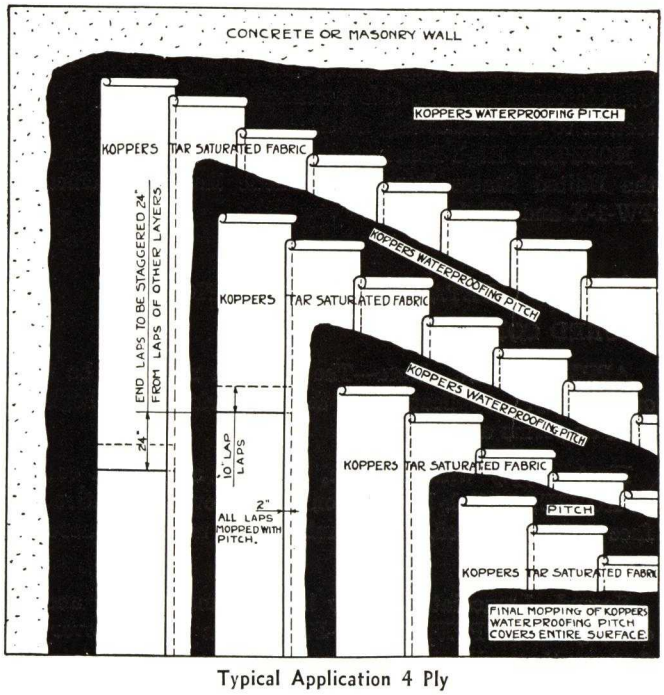
Pitch shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit.

All wall angles, corners or any place where in the opinion of the engineer or architect the waterproofing course may be subject to unusual strain there shall be applied on the water pressure side not less than two (2) additional reinforcement plies of fabric and moppings of pitch.

Insulate all hot water and steam pipes which project through or are near the surfaces to be waterproofed so as to prevent injury to the waterproofing. Extra plies of fabric and other precautions should be taken to prevent water from getting between the waterproofing and the waterproofed surface at all points where the membrane is penetrated by drains, pipes, etc.

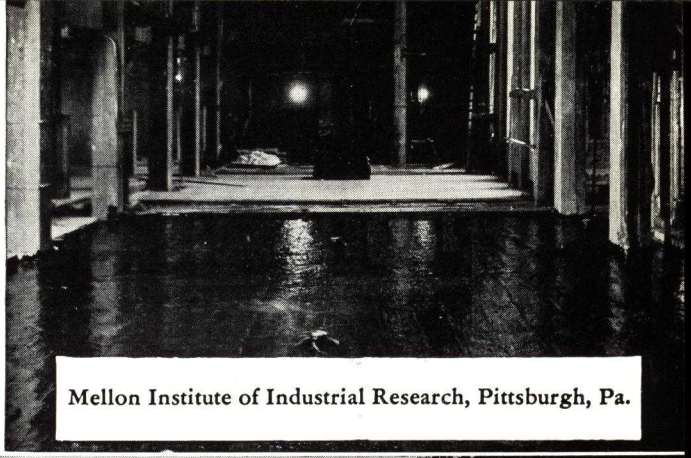
Plies of KOPPERS Tar Saturated Fabric or KOPPERS Approved Tarred Felt	Alternate Moppings of KOPPERS Waterproofing Pitch Required	Pounds of Pitch Required to Complete each 100 sq. ft. of Waterproofing
2	3	105
3	4	140
4	5	175
5	6	210
6	7	245

All membrane waterproofing shall be applied by an experienced waterproofing contractor.

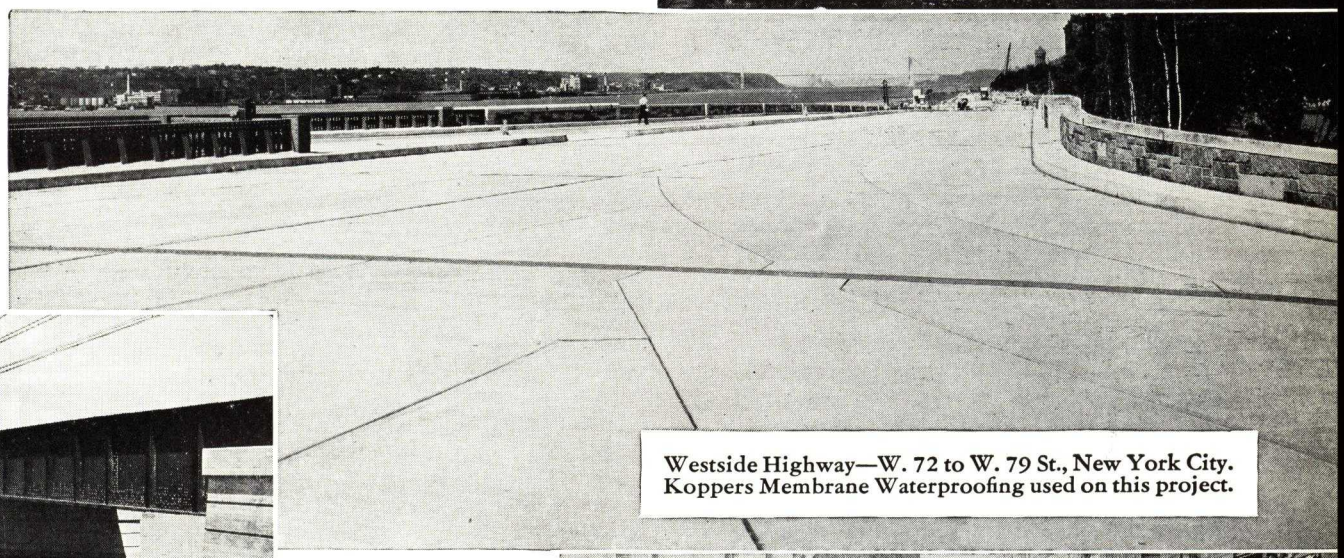


Typical Application 4 Ply

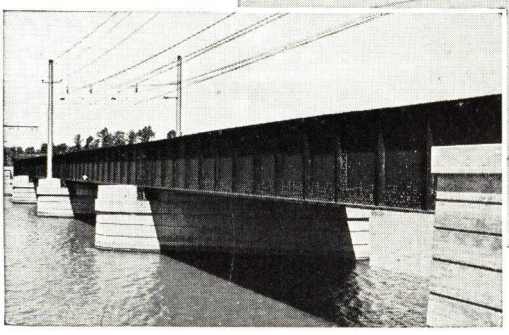
STRUCTURES PROTECTED BY KOPPERS MEMBRANE WATERPROOFING



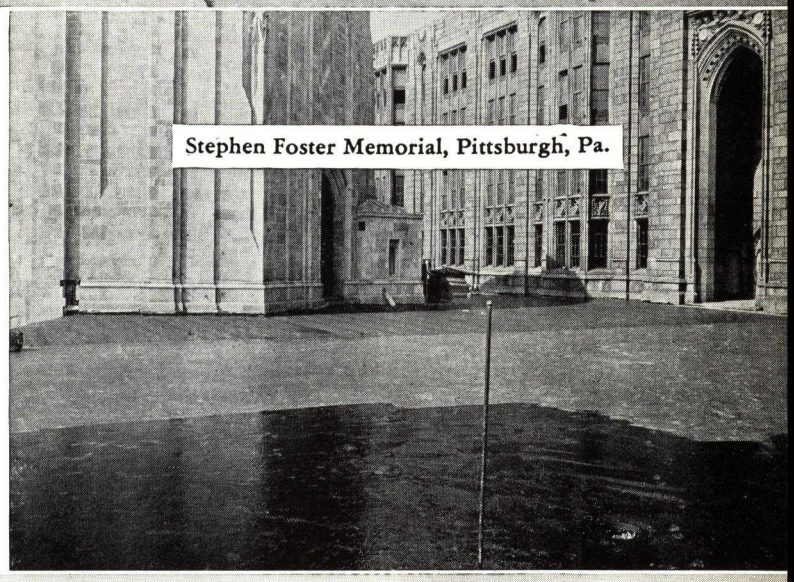
Mellon Institute of Industrial Research, Pittsburgh, Pa.



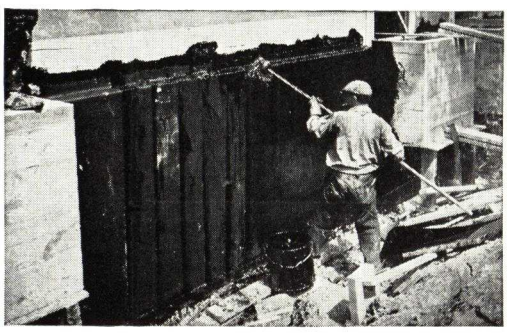
Westside Highway—W. 72 to W. 79 St., New York City.
Koppers Membrane Waterproofing used on this project.



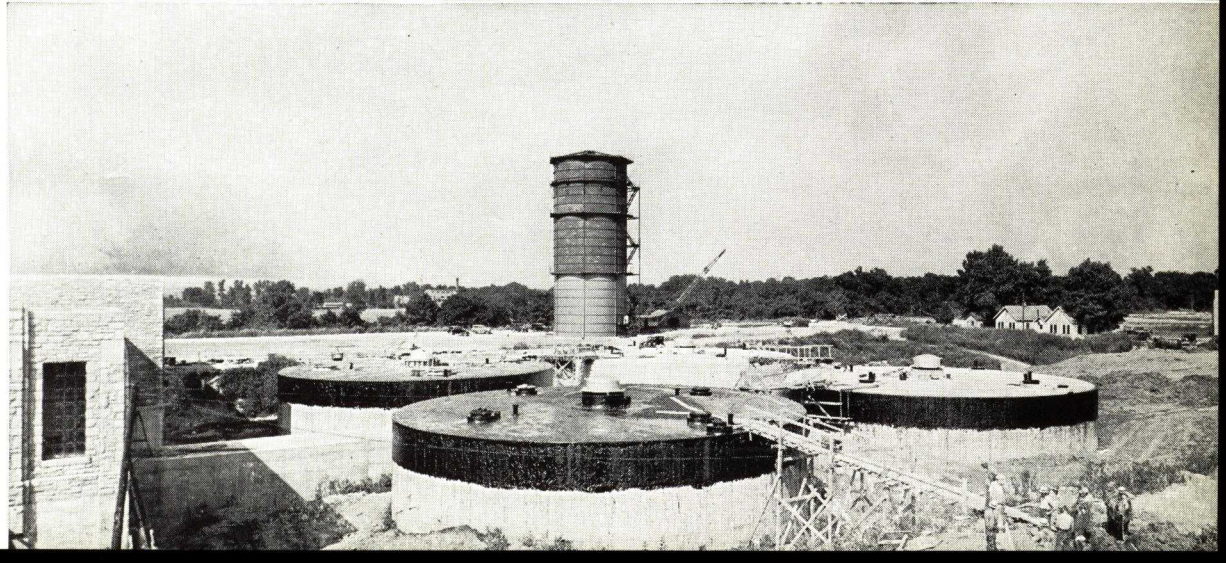
Pennsylvania Railroad Bridge,
Washington, D. C.



Stephen Foster Memorial, Pittsburgh, Pa.



Applying Koppers Membrane Waterproofing on the foundations of the Allegheny County Home at Woodville, Pa.



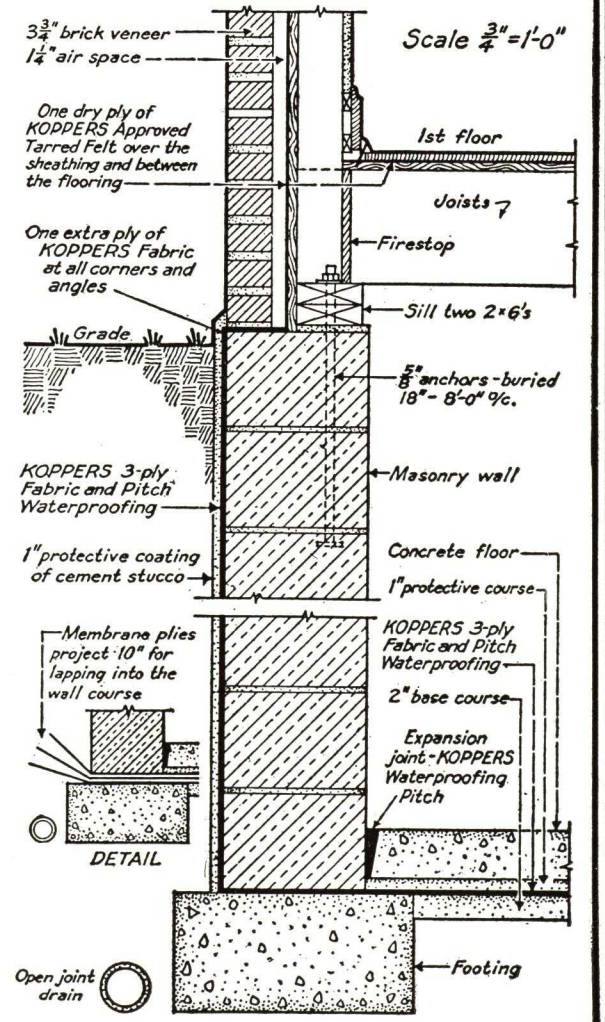
Koppers Waterproofing on the sludge digestion tanks at the new sewage treatment plant at Columbus, Ohio, where it serves as a gas-proof as well as water-proof covering. (In the background is a gas holder produced by Koppers' Bartlett Hayward Division.)

PENCIL POINTS DATA SHEETS

WATERPROOFING OF RESIDENCE FOUNDATIONS

Prepared by Don Graf, B.S., M.Arch.

Sheet No. F9 KOPPERS COMPANY PITTSBURGH

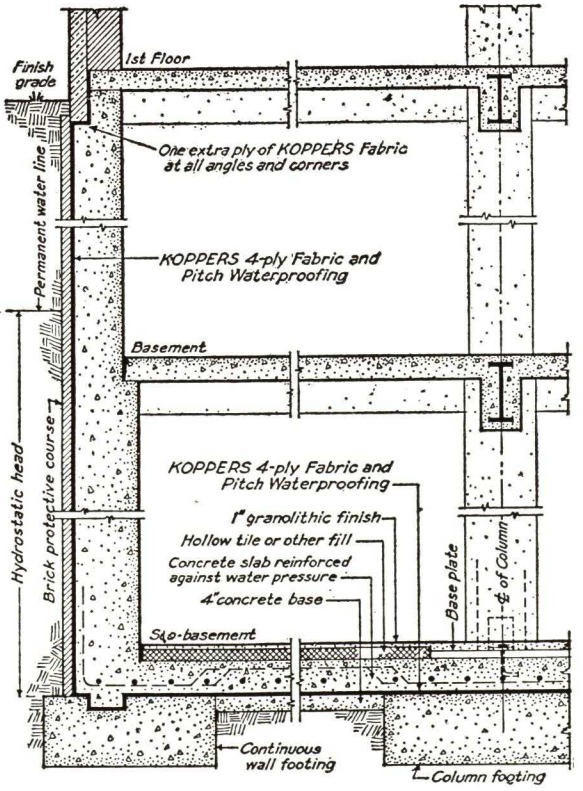


PENCIL POINTS DATA SHEETS

WATERPROOFING OF DEEP FOUNDATIONS

Prepared by Don Graf, B.S., M.Arch.

Sheet No. F9 KOPPERS COMPANY PITTSBURGH



In the construction of deep basements having unfavorable water conditions, the waterproofing method is shown here. The KOPPERS 4-ply Fabric and Pitch Waterproofing membrane will withstand a hydrostatic head up to 18'. From 18' to 25' 5 plies are used. A sheet of 20-oz. soft rolled copper should be placed between the plies beneath all columns, posts or walls under which the pressure exceeds 400 lbs. per sq. inch.

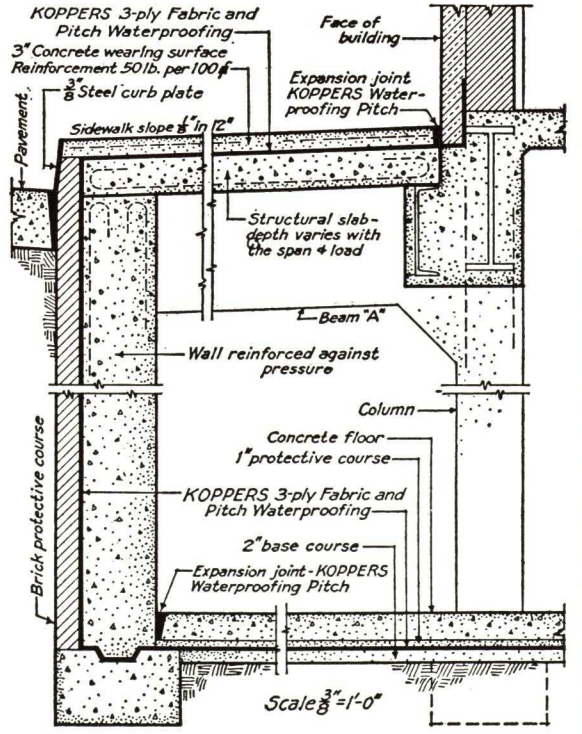
The sub-basement floor is reinforced as a flat slab to resist the upward pressure of the water. Inverted beams may be used, but these necessitate a greater amount of fill to bring the construction to a level to receive the wearing surface. If piles are used, the footings shown above become the pile cappings. No dowels need be run through the membrane.

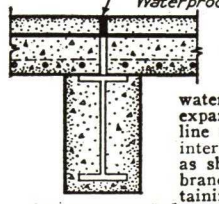
PENCIL POINTS DATA SHEETS

WATERPROOFING OF SIDEWALK VAULT

Prepared by Don Graf, B.S., M.Arch.

Sheet No. F9 KOPPERS COMPANY PITTSBURGH





The problem involved in constructing sidewalk vaults is to provide for movement of the concrete to eliminate cracking, and at the same time to exclude water so that the space may be usable. A 1" expansion joint should occur at the building line as shown. Others should occur at proper intervals at right angles to the building face as shown in the detail at the left. The membrane acts as a flexible dam in the joint, retaining the filling of pitch. To facilitate the movement of the slabs, 2 dry plies of Koppers Approved Tarred Felt are placed between the bottom of the slab and its bearing surface on beams or wall, thus breaking the joint.

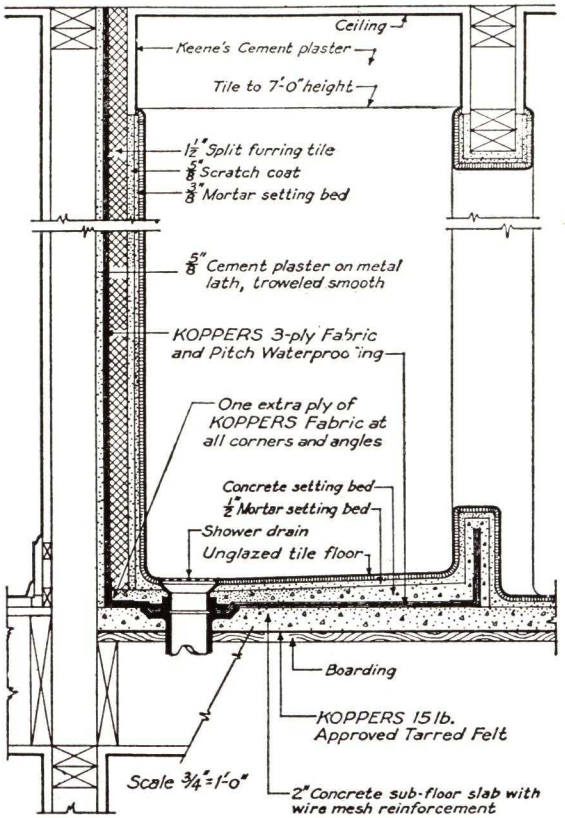
PENCIL POINTS DATA SHEETS

SHOWER BATH CONSTRUCTION

Prepared by Don Graf, B.S., M.Arch.

Sheet No. D6

KOPPERS COMPANY PITTSBURGH



The usual sizes for shower stalls are as follows:—30 x 36, 30 x 42, 36 x 36, 36 x 42, 42 x 42. Where space permits, the largest size given is desirable. Showers less than 36 x 36 in the clear should only be planned when space conditions make it mandatory. The door opening may be closed either with a water-proof curtain or any of the standard shower stall doors having ventilating panels.

The floor of the shower should be of an unglazed or abrasive tile, to prevent slipping. Glazed or unglazed tiles may be used for the walls at the discretion of the designer. Floor drains vary from 1½" to 3" wastes. The larger the better.

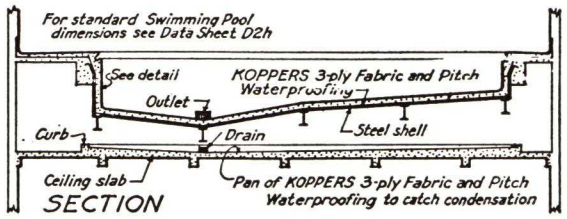
PENCIL POINTS DATA SHEETS

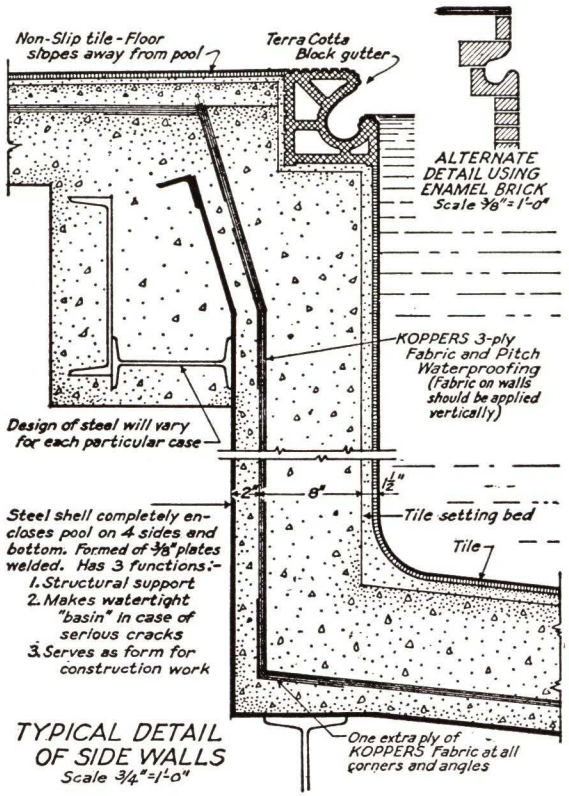
INDOOR SWIMMING POOL

Prepared by Don Graf, B.S., M.Arch.

Sheet No. D2

KOPPERS COMPANY. PITTSBURGH





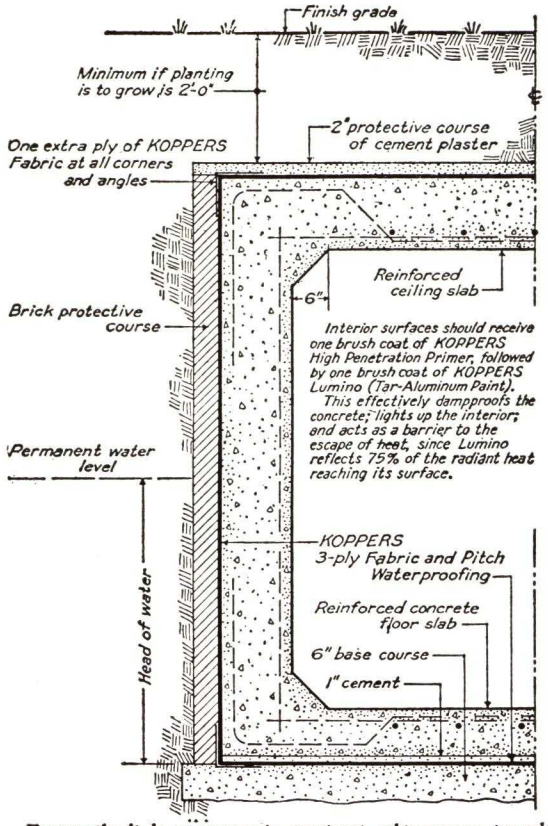
PENCIL POINTS DATA SHEETS

SUBTERRANEAN TUNNEL TO CONNECT BUILDINGS

Prepared by Don Graf, B.S., M.Arch.

Sheet No. F9

KOPPERS COMPANY PITTSBURGH



Frequently it is necessary to construct subterranean tunnels from one building to another, either for a passageway for circulation of people, or as a conduit to contain pipes and ducts. If the soil will retain ground water, or if the passage extends below the permanent water level, an effective waterproofing is necessary as shown above. This forms an unbroken envelope through which moisture is unable to penetrate.

The thickness of the floor slab and the reinforcing will depend upon the span and the head of water to be resisted. The thickness and reinforcing of the walls depend upon the height and the water head. The detail of the roof or ceiling slab will depend upon the span and the weight of earth to be sustained.

OTHER KOPPERS PRODUCTS

ROAD MATERIALS

Koppers Tarmac—
For construction, maintenance and repair of highways, streets, private driveways, plant roads, pavements, playgrounds, etc.

WOOD PRESERVATIVES

Koppers Coal Tar Creosote
Koppers Creosote-Coal Tar Solutions
Koppers Anthracene Oils
Koppers Kolineum
Koppers Shingle Stain Oils

PITCH COKE

A low ash carbon for the chemical and metallurgical industries

CRUDE NAPHTHALENE

Standard 74°, 76° and 78° grades

CRUDE TARS

Coke Oven Tar
Horizontal Retort Tar
Vertical Retort Tar
Water Gas Tar

REFINED TARS

Mold Wash Tar
Fish Net Tar
Pipe Dip
Saturating Tar

TAR ACIDS AND TAR ACID OILS

Phenol (82% and 90%)
Cresol (U. S. P., 3° Meta-Para Resin and plasticizer grades)
Cresylic Acid (Disintectant and insecticide grades)
Tar Acid Oils (15-25-35%)
Flotation Oils

LIGHT OILS

Benzol
Toluol
Xylol
Solvent Naphtha

AGRICULTURAL PRODUCT

Tree Spray Oil

BITUMINOUS PAINTS

Koppax Black Paints
Lumino Aluminum Paint
Heat Resisting Paints
Acid-Proof Paints
Paint Base Tars and Pitches

PRESSURE-TREATED WOOD

Treated Joists
Treated Sills
Treated Posts
Treated Sub-Flooring
Treated Structural Lumber
Treated Roof Stringers
Treated Poles
Treated Piling
Treated Foundation Timbers

Also all other types of treated wood, including ties, guard rails, posts, culverts, bridge material, etc.

KOPPERS COMPANY

Tar and Chemical Division

PITTSBURGH, PENNSYLVANIA

SALES OFFICES

NEW YORK, N. Y., Koppers Building, Harrison Turnpike, Kearny, N. J.
BOSTON, MASS., 250 Stuart Street
PROVIDENCE, R. I., Industrial Trust Building
NEW HAVEN, CONN., 251 East Street
CHICAGO, ILL., 39th Street and 52nd Avenue, Cicero, Ill.
WOODWARD, ALA. (Phone and Wire—Birmingham, Ala.)
ST. LOUIS, MO., 4000 Bingham Avenue

PLANTS

BUFFALO, N. Y.
CARROLLVILLE, WIS.
CICERO, ILL.
EVERETT, MASS.
FOLLANSBEE, W. VA.
HAMILTON, OHIO
KEARNY, N. J.
NEW HAVEN, CONN.
PROVIDENCE, R. I.
ST. LOUIS, MO.
ST. PAUL, MINN.
SWEDELAND, PA.
UTICA, N. Y.
WOODWARD, ALA.
YOUNGSTOWN, OHIO

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SECTION 6

CONTINUED ⟶

REILLY TAR & CHEMICAL CORPORATION

Manufacturers of Built-up Roofing and Waterproofing Materials

2513 So. Damen Avenue
CHICAGO, ILL.

Merchants Bank Building
INDIANAPOLIS, IND.

500 Fifth Avenue
NEW YORK, N. Y.

PLANTS

CHICAGO, ILL.
INDIANAPOLIS, IND.
GRANITE CITY, ILL.
NEWARK, N. J.
PROVO, UTAH
MOBILE, ALA.
NORFOLK, VA.
FAIRMONT, W. VA.
SEATTLE, WASH.
CHATTANOOGA, TENN.
DOVER, OHIO
MINNEAPOLIS, MINN.

PRODUCTS

Coal Tar Pitch.
Tarred Felt.
Refined Coal Tar.
Plastic Cement.
Roof Coating.

For Reilly Wood Preservative, see File Index.

"BUILT-UP" ROOFS

Reilly Bonded Tarred Felt and Bonded Pitch are manufactured especially for use in the construction of 10-year, 15-year and 20-year Bonded Roofs. These products conform with the requirements of the U. S. Government Specifications and Underwriters' Laboratories. A surety bond issued by the National Surety Corporation will be furnished upon completion of a Reilly 10, 15, or 20-year Bonded Roof, which has been subject to the careful inspection of our own inspector during its entire construction by a Reilly Approved Roofing Contractor.

In cases where the surety bond and inspection service are not essentially of interest, the application of Reilly Coal Tar Pitch and Reilly Tarred Felt in accordance with approved specifications provides the most durable, modern and satisfactory type of roof construction.

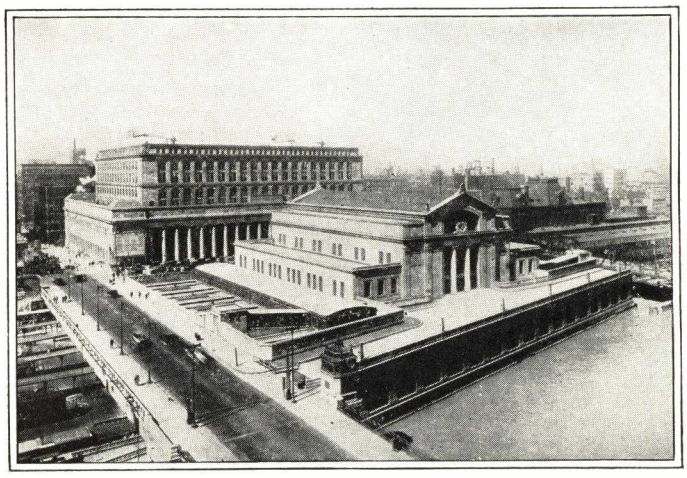
Reilly Bonded Roof Specifications provide for the following types of construction:

5-Ply for use over boards—20-Year Guarantee Bond
4-Ply for use over boards—15-Year Guarantee Bond
4-Ply for use over poured concrete or Gypsum—20-Year Guarantee Bond
3-Ply for use over poured concrete or Gypsum—15-Year Guarantee Bond

Note: In cases where only a 10-year Guarantee Bond is desired, our 10-year Bond will be issued on roofs constructed in accordance with our 15-year Specifications.

WATERPROOFING

Reilly Specifications for Waterproofing are available upon request.



SPECIFICATIONS FOR REILLY BONDED ROOFS
5-Ply Roof for Use Over Boards
20-Year Guarantee Bond

(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Lay one (1) thickness of sheathing paper or unsaturated Felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

(b) Over the entire surface lay two (2) plies of Reilly Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining Felt is laid.

(c) Coat the entire surface uniformly with Reilly Bonded Pitch.

(d) Over the entire surface lay three (3) plies of Reilly Bonded Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Reilly Bonded Pitch the full twenty-two (22) inches on each sheet, so that in no place shall Felt touch Felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of Felt.

(e) Over the entire surface pour from a dipper a uniform coating of Reilly Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

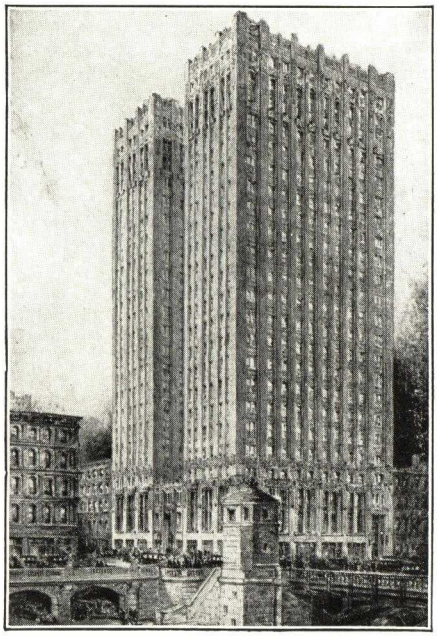
The felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of pitch shall be used

Installations

Reilly Roofing and Waterproofing have been installed on buildings of all types and sizes. Representative installations are shown on these pages.

At left:
Union Station, Chicago

At right:
Engineering Building, Chicago



for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(f) The use of copper or lead for flashings and counter-flashings is recommended.

4-Ply Roof for Use Over Boards 15-Year Guarantee Bond

(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Lay one (1) thickness of sheathing paper or unsaturated Felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

(b) Over the entire surface lay two (2) plies of Reilly Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining Felt is laid.

(c) Coat the entire surface uniformly with Reilly Bonded Pitch.

(d) Over the entire surface lay two (2) plies of Reilly Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Reilly Bonded Pitch the full seventeen (17) inches on each sheet so that in no place shall Felt touch Felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than one (1) ply of Felt.

(e) Over the entire surface pour from a dipper a uniform coating of Reilly Bonded Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The felt shall be laid without wrinkles or buckles. Not less than one hundred and twenty-five (125) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(f) The use of copper or lead for flashings and counter-flashings is recommended.

4-Ply Roof for Use Over Poured Concrete or Gypsum 20-Year Guarantee Bond

(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be smooth, firm, dry and free from loose material. If roof deck slopes, it shall be properly graded to outlets. On slopes exceeding one (1) inch and less than two (2) inches to the foot, roof deck shall permit nailing or creosoted wood nailing strips shall be set in the concrete flush with the surface and spaced three (3) feet apart. These strips to be placed up and down and not across the slope of the roof.

(a) Coat the concrete or gypsum uniformly with Reilly Bonded Pitch.

(b) Over the entire surface lay four (4) plies of Reilly Bonded Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Reilly Bonded Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall Felt touch Felt.

(c) When nailing is necessary nails should be placed not less than three (3) inches from the upper edge of each sheet and not more than three (3) feet apart. All nails shall be covered by not less than three (3) plies of felt.

(d) Over the entire surface pour from a dipper a uniform coating of Reilly Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The Felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(e) The use of copper or lead for flashings and counter-flashings is recommended.

3-Ply Roof for Use Over Poured Concrete or Gypsum 15-Year Guarantee Bond

(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be smooth, firm, dry and free from loose material. If roof deck slopes, it shall be properly graded to outlets. On slopes exceeding one (1) inch and less than two (2) inches to the foot, roof deck shall permit nailing or creosoted wood nailing strips shall be set in the concrete flush with the surface and spaced three (3) feet apart. These strips to be placed up and down and not across the slope of the roof.

(a) Coat the concrete or gypsum uniformly with Reilly Bonded Pitch.

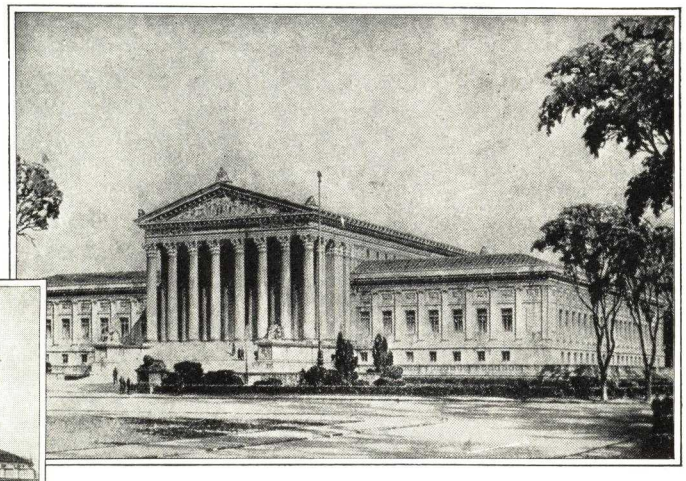
(b) Over the entire surface lay three (3) plies of Reilly Bonded Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Reilly Bonded Pitch the full twenty-two (22) inches on each sheet so that in no place shall Felt touch Felt.

(c) When nailing is necessary nails should be placed not less than three (3) inches from the upper edge of each sheet and not more than three (3) feet apart. All nails shall be covered by not less than three (3) plies of felt.

(d) Over the entire surface pour from a dipper a uniform coating of Reilly Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The Felt shall be laid without wrinkles or buckles. Not less than one hundred and seventy-five (175) pounds of Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(e) The use of copper or lead for flashings and counter-flashings is recommended.



Above:
New Building, United States Supreme Court, Washington, D. C.

At Left:
New Department of Justice Building, Washington, D. C.

MEMORANDA

RU-BER-OID

BUILT-UP ROOFS

6/9

A half century of RU-BER-OID

SINCE 1892, when The Ruberoid Co. pioneered in the production of prepared-ready-to-lay roofing, the growth of the company, the use and number of its products, has been constant and has kept pace with the growth of the United States. Ruberoid products are found all over the world — East and West — at the equator and touching the Arctic Circle.

Ruberoid Built-up Roofing materials are made under the constant supervision of Ruberoid engineers who are experts. The formulae used in these materials have been developed over a long period of years and are the result of a vast amount of research and tests under actual conditions which roofs must meet.

Ruberoid specifications comprising all types of built-up roofs enable architects to specify the type of roof best adapted to construction and climatic conditions. Ruberoid Bonded Built-up Roofs provide for the architect, builder and owner, a guarantee for 10, 15 or 20 years, according to the specifications used. Ruberoid Bonded Roofs are applied only by approved roofing contractors and the guarantee is backed by a National Surety Bond.

There are four popular types of built-up roofing used for roof construction; Asbestos Felt and Asphalt, Coal Tar Pitch and Tarred Felt, Asphalt Felt and Asphalt and combination roofs consisting of Asphalt Felt, Asphalt-saturated Asbestos Felt and Roofing Asphalt.

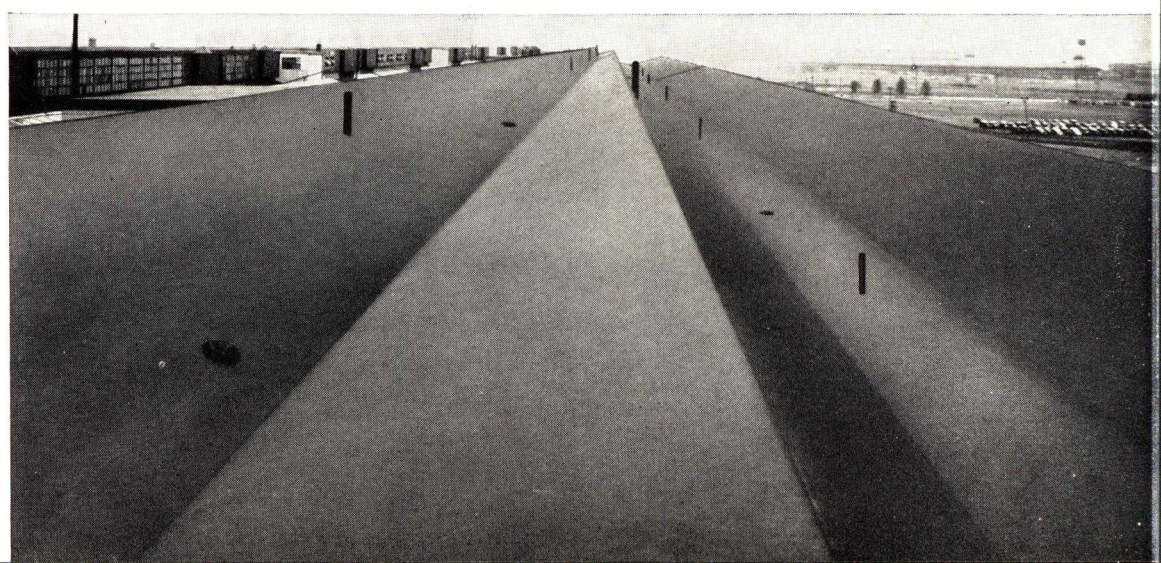
Climatic conditions, the pitch of the roof, proximity to fire hazards, construction of the roof deck and many other factors will determine what type of roof is selected. We can supply the materials for each of the four types of roofs, with specifications to meet any conditions.

On the opposite page are listed many of the Ruberoid Built-up Roofing Materials.

Tabulated on page 4 of this catalog is a chart, showing the specifications generally used for various types of roofs — the guarantees applying and other essential information.

On pages 5 to 11 are Ruberoid Specifications, covering each of the four principal types of roofs.

If you wish further information or have any unusual roofing problems, there is an efficient engineering department located at each of our district offices, ready to give you the benefit of their experience and to help you meet special conditions.



BUILT-UP ROOFING MATERIALS

ASPHALT FELTS — No. 151

Consist of rag felts saturated with waterproofing asphalt. 32 in. and 36 in. wide rolls in No. 12, 14, 15, 20, 30 and 40 lb. weights. No. 24 lb. in 32 in. width only. Weights indicate lbs. per 100 sq. ft. average weight. Roll content varies from 432 to 108 sq. ft. All weights except No. 12 carry Underwriters' Label.

TARRED FELTS — No. 152

Consist of rag felts saturated with Coal Tar. Furnished in No. 12, 14, 15, and 24 lb. weights in rolls containing from 432 to 216 sq. ft. Weights indicate lbs. per 100 sq. ft. All weights except No. 12 carry Underwriters' Label.

ASBESCOAT No. 60 Asbestos Base Sheet — No. 157

A heavy asbestos felt impregnated and coated on both sides with waterproofing asphalt and sanded with fine silica sand. Weight: 55 lbs. per 108 sq. ft. roll, 32 in. wide.

ASBESTOS FELTS — No. 158

Consist of felts made of asbestos fibres impregnated with waterproofing asphalt. Furnished as follows: Nos. 15, 20, 35 in 32 in. wide rolls. Nos. 15 and 20 contain 324 sq. ft. per roll. No. 35: 216 sq. ft. No. 15, also available in 4 in. wide rolls containing 121½ lin. ft. No. 20 has an additional coating of asphalt on one side.

COAL TAR PITCH — No. 155

Light Cooperage: 375 to 425 lbs. Heavy Cooperage: 625 to 675 lbs. Metal Containers: 500 lbs. Steel Drums: 475 lbs. Sm. light wood barrel—300 to 350 lbs. Large light wood barrel: 475 lbs. Wood barrels and metal drums: 400 lbs.

ASBESTOS COMBINATION FLASHING — No. 161

3-ply combination, consisting of one asphalt saturated fabric cemented between two asphalt impregnated asbestos felts. A very flexible flashing material having unusual strength due to the fabric insertion. No. 29—16 in. wide, No. 58—32 in. wide. 29 and 58 lbs. per 50 ft. 6 in. wide roll.

ASPHALT PRIMER — No. 154

A light penetrating asphalt coating for non-combustible decks and walls. Available in 60 and 30 gal. drums. Weight, approximately 7½ lbs. per gallon.

COAL TAR (Refined) — No. 156

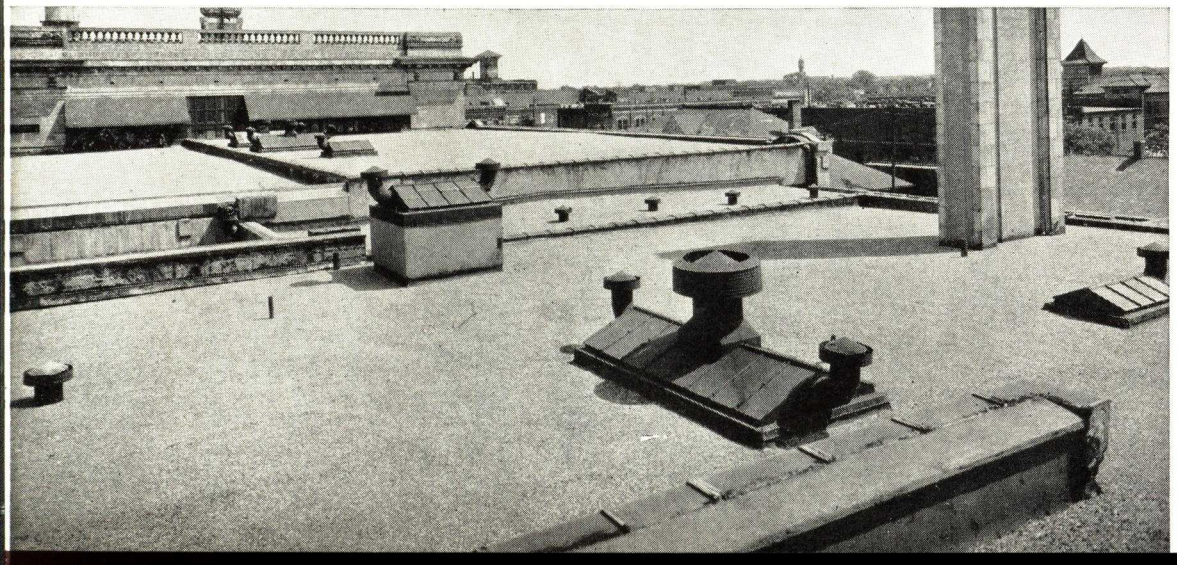
For use as a general preservative, underground and under water. Furnished in wood or metal barrels containing 50 gal. Weight: approximately 550 lbs.

TAR SATURATED ASBESTOS FELT — No. 159

Consists of asbestos felt saturated with coal tar. Used in construction of Asbestos Built-up Roofs. No. 15 lb.: 32 in., 324 sq. ft. per 45 lb. roll.

ROOFING ASPHALT — No. 153

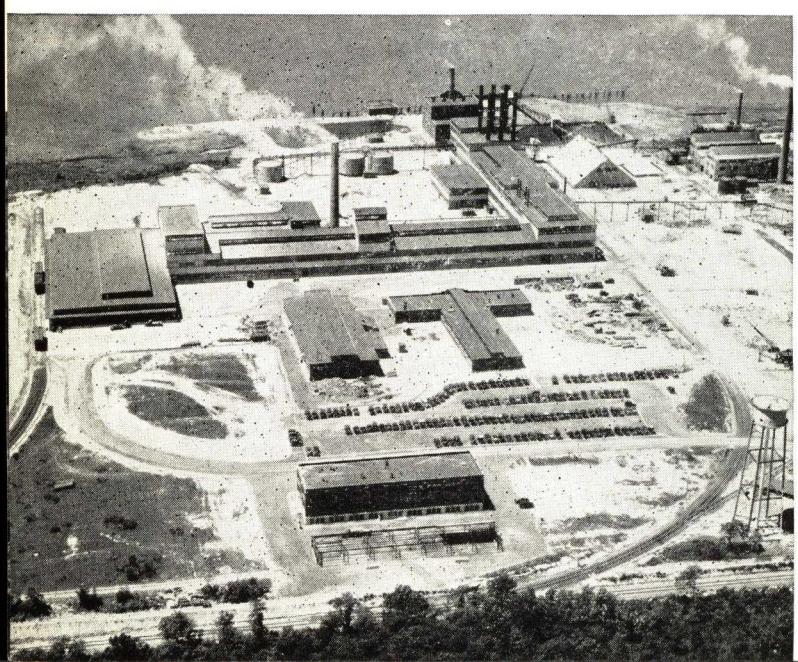
99-9/10% pure petroleum asphalt having a high rating in tests for ductility (stretch) and viscosity (adherence). Used in connection with built-up roofs as the cementing layer between the felts and for top-coating over the roof when all the felts have been laid. Furnished in 150 to 160° melting point for flat roofs and 180 to 190° melting point for steep roofs. Put up in metal drums weighing approximately 475 lbs. per drum and 410 lb. metal drums.



6/9 SUMMARY OF SPECIFICATIONS OF BUILT-UP ROOFS

TYPE No.	DESCRIPTION
1	Tar saturated Rag Felt and Coal Tar Pitch, Slag or Gravel Finish.
2	Asphalt saturated Rag Felt and Roofing Asphalt, Slag or Gravel Finish. Also Mineral-surfaced Finish.
3	Asbestos Felt Built-up Roofs, Asphalt saturated Asbestos Felts and Bond Roofing Asphalt, Smooth Finish.
4	Combination Asphalt and Asbestos Felts. Asphalt saturated Rag Felt, Asphalt saturated Asbestos Felt and Bond Roofing Asphalt, Smooth Finish.

Type No.	Specification No.	Designation	Construction of Deck	Limitation of Roof Pitch (Inches)	Surface Finish	Type of Roofing Felt Involved	Underwriters' Lab. Inc. Rating	Number of Plies of Felt	Number of Moppings of Pitch	Total Weight Per Square		Term or Guaranty Bonded Yrs.
										Gravel Surfaced	Surfaced Slag	
1	151	Pitch and Felt	Wood	2	Slag or Gravel	Tarred Rag Felt	A	One Layer Sheathing Paper, Four Plies No. 15 Tarred Felt	3	596	496	15
1	152	Pitch and Felt	Concrete	1	Slag or Gravel	Tarred Rag Felt	A	Three Plies No. 15 Tarred Felt	4	625	525	15
1	202	Pitch and Felt	Wood	2	Slag or Gravel	Tarred Rag Felt	A	One Layer Sheathing Paper, Five Plies No. 15 Tarred Felt	4	637	537	20
1	203	Pitch and Felt	Concrete	1	Slag or Gravel	Tarred Rag Felt	A	Four Plies No. 15 Tarred Felt	5	665	565	20
2	102	Asphalt Felt	Wood	Over 3	Mineral	Asphalt Felt	C	Two No. 15 Asphalt Felt, Two Ruberoid Dubl-Coverage Roofing	2	Min.	194	10
2	103	Asphalt Felt	Concrete	3 to 6	Mineral	Asphalt Felt	C	Ruberoid Concrete Primer, One No. 15 Asbestos Felt, Two Ruberoid Dubl-Coverage Roofing	3	Min.	218	10
2	153	Asphalt Felt	Wood	½ to 3	Slag or Gravel	Asphalt Felt	A	Four No. 15 Felts	3	566	466	15
2	154	Asphalt Felt	Concrete	½ to 3	Slag or Gravel	Asphalt Felt	A	Three No. 15 Felts	4	585	485	15
2	204	Asphalt Felt	Wood	½ to 3	Slag or Gravel	Asphalt Felt	A	Five No. 15 Felts	4	607	507	20
2	205	Asphalt Felt	Concrete	½ to 3	Slag or Gravel	Asphalt Felt	A	Four No. 15 Felts	5	625	525	20
3	150	Asbestos	Wood	½ to 6	Smooth	Asbestos	A	One No. 60 Asbestos, Two No. 20 Asbestos	3	Smooth	172	15
3	200	Asbestos	Wood	½ to 6	Smooth	Asbestos	A	One No. 60 Asbestos, Two No. 20 Asbestos	3	Smooth	172	20
3	201	Asbestos	Concrete	½ to 6	Smooth	Asbestos	A	One No. 60 Asbestos, Two No. 20 Asbestos	4	Smooth	215	20
4	100	Combination	Wood	½ to 6	Smooth	Rag & Asbestos	C	One No. 30 Rag Felt, Two No. 20 Asbestos	3	Smooth	149	10
4	101	Combination	Concrete	½ to 6	Smooth	Rag & Asbestos	A	One No. 30 Rag Felt, Two No. 20 Asbestos	4	Smooth	182	10
4	156	Combination	Wood	½ to 6	Smooth	Rag & Asbestos	C	One No. 40 Rag Felt, Two No. 20 Asbestos	3	Smooth	160	15
4	157	Combination	Concrete	½ to 6	Smooth	Rag & Asbestos	A	Two No. 15 Rag Felt, Two No. 20 Asbestos	5	Smooth	212	15
4	208	Combination	Wood	½ to 6	Smooth	Rag & Asbestos	B	One No. 40 Rag Felt, Three No. 20 Asbestos	4	Smooth	199	20
4	209	Combination	Concrete	½ to 6	Smooth	Rag & Asbestos	A	Two No. 15 Rag Felt, Three No. 20 Asbestos	6	Smooth	232	20



GENERAL SPECIFICATIONS

for

RUBEROID BONDED BUILT-UP ROOFS

Applicable to All Specifications for Ruberoid Built-up Roofs on the Following Pages

DEFINITIONS

Unless otherwise specifically stated in any case, the terms hereunder listed shall be construed in accordance with definitions as follows:

Manufacturer—The RUBEROID Co., whose main office is at 500 Fifth Avenue, New York, N. Y.

Contractor—The Roofing Contractor.

Asphalt Felt — Ruberoid No. 30 Asphalt Felt. (Exceptions: Specifications No. 157, 209. Use Ruberoid No. 15 Asphalt Felt.)

Asbestos Felt—Ruberoid No. 20 Asphalt-saturated Asbestos Felt.

Asphalt—Ruberoid Roofing Asphalt or Ruberoid Bond Roofing Asphalt.

Tarred Felt—Ruberoid No. 15 Tarred Felt.

Coal Tar Pitch—Ruberoid Coal Tar Pitch.

Asbestos Base Felt—Ruberoid No. 60 Asbestos Base Felt.

Concrete Primer—Ruberoid Concrete Primer.

Asphalt Base Felt—Ruberoid No. 40 Asphalt Felt.

WORK BY OTHERS

Over Board Sheathing: Specifications No. 100, 102, 150, 151, 153, 156, 200, 202, 204 and 208.

The roof deck must be constructed of seasoned lumber, dressed on upper side, dry and free from large cracks and knot holes. Roof boards must be securely nailed in place, leaving no nail heads above the wood surfaces. Surfaces must be properly graded to outlets and cant strips provided in the angle formed between the roof and vertical surfaces.

Over Board Sheathing With or Without Approved Insulation and Precast Gypsum Blocks: Specifications No. 151, 202.

If over boards, the roof deck shall be constructed of seasoned lumber, smooth and securely nailed, and free from large cracks or knot holes. It shall be properly graded to outlets and swept clean and free from all loose material.

Over Poured Concrete, Poured Gypsum, Precast Concrete Tile or Book Tile With or Without Approved Insulation: Specifications No. 101, 103, 152, 154, 157, 201, 203, 205 and 209.

The roof deck shall be thoroughly dry, smooth and free from loose material, and properly graded to outlets.

Where Book Tile is used the surface of the tile shall be covered with portland cement mortar 1-in. thick with a smooth and even finish.

Where poured gypsum or precast gypsum blocks are used, all felt shall be nailed as required when the roof deck is of boards.

For inclines exceeding 3-in. to the foot, if the deck is of concrete, wooden nailing strips must be provided at proper intervals.

Coves shall be provided in the angle formed between the roof and vertical surfaces.

GENERAL REQUIREMENTS APPLYING TO CONTRACTOR

The contractor must be approved by the manufacturer.

The contractor shall inspect the roof surfaces and shall not proceed with roofing work until all defects reasonably apparent by proper inspection and which might injure the roofing, have been remedied by others. The contractor assumes responsibility for existing undersurfaces as to their fitness to receive roofing when he proceeds with his work.

Roof surfaces shall be swept clean and free of all loose material before proceeding with roofing work.

The contractor shall afford all necessary facilities for inspections by the manufacturer.

GENERAL NOTES

Note 1—Insulated Roofs—If this roof is to be applied over insulating material, the insulation must be firm, capable of withstanding traffic without crushing and of a type that will retain nails.

No more insulation shall be laid at one time than can be promptly protected by roofing in the event of sudden weather changes. A felt cut-off shall be mopped along the edge of the insulation at a distance not greater than one width of insulating material from walls, curbs and other openings.

Note 2—Leader Heads, Vents, etc.—Leader heads, vents and other openings shall be furnished with metal flanges of sufficient width to permit proper connections with the roofing. If not so furnished an exception of responsibility will be taken for any leaks which may develop immediately adjacent. Flanges of scuppers, gutters, gravel guards, finishing or edging strips, leader heads and vents shall be set on top of all felts, nailed and double felt stripped.

BONDS

The Manufacturer's Surety Bond Guaranty as issued by the National Surety Corp. of New York, N. Y., covering a period of *. . . 10, 15, or 20 years, depending upon the specification used . . .* from date of completion of the work shall be furnished.

Note: This guarantee is not given on jobs of less than 50 squares, nor in such portions of the United States as are not covered by the Manufacturer's Inspection Service, except by special arrangement with the Manufacturer.

ASBESTOS FELT AND ASPHALT FELT, SMOOTH FINISH ROOF

For Use Over Board Sheathing

For Inclines Not Exceeding 6-in. per Ft. (Not to Be Used on True Level Decks)

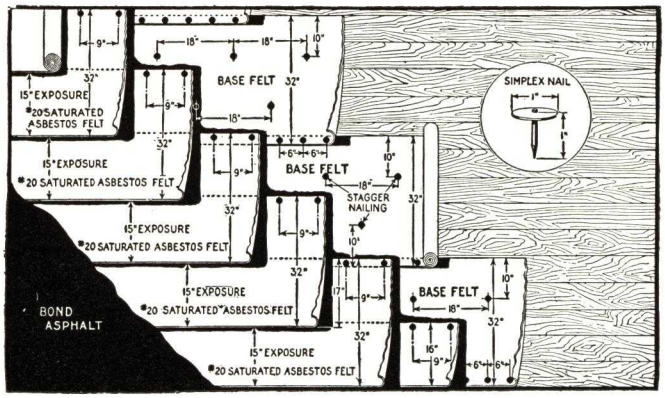
SPECIFICATION No. 100 (COMBINATION) — 10-YEAR BOND*

Underwriters' Laboratories Class C Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 10-year Guaranty Bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one ply of No. 30 Asphalt Felt, lapping sheets 2-in. at edges and not less than 6-in. at end laps. Nail at 6-in. intervals along lap and at 18-in. intervals along lines 10-in. from each edge of each sheet, the latter nails being staggered. This felt shall be turned up not less than 4-in. along all walls and vertical surfaces.



Second—Over entire surface lay two plies of No. 20 Saturated Asbestos Felt, embedding each sheet in Asphalt, lapping each sheet 17-in. over preceding one and rolling each sheet immediately behind the mop to insure proper adhesion of all sheets. In no place shall felt touch felt. Each sheet shall be nailed along back edge only from 1-in. to 1½-in. down, at intervals of approximately 18 in. These felts shall be cut off at angle of roof deck and all vertical surfaces.

Third—Over entire surface mop a uniform coating of Asphalt, using not more than 20 lb. per 100 sq. ft.

Total Approximate Weight, 100 sq. ft.....149 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly embedded by brooming felt. Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to board surfaces shall be done with Simplex flat head roofing nails or with ⅞-inch galvanized roofing nails, driven through flat tin discs.

All roofing work shall be done to the satisfaction and approval of the manufacturer.

SPECIFICATION No. 101 (COMBINATION) — 10-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Gypsum Block, Precast Concrete Tile, Book Tile or Approved Insulation

For Incline Not Exceeding 6-in. per Ft. (Not to be Used on True Level Decks)

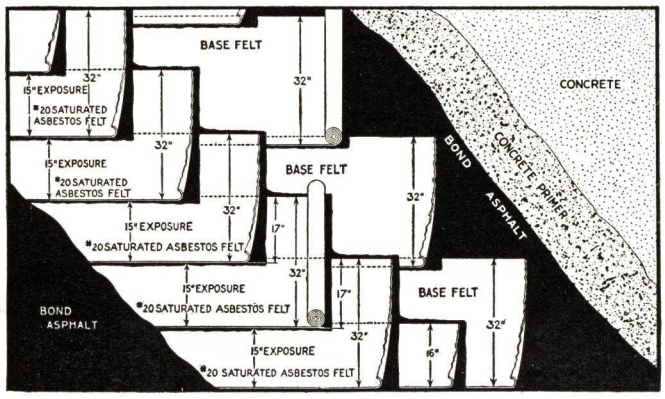
Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 10-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat entire surface with Primer applied cold, allowing same to dry thoroughly. Where plastic material is used to caulk joints of blocks, coating of primer shall be held back 2-in. from all joints.

Second—Over entire surface lay one ply of No. 30 Asphalt Felt in Roofing Asphalt, lapping each sheet 2-in. over preceding one at edges and not less than 6-in. at end laps. Roll each sheet immediately behind mop to insure proper adhesion of all sheets. Mopping and rolling shall be so done as to secure a continuous bed of asphalt of uniform thickness. In no place shall felt touch felt or roof deck. Felts shall be cut off at angle of roof deck and all vertical surfaces.



On inclines exceeding 3-in. to the foot these sheets shall be nailed at intervals of 9-in. along the lap into the nailing strips.

Note: Where poured gypsum or precast gypsum blocks are used, all three plies of felt shall be nailed as specified for board decks.

Third—Over entire surface lay in asphalt two plies of No. 20 Saturated Asbestos Felt, lapping each sheet 17-in. over preceding one, rolling each sheet immediately behind mop to insure a uniform coating of hot asphalt. In no place shall felt touch felt.

On inclines exceeding 3-in. to the foot, sheets shall be nailed at intervals of 18-in. along the nailing strips or back edge.

These felts shall be cut off at angle of roof deck and vertical surfaces.

Fourth—Over entire surface mop a uniform coating of asphalt, using not more than 20 lb. per 100 sq. ft.

Total Approximate Weight 100 sq. ft.....182 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind hot mop and firmly embedded by brooming the felt. Asphalt shall not be heated to exceed 450° F.

All nailing of roofing shall be done with Simplex flat head roofing nails or with ⅞-inch galvanized roofing nails, driven through flat tin discs.

All roofing work shall be done to the satisfaction and approval of the manufacturer.

*For general specification see page 5.

COAL TAR PITCH AND TARRED FELT, GRAVEL OR SLAG FINISH ROOF

For Use Over Board Sheathing With or Without Approved Insulation and Precast Gypsum Blocks

For Inclines Not Exceeding 2-In. per Ft.

SPECIFICATION No. 151 — 15-YEAR BOND*

Underwriters' Laboratories Class A Rating

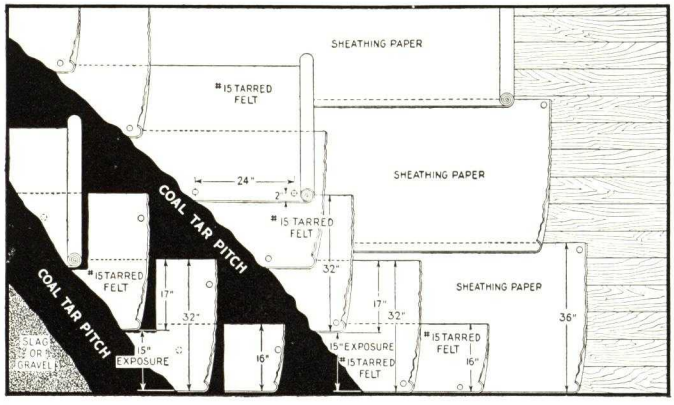
The roofing shall be a Ruberoid Bonded Roof carrying a 15-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one thickness of sheathing paper, weighing not less than 5 lb. per 100 sq. ft., lapping sheets at least 1-in. If Precast Gypsum Block is used, sheathing paper may be omitted.

Second—Over entire surface lay two plies of No. 15 Tarred Felt, lapping each sheet 17-in. over preceding one, and turning up these felts not less than 4-in. along all vertical surfaces. Nail as often as is necessary to secure, until remaining felt is laid.

Third—Coat entire surface uniformly with Coal Tar Pitch.



Fourth—Over entire surface lay two plies of No. 15 Tarred Felt, lapping each sheet 17-in. over preceding one, mopping with Coal Tar Pitch full 17-in. on each sheet, so that in no place shall felt touch felt. Back edge of each sheet shall be nailed at intervals of 24-in. at a distance not greater than 6-in. from back edge of sheet. Such nailing as is necessary shall be done so that all nails are covered by not less than one ply of felt. Felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Fifth—Over entire surface pour a uniform coating of Coal Tar Pitch into which, while hot, embed not less than 400 lb. of gravel or 300 lb. of slag for each 100 sq. ft. Gravel or slag shall be ¼-in. to ⅝-in. in size, dry and free from dirt. If roof is applied during cold weather, or slag or gravel is damp, it shall be heated and dried immediately before application.

Total Approximate Weight 100 sq. ft.. { gravel surface ..596 lb. / slag surface ....496 lb.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. Pitch shall not be heated to exceed 400° F.

All nailing or roofing shall be done with Simplex flat head roofing nails or with ⅞-inch galvanized roofing nails, driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

ASPHALT FELT AND ASPHALT WITH SLAG OR GRAVEL SURFACE—SPECIFICATION NO. 153

15-Year Bond—Underwriters' Class A Rating—For inclines not exceeding 4-in. per Ft.

Construction identical with No. 151, except that no sheathing paper is required.

SPECIFICATION No. 152 — 15-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Precast Concrete Tile or Book Tile With or Without Approved Insulation

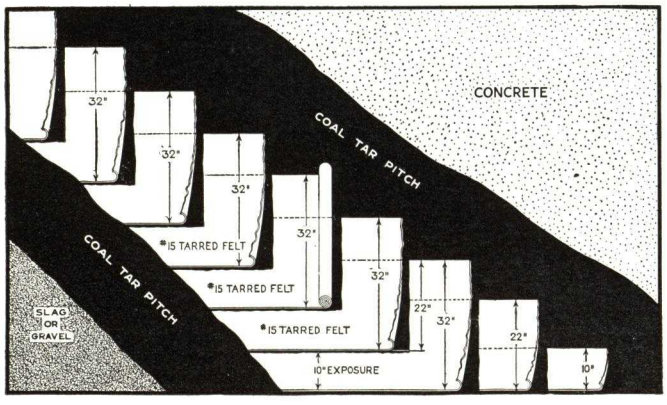
For Inclines Not Exceeding 1-in. per Ft.

Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 15-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat deck uniformly with Coal Tar Pitch. If Precast Concrete Tile is used, surface shall be spot or strip mopped.



Second—Over entire surface lay three plies of No. 15 Tarred Felt, lapping each sheet 22-in. over preceding one and mopping with Coal Tar Pitch full 22-in. on each sheet so that in no place shall felt touch felt. Felt shall be cut off at angle of roof deck and walls or vertical surfaces.

Third—Over entire surface pour a uniform coating of Coal Tar Pitch into which, while hot, embed not less than 400 lb. of gravel or 300 lb. of slag for each 100 sq. ft. Gravel or slag shall be from ¼-in. to ⅝-in. in size, dry and free from dirt.

If roof is applied during cold weather, or slag or gravel is damp, it shall be heated and dried immediately before application.

Total Approximate Weight 100 sq. ft.. { gravel surface ..625 lb. / slag surface ....525 lb.

WORKMANSHIP

All felt shall be laid without wrinkles or buckles. Pitch shall not be heated to exceed 400° F.

All roofing shall be done to the satisfaction and approval of the manufacturer.

ASPHALT FELT AND ASPHALT WITH SLAG OR GRAVEL SURFACE—SPECIFICATION NO. 154

15-Year Bond—Underwriters' Class A Rating—For inclines not exceeding 3-in. per ft.

Construction Identical with No. 152, except that a concrete primer is used.

*For general specification see page 5.

ASBESTOS FELT AND ASPHALT SMOOTH FINISH ROOF

For Use Over Board Sheathing

For Inclines Not Exceeding 6-In. per Ft. (Not to Be Used on True Level Decks)

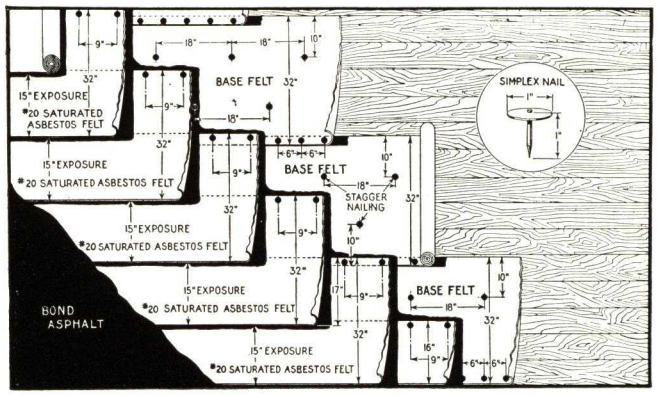
SPECIFICATION No. 200 — 20-YEAR BOND*

Underwriters' Laboratories Class A Rating

The roofing shall be Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one ply of No. 60 Saturated Asbestos Base-Felt, lapping each sheet 2-in. at edges and not less than 6-in. at end laps. Nail at 6-in. intervals along lap, and also at intervals of 18-in. on a line 10-in. from each edge of sheet, staggering the nails. Felt shall be turned up not less than 4-in. along all vertical surfaces.



Second—Over entire surface embed in Asphalt two plies of No. 20 Saturated Asbestos Felt, lapping each sheet 17-in. over preceding one, rolling each sheet immediately behind mop to insure a uniform coating of hot Asphalt so that in no place shall felt touch felt. Each sheet shall be nailed along the back edge from 1 to 1½-in. down at intervals of approximately 18-in. These felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Third—Over entire surface mop a uniform coating of Asphalt using not more than 20 lb. per 100 sq. ft.

Total Approximate Weight per 100 sq. ft.....172 lb.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly embedded by brooming the felt. The Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to board surfaces shall be done with Simplex flat head roofing nails or with ⅞-inch galvanized roofing nails driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

SPECIFICATION No. 201 — 20-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Gypsum Block, Precast Concrete Tile, Book Tile or Approved Insulation

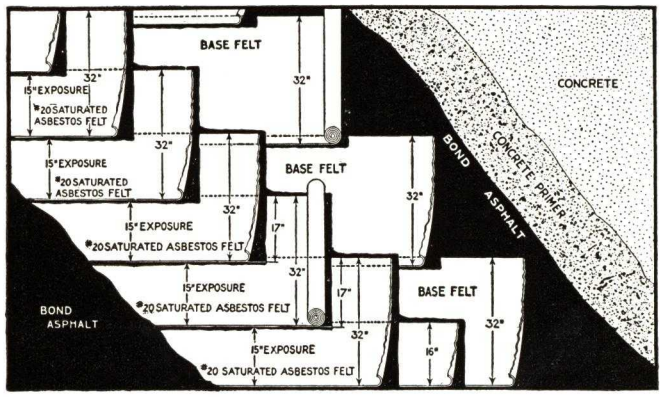
For Inclines Not Exceeding 6-In. per Ft. (Not to Be Used on True Level Decks)
Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat entire surface with Concrete Primer applied cold and allow same to dry thoroughly. Where plastic material is used to caulk joints of blocks, coating of primer shall be held back 2-in. from all joints.

Second—Over entire surface embed in Ruberoid Bond Asphalt one ply of No. 60 Asbestos Base-Felt, lapping each sheet 2-in. over preceding one at edges and not less than 6-in. at end laps. Nail at intervals of 12-in. along laps into nailing strip. All felts shall be cut off at angle of roof deck and all walls or vertical surfaces.



Third—Over entire surface embed in Ruberoid Bond Asphalt two plies of No. 20 Asphalt-saturated Asbestos Felt, lapping each sheet 17-in. over preceding one, rolling each sheet immediately behind mop to insure a uniform coating of hot asphalt so that in no place shall felt touch felt.

On inclines exceeding 3-in. to the foot, these sheets shall be nailed 6-in. from back edge at intervals of 24-in. All felts shall be cut off at angle of roof deck and all walls or vertical surfaces.

Fourth—Over entire surface mop a uniform coating of Asphalt, using not more than 20 lb. per 100 sq. ft.

Total Approximate Weight per 100 sq. ft. .....215 lb.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly embedded by brooming the felt.

All nailing of roofing to roof surfaces shall be done with Simplex flat head roofing nails or with ⅞-in. galvanized roofing nails, driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

*For general specification see page 5.

COAL TAR PITCH AND TARRED FELT, GRAVEL OR SLAG FINISH ROOF

For Use Over Board Sheathing With or Without Approved Insulation and Precast Gypsum Blocks

For Inclines Not Exceeding 2-In. per Ft.

SPECIFICATION No. 202 — 20-YEAR BOND*

Underwriters' Laboratories Class A Rating

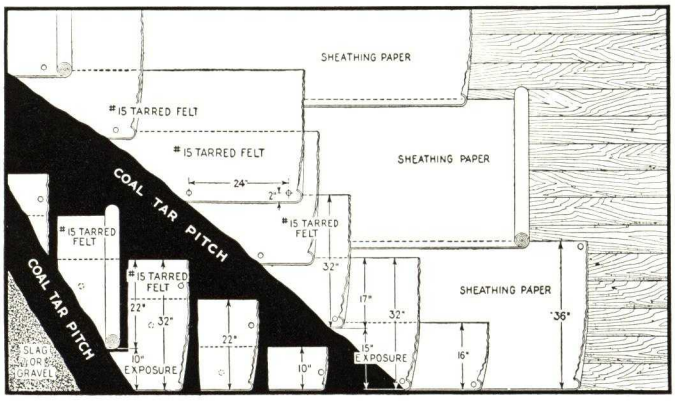
The roofing shall be a Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one thickness of sheathing paper, weighing not less than 5 lb. per 100 sq. ft., lapping the sheets at least 1-in. If Precast Gypsum Block is used, sheathing paper may be omitted.

Second—Over entire surface lay two plies of No. 15 Tarred Felt, lapping each sheet 17-in. over preceding one and nailing enough to secure, until remaining felt is laid. These felts shall be turned up not less than 4-in. along all walls or vertical surfaces.

Third—Coat entire surface uniformly with Coal Tar Pitch.



Fourth—Over entire surface lay three plies of No. 15 Tarred Felt, lapping each sheet 22-in. over preceding one, mopping with Coal Tar Pitch the full 22-in. on each sheet, so that in no place shall felt touch felt. The back edge of sheet shall be nailed at intervals of 24-in. at a distance not greater than 6-in. from back edge of sheet. Necessary nailing shall be done so that all nails are covered by not less than two plies of felt. These felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Fifth—Over entire surface pour a uniform coating of Coal Tar Pitch into which, while hot, embed not less than 400 lb. of gravel or 300 lb. of slag for each 100 sq. ft. Gravel or slag shall be ¼-in. to ⅝-in. in size, dry and free from dirt. If roof is applied during cold weather, or slag or gravel is damp, it shall be heated and dried immediately before application.

Approximate Weight per 100 sq. ft.....{ gravel surface ..637 lb. / slag surface ....537 lb.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles, and pitch shall not be heated to exceed 400° F.

All nailing of roofing shall be done with Simplex flat head roofing nails or with ⅞-inch galvanized roofing nails, driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

ASPHALT FELT AND ASPHALT WITH SLAG OR GRAVEL SURFACE—SPECIFICATION NO. 204

20-Year Bond-Underwriters' Class A Rating—For inclines not exceeding 3-in. per ft.

Construction Identical with No. 202, except that no sheathing paper is used.

SPECIFICATION No. 203 — 20-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Precast Concrete Tile or Book Tile With or Without Approved Insulation

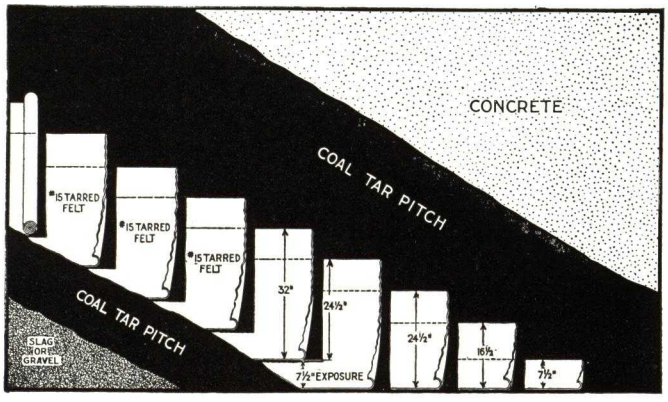
For Inclines Not Exceeding 1-In. per Ft.

Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat roof deck uniformly with Coal Tar Pitch. If Precast Concrete Tile is used, surface shall be spot or strip mopped.



Second—Over entire surface lay four plies of No. 15 Tarred Felt, lapping each sheet 24½-in. over the preceding one and mopping with Coal Tar Pitch the full 24½-in. on each sheet, so that in no place shall felt touch felt. These felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Third—Over entire surface pour a uniform coating of Coal Tar Pitch into which, while hot, embed not less than 400 lb. of gravel or 300 lb. of slag for each 100 sq. ft. Gravel or slag shall be from ¼-in. to ⅝-in. in size, dry and free from dirt. If roof is applied during cold weather, or slag or gravel is damp, it shall be heated and dried immediately before application.

Approximate Weight per 100 sq. ft.....{ gravel surface ..665 lb. / slag surface ....565 lb.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles, and pitch shall not be heated to exceed 400° F.

All roofing shall be done to the satisfaction and approval of the manufacturer.

ASPHALT FELT AND ASPHALT WITH SLAG OR GRAVEL SURFACE—SPECIFICATION NO. 205

20-Year Bond-Underwriters' Class A Rating—For inclines not exceeding 3-in. per ft.

Construction Identical with No. 203, except that a concrete primer is used.

*For general specification see page 5.

ASBESTOS FELT AND ASPHALT FELT, SMOOTH FINISH ROOF

For Use Over Board Sheathing

For Inclines Not Exceeding 6-in. per Ft. (Not to Be Used on True Level Decks)

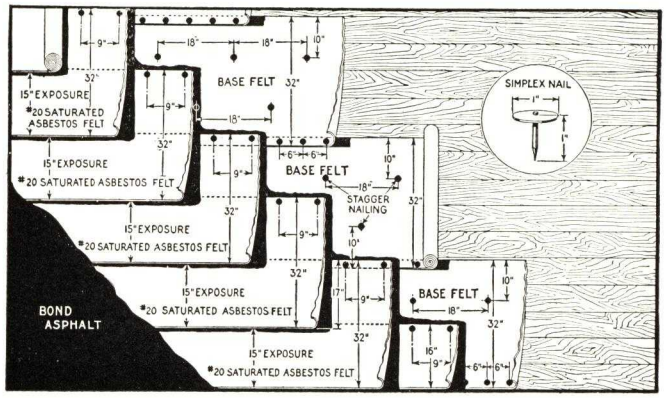
SPECIFICATION No. 156 (COMBINATION) — 15-YEAR BOND*

Underwriters' Laboratories Class C Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 15 year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one ply of No. 40 Asphalt Base Felt, lapping each sheet 2-in. at edges and not less than 6-in. at end laps. Nail at 6-in. intervals along lap and also at intervals of 18-in. on a line 10-in. from each edge of sheet, staggering the nails. This felt shall be turned up not less than 4-in. along all walls and vertical surfaces.



Second—Over entire surface embed in Ruberoid Bond Asphalt two plies of No. 20 Asphalt-Saturated Asbestos Felt lapping each ply 17-in. over preceding one and rolling each ply immediately behind mop to insure a uniform coating of hot asphalt so that in no place shall felt touch felt. Each ply shall be nailed along back edge at intervals of approximately 18-in. These felts shall be cut off at angle of roof deck and all walls or vertical surfaces.

Third—Over entire surface mop a uniform coating of Asphalt, using not more than 20 lbs. per 100 sq. ft.

Total approximate weight, 100 sq. ft. .....149 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind hot mop and firmly embedded by brooming the felt. Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to board surfaces shall be done with Simplex flat head roofing nails or with ⅞-in. galvanized roofing nails driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

SPECIFICATION No. 157 (COMBINATION) — 15-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Gypsum Block, Precast Concrete Tile, Book Tile or Approved Insulation

For Inclines Not Exceeding 6-In. per Ft. (Not to Be Used on True Level Decks)

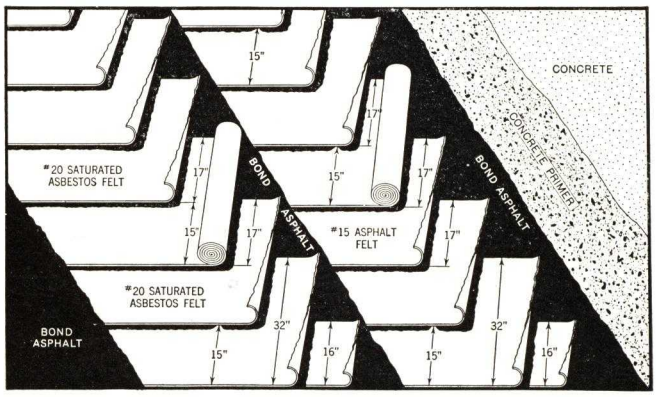
Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 15-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat entire surface with Primer applied cold, allowing same to dry thoroughly. Where plastic material is used to caulk joints of blocks, coating of primer shall be held back 2-in. from all joints.

Second—Over entire surface lay two plies of No. 15 Asphalt Felt in Ruberoid Bond Roofing Asphalt, lapping each ply 17-in. over preceding one and rolling each ply immediately behind mop to insure proper adhesion of all sheets. In no place shall felt touch felt. Felts shall be cut off at top of cove in angle of roof deck and all vertical surfaces.



On inclines exceeding 3-in. to the foot these sheets shall be nailed at intervals of 18-in. along back edge into the nailing strips.

Note: Where poured gypsum or precast gypsum blocks are used, all felt shall be nailed as specified for board decks.

Third—Over entire surface lay in asphalt two plies of No. 20 Asphalt-saturated Asbestos Felt, lapping each ply 17-in. over preceding one, rolling each ply immediately behind mop to insure a uniform coating of hot asphalt. In no place shall felt touch felt.

On inclines exceeding 3-in. to the foot, plies shall be nailed at intervals of 18-in. along back edge into the nailing strips.

The felt shall be cut off at angle of roof deck and vertical surfaces.

Fourth—Over entire surface mop a uniform coating of asphalt, using not more than 20 lbs. per 100 sq. ft.

Total Approximate Weight per 100 sq. ft. .....212 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly imbedded by brooming the felt. Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to roof surfaces shall be done with Simplex flat head roofing nails or with ⅞-in. galvanized roofing nails driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

*For general specification see page 5.

ASBESTOS FELT AND ASPHALT FELT, SMOOTH FINISH ROOF

For Use Over Board Sheathing

For Inclines Not Exceeding 6-In. per Ft. (Not to Be Used on True Level Decks)

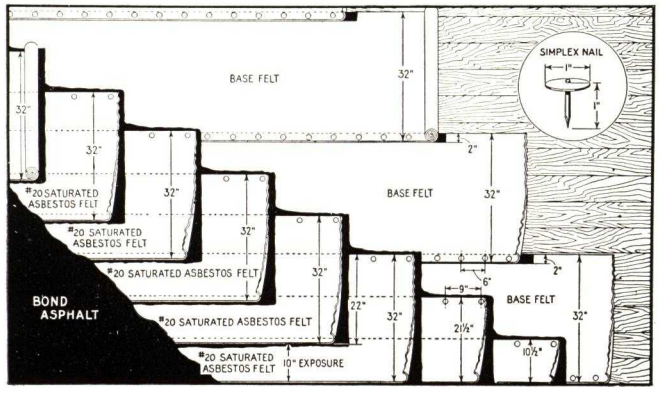
SPECIFICATION No. 208 (COMBINATION) — 20-YEAR BOND*

Underwriters' Laboratories Class B Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Lay one ply of No. 40 Saturated Asphalt Base Felt, lapping each sheet 2-in. and not less than 6-in. at end laps. Nail at 6-in. intervals along the lap. This felt shall be turned up not less than 4-in. along all vertical surfaces.



Second—Over this No. 40 Asphalt Base Felt embed in Ruberoid Bond Asphalt three plies of No. 20 Saturated Asbestos Felt, lapping each sheet 22-in. over preceding one, rolling each sheet immediately behind mop to insure a uniform coating of hot Ruberoid Bond Asphalt so that in no place shall felt touch felt. Each sheet shall be nailed along back edge from 1 to 1½-in. down at intervals of approximately 18-in. These felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Third—Over entire surface mop a uniform coating of Asphalt, using not more than 20 lbs. per 100 sq. ft.

Total approximate weight per 100 sq. ft. .....199 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly embedded by brooming the felt. The Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to board surfaces shall be done with Simplex flat head roofing nails or with ⅞-in. galvanized roofing nails driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

SPECIFICATION No. 209 (COMBINATION) — 20-YEAR BOND*

For Use Over Poured Concrete, Poured Gypsum, Gypsum Block, Precast Concrete Tile, Book Tile or Approved Insulation

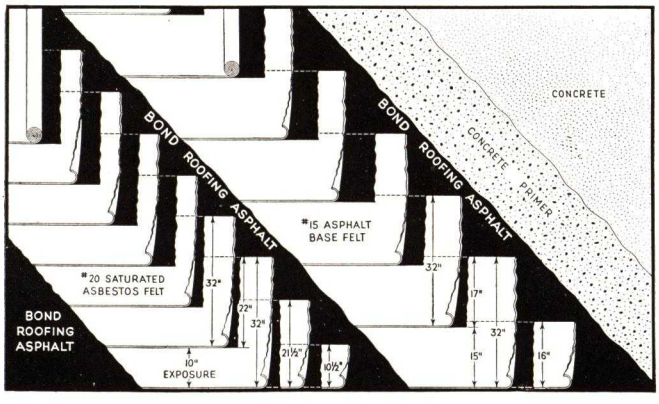
For Inclines Not Exceeding 6-In. per Ft. (Not to Be Used on True Level Decks)
Underwriters' Laboratories Class A Rating

The roofing shall be a Ruberoid Bonded Roof carrying a 20-year guaranty bond, installed in accordance with conditions and specifications as hereinafter set forth.

SPECIFICATIONS FOR LAYING ROOFING

First—Coat entire surface with Primer applied cold, allowing same to dry thoroughly. Where plastic material is used to caulk joints of blocks, coating of primer shall be held back 2-in. from all joints.

Second—Over entire surface lay two plies of No. 15 Asphalt Felt in Roofing Asphalt, lapping each ply 17-in. over preceding one and rolling each ply immediately behind mop to insure proper adhesion of all sheets. In no place shall felt touch felt. Felts shall be cut off at top of cove or angle of roof deck and all vertical surfaces.



On inclines exceeding 3-in. to the foot these sheets shall be nailed at intervals of 18-in. along the back edge into nailing strips.

Third—Over entire surface embed in Ruberoid Bond Asphalt three plies of No. 20 Saturated Asbestos Felt, lapping each sheet 22-in. over preceding one, rolling each sheet immediately behind mop to insure a uniform coating of hot Roofing Bond Asphalt so that in no place shall felt touch felt. Each sheet shall be nailed 6-in. from back edge, at intervals of approximately 18-in. These felts shall be cut off at angle of roof deck and walls or vertical surfaces.

Note: Where poured gypsum or precast gypsum blocks are used, all felt shall be nailed as specified for board decks.

On inclines exceeding 3-in. to the foot, these sheets shall be nailed along back edge at intervals of 24-in.

Fourth—Over entire surface mop a uniform coating of Asphalt, using not more than 20 lbs. per 100 sq. ft.

Total Approximate Weight per 100 sq. ft. .....232 lbs.

WORKMANSHIP

Felt shall be laid without wrinkles or buckles. It shall be rolled immediately behind the hot mop and firmly embedded by brooming the felt. Asphalt shall not be heated to exceed 450° F.

All nailing of roofing to board surfaces shall be done with Simplex flat head roofing nails or with ⅞-in. galvanized roofing nails driven through flat tin discs.

All roofing shall be done to the satisfaction and approval of the manufacturer.

*For general specification see page 5.

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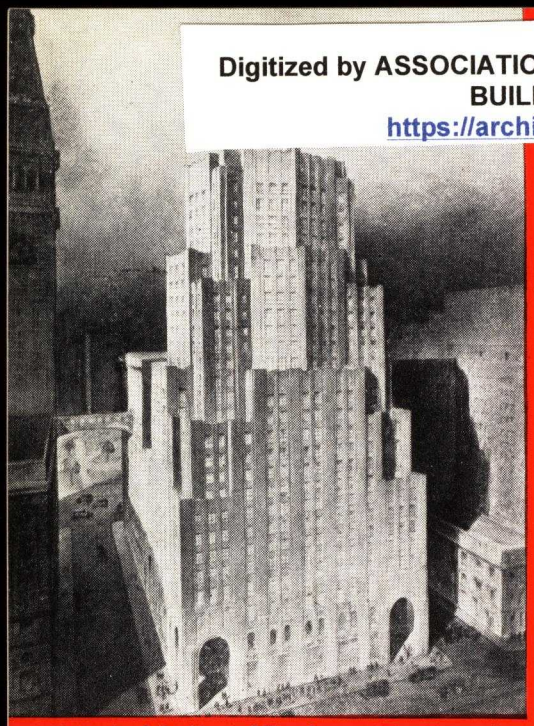
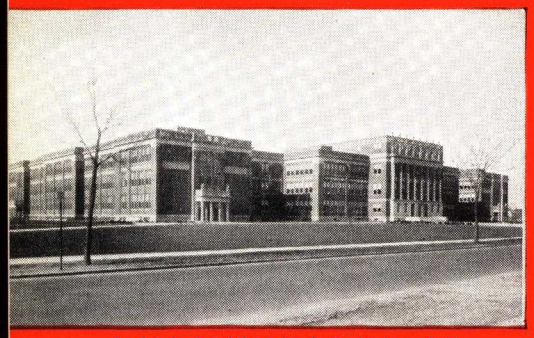


New unit of the Home Office Group of the Metropolitan Life Insurance Co., New York, N. Y. Protected with 45,000 square feet RU-BER-OID Built-up Roofing.
Architects—Dan Everett Waid & Harvey Wiley Corbett, N.Y.



Benjamin Franklin School, Rochester, N. Y.
Protected with 140,000 square feet RU-BER-OID Built-up Roofing.
Architect—Gordon and Kaelber, Rochester, N. Y.

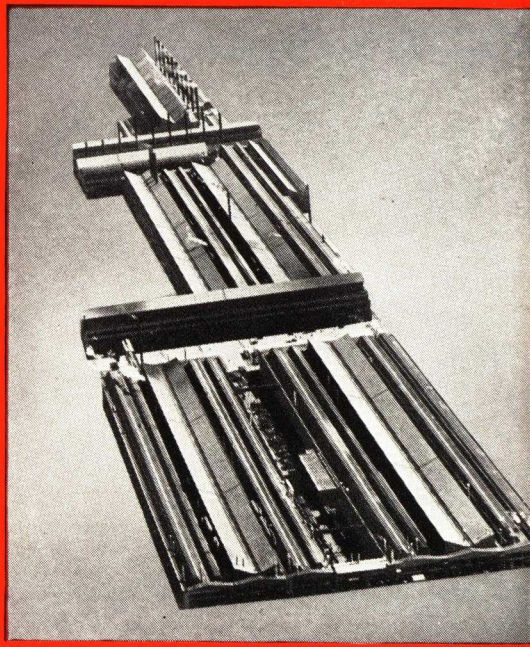
Chicago Merchandise Mart, Chicago, Ill. Protected with 225,000 square feet RU-BER-OID Built-up Roofing
Architects—Graham, Anderson, Probst & White, Chicago, Ill.

Manufacturing and Warehouse Building
Continental Can Company, Houston, Texas. Protected with 50,000 square feet RU-BER-OID Built-up Roofing.
Plans—Company Engineer.

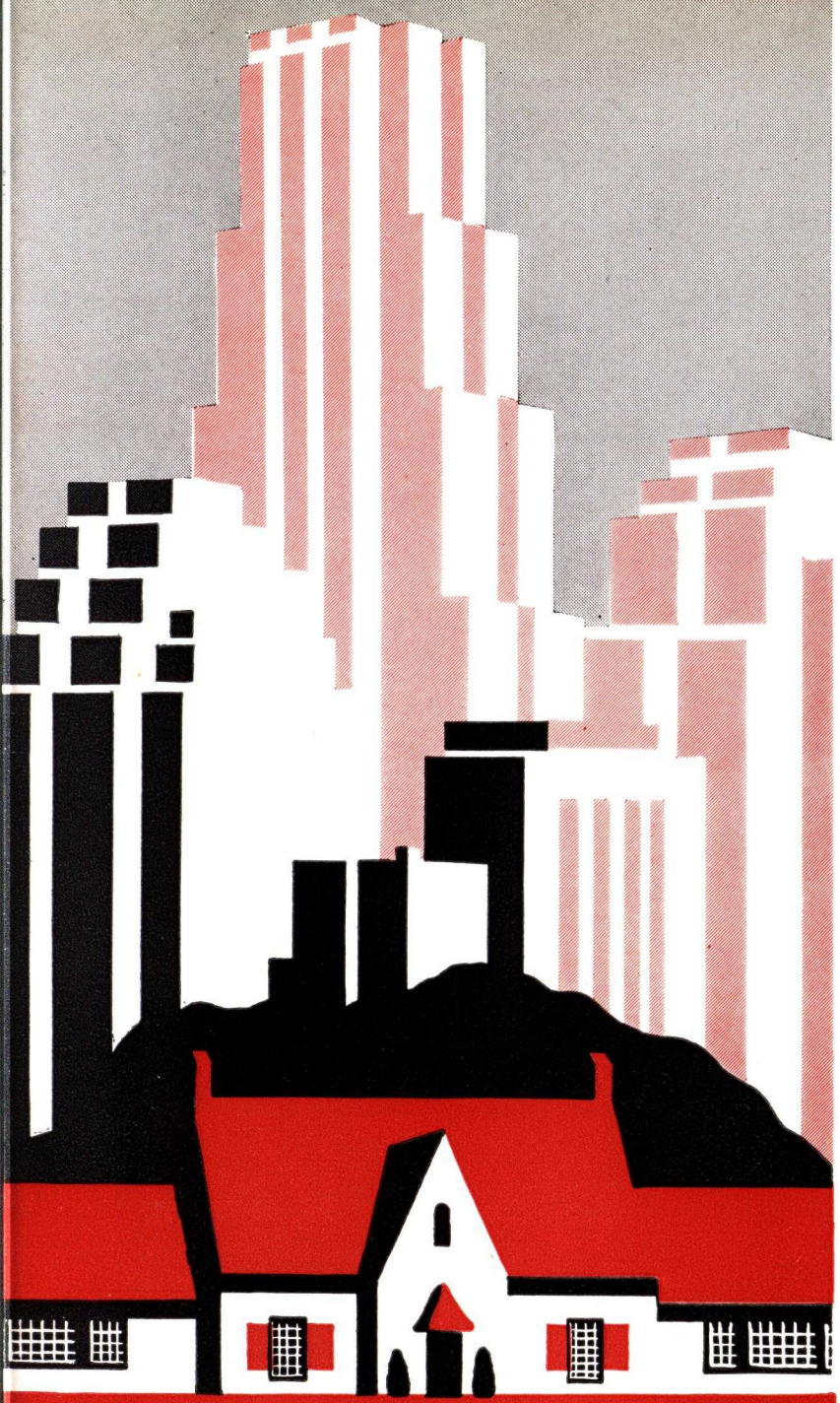
Cleveland Stadium, Cleveland, Ohio.
Protected with 220,000 square feet RU-BER-OID Built-up Roofing.
Architects—Walker & Weeks, Cleveland, Ohio.

Huron Road Hospital, E. Cleveland, Ohio.
Protected with 19,000 square feet RU-BER-OID Built-up Roofing.
Architect--George S. Rider Co., Cleveland, Ohio.

Lawrence Hotel, Erie, Pa.
Protected with 11,200 square feet RU-BER-OID Built-up Roofing.
Roofer—McCreary Roofing Co., Erie, Pa.



The Ford Company Pressed Steel and Spring Upset Buildings at the River Rouge Plant are pictured here. Over 2,000,000 square feet RU-BER-OID Built-up Roofs protect Ford factories. Architect, Albert Kahn, Detroit, Mich.



USG BUILT-UP ROOFING

USG

SPECIFICATION MANUAL

UNITED STATES GYPSUM COMPANY

United States Gypsum Co. Built-up Roofing Specifications

Specification Number	Guaranty Bond Term of Years	Underwriters' Classification	Limitation of Roof Deck Incline in Inches per Foot	TYPE OF ROOF DECK								TYPE OF MATERIAL												INDEX
														Weight of Material per 100 Square Feet										
														Saturated Felt			Base Sheet		Cap Sheet		Bitumen			Surface Finish	Page Number
				Wood	Precast Gypsum	Poured Concrete	Poured Gypsum	Precast Concrete	Book Tile	Steel	Insulation	Number of Plies of Felt	Number of Mopings of Bitumen	20-lb. Asbestos	15-lb. Rag	15-lb. Asbestos	Rag	Asbestos	Rag	Asbestos	Asphalt	Pitch	Primer		
1-A	20	A	0 to 2	•	•							5	4		75							150		Gravel	5
1-B	20	A	0 to 2	•	•							5	4		75						125			Gravel	5
1-C	20	A	0 to 2	•	•							5	4		30	45					125			Gravel	5
2-A	20	A	0 to 2			•	•	•	•		•	4	5		60							200		Gravel	7
2-B	20	A	0 to 2			•	•	•	•		•	4	5		60						150			Gravel	7
2-C	20	A	0 to 2			•	•	•	•		•	4	5		30	30					150			Gravel	7
3-A	10	A	0 to 2	•	•							4	3		60							125		Gravel	9
3-B	10	A	0 to 2	•	•							4	3		60						100			Gravel	9
3-C	10	A	0 to 2	•	•							4	3		30	30					100			Gravel	9
4-A	10	A	0 to 2			•	•	•	•		•	3	4		45							175		Gravel	11
4-B	10	A	0 to 2			•	•	•	•		•	3	4		45						125			Gravel	11
4-C	10	A	0 to 2			•	•	•	•		•	3	4		15	30					125			Gravel	11
5-A	20	C	2 to 6	•	•							4	4		45		60				100			Smooth	13
5-B	20	B	2 to 6	•	•							4	4	60			60				100			Smooth	13
5-C	20	A	2 to 6	•	•							4	4	60				60			100			Smooth	13
6-A	20	C	2 to 6			•	•	•	•	•	•	5	5		45				68		125		10	Sanded	15
6-B	20	C	2 to 6			•	•	•	•	•	•	5	5		45					68	125		10	Sanded	15
6-C	20	A	2 to 6			•	•	•	•	•	•	5	5	60						68	125		10	Sanded	15
7-A	10	C	2 to 6	•	•							3	3		30		45				75			Smooth	17
7-B	10	C	2 to 6	•	•							3	3	40			45				75			Smooth	17
7-C	10	A	2 to 6	•	•							3	3	40				45			75			Smooth	17
8-A	10	C	2 to 6			•	•	•	•	•	•	4	4		30				68		100		10	Sanded	19
8-B	10	C	2 to 6			•	•	•	•	•	•	4	4		30					68	100		10	Sanded	19
8-C	10	A	2 to 6			•	•	•	•	•	•	4	4	40						68	100		10	Sanded	19
9	20	C	1 to 6	•	•							4	3		45				85		75			Mineral	21
10	20	C	1 to 6			•	•	•	•	•	•	4	4		45				85		105		10	Mineral	23
11	10	C	1 to 6	•	•							3	2		30				85		50			Mineral	25
12	10	C	1 to 6			•	•	•	•	•	•	3	3		30				85		80		10	Mineral	27
13-A	10	C	2 to 6	•	•							3	3		30		30				75			Smooth	29
13-B	10	C	2 to 6	•	•							3	3	40			30				75			Smooth	29
13-C	10	A	2 to 6	•	•							3	3	40				35			75			Smooth	29

USG WEATHERWOOD ROOF DECK INSULATION
Specifications and Details—**Pages 31 to 36 inclusive**

USG BUILT-UP ROOF FLASHINGS
Specifications and Details—**Pages 37 to 43 inclusive**

UNITED STATES GYPSUM COMPANY

Engineering Sales Division

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GENERAL OFFICES

300 West Adams St., CHICAGO, ILL.

SALES OFFICES IN ALL PRINCIPAL CITIES—FOR LIST SEE BACK COVER

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A NEW USG SERVICE—COMPLETE ROOFS

Insulating Roof Decks, Built-up Roofing and Flashings

UNDIVIDED RESPONSIBILITY

The United States Gypsum Company offers you undivided responsibility for the complete roof which consists of (1) the structural fireproof roof deck, (2) insulation board, if required, (3) waterproof built-up roofing, and (4) flashings.

HOW THIS IS POSSIBLE

In more than twenty years experience in roof deck manufacture and erection, USG has obtained a thorough knowledge of the requirements of the complete roof. Now USG manufactures in its own mills the units of the complete roof. Each unit is manufactured with the relative requirements of the other roof units considered, which results in better performance of the roof assembly.

DIVIDED RESPONSIBILITY

With responsibility for the roof units divided between two or more manufacturers, there is frequently room for an honest difference of opinion. Did some difficulty start in the built-up roofing and in turn affect the roof deck or vice versa? It has been a long standing problem—to which USG now offers you the answer.

WHAT UNDIVIDED RESPONSIBILITY MEANS TO YOU AND YOUR CLIENTS

Visualize the building constructed to the point where exterior walls and structural steel are erected in place but with the structure still open to the sky. Then USG takes complete responsibility for the dependable performance of the units which protect the building and its contents against the weather—the roof deck, insulation board, built-up roofing, and flashings—the complete roof.

MANY TYPES TO COVER PRACTICALLY EVERY NEED

Then consider that USG undivided responsibility is obtainable on a wide range of constructions—USG makes three types of incombustible roof deck—Gypsum, Steel, and Cell Concrete. USG also makes flashings and a full line of built-up roofing adaptable for use over all types of roof decks.

ENGINEERING SERVICE

USG maintains a complete engineering organization experienced in solving roof problems and skilled in economics of structural design.

SOLUTION OF YOUR ROOF PROBLEM

USG complete roof specifications centralize responsibility—a consideration of great value to you and your client.

USG offers the best solution to your roof problem because it offers the complete solution.

Why not call in a USG Engineer on your roof problem? His advice will be unbiased and authentic and there will be no cost or obligation to you.

USG CORRELATIVE PROVISIONS

PREPARATION AND OTHER REQUIREMENTS OF ROOF DECKS TO RECEIVE USG STANDARD BUILT-UP ROOFING

NOTE—*Construction of roof decks and provision for satisfactory surfaces to receive the roofing are not a part of the Roofing Contractor's work and are therefore not included in the individual USG Roofing Specifications. The following provisions, however, should be included as they apply under the proper headings of the specifications to be executed by others.*

PARAPETS AND SIMILAR VERTICAL WALLS

Parapet and similar vertical walls surrounding the roof areas should be so constructed as to prevent infiltration of moisture to the interior of the walls above the line of roof flashing. For recommendations, see page 37.

ROOF DECK PROVISIONS

GENERAL

Drainage—Roof decks shall be accurately graded to drainage connections which shall be provided to assure the free flow of water from all points of the roof surface.

Gypsum fill to make drainage slopes above the roof deck is preferable to cinder aggregate fill which tends to expand excessively and crack.

The size and location of the drainage leader connections depend upon the rate of rainfall in the locality of the roof. It is estimated that the maximum rate of rainfall in the United States varies from 4.5 to 8.5 inches per hour. For all practical purposes, provision for the handling of 6.5 inches of rainfall per hour may be used as a guide.

An accepted rule is to provide one square inch of leader (drain pipe) area for every 150 square feet of roof surface. Leaders should be spaced not more than 50 feet apart for pitched roofs and not more than 75 feet apart for flat roofs.

Lower roofs must be protected against abrasion and damage from water streams shed from open valleys or gutters of upper roofs by installing metal spreaders to distribute the flow of water.

Expansion Joints—Proper expansion joints shall be provided on large roof areas to eliminate excessive contraction and expansion.

WOOD DECKS

Decks shall be constructed of splined or matched tongue and groove well seasoned or treated lumber not less than 13/16 in. in thickness.

Purlin and rafter spacing shall be such as to prevent noticeable deflection under ordinary loads. Snow loads shall be provided for where needed.

Boards shall be dry, smooth, and free from wide cracks or large knot holes and shall be laid close together. They shall have solid bearings at ends (unless end matched) and shall be securely nailed to each bearing with not less than two face nails with heads driven flush with the surface of the boards.

All cracks wider than ¼ inch and all knot holes larger than ¼ inch in diameter shall be covered with tin or other suitable metal substantially nailed in place. End joints wider than ¼ inch shall be likewise covered.

POURED GYPSUM OR CONCRETE DECKS

The poured gypsum (such as USG Sheetrock Pyrofill Roof Construction) or poured concrete roof deck surfaces shall be dry, smooth, firm, and thoroughly set, free from frost and projections above or depressions in the plane of the roof deck surface.

The roof deck shall be free from loose sand, scale resulting from frozen mix, and all loose material.

All irregularities in the surface of the deck shall be satisfactorily corrected by the removal of high spots and the filling in of low spots with gypsum or cement mortar properly bonded to the deck surface. All sharp arrises shall be rounded.

Unless the character of the concrete will permit nailing, provision shall be made for anchoring the roofing material at ridges, eaves, and gables by embedding treated wood nailing strips in the concrete level with the surface or attached to the structural steel.

On concrete decks, when the incline of the roof deck exceeds 3 inches in 12 inches, provision shall be made to enable the Roofing Contractor to securely anchor the roofing materials. Embed treated wood nailing strips in the roof deck parallel with the roof pitch not to exceed 4 feet apart on centers.

See Page 2 for New USG ***Complete*** *Roof Service*

PRECAST GYPSUM OR CONCRETE SLAB DECKS

Tile (such as USG Pyrobar Precast Gypsum Tile) or precast concrete slabs shall be accurately laid upon the supporting steel work.

Bearings shall be even and full and the units laid tight. All joints on the deck surface shall be pointed full with gypsum mortar or plastic cement, struck smooth. All roof surfaces shall be smooth and true ready to receive the roofing materials.

On concrete decks, suitable nailing strips embedded in or securely fastened to the units or to the structural steel flush with the surface shall be provided at ridges, eaves, gables, and crests to provide secure fastening for roofing materials, gravel stops, flashings, and metal fascias.

On concrete decks when the incline of the roof deck exceeds 3 inches in 12 inches, provision shall be made to enable the Roofing Contractor to securely anchor the roofing materials. Embed treated wood nailing strips in the roof deck parallel with the roof pitch not to exceed 4 feet apart on centers.

BOOK TILE DECKS

Book tile and similar surfaces shall be covered with not less than a 1 inch thickness of Gypsum or Portland cement mortar finished smooth, firm, and properly bonded to the underlying tile.

Other requirements applying to poured gypsum or concrete decks shall apply in like manner.

STEEL DECKS

Steel decks (such as USG Steel Roof Deck) shall be in accordance with the manufacturer's standard designs with allowable safe loads based on actual tests on bare plates.

The deck shall be free from perforations which will allow hot bitumen to drip through and shall be free from bolt heads or similar projections above the roof surface other than the attachment clips and accessories required to attach the deck to the purlins.

Decks and fittings, unless galvanized, must be painted with a shop coat of paint to assure a satisfactory bonding surface for the roofing materials. If surfaces are not properly painted at the time of erection, they shall be painted by the steel erection contractor to the Roofing Contractor's satisfaction prior to the application of the roofing materials.

At least one layer of ½ inch approved roof insulation (such as USG Weatherwood Roof Insulation) shall be applied to the steel deck before the application of the roofing materials will be permitted. Insulation shall be applied in strict accordance with Insulation Specifications, pages 31 to 36 inclusive. Proper devices for fastening the roof insulation shall be provided by the steel deck manufacturer where the roof deck incline exceeds 3 inches in 12 inches.

CANT STRIPS

General—Cant strips shall be provided at all intersections of roof surfaces with vertical walls, parapets, and curbs. The cant shall be not less than 3½ inches in height and shall extend out not less than 3½ inches on the roof surface.

On Wood Decks—The cant strip may be constructed of beveled lumber not less than one (1) inch thick secured to 2 inch triangular blocks nailed to the roof deck approximately 16 inches on centers. A diagonal half 4 in. x 4 in. set in the angle and securely toe nailed at the lower edge is acceptable and recommended.

On Incombustible Deck—A gypsum mortar or concrete cant properly bonded to the roof deck shall be installed on gypsum or concrete decks.

USG Metal Cant Strip—A 20 gauge galvanized or painted metal cant strip made particularly for use with USG Steel Roof Decks may be used to advantage on all types of decks. See details, page 43.

FLASHING RAGGLES

General—Unless otherwise specified, flashing raggles shall be provided in all vertical walls, parapets, and curbs. They shall be uniformly ½ inch wide by 1½ inch deep free from mortar or projections of any kind. They shall be set not less than five (5) inches nor more than eight and one-half (8½) inches above the top of the roof deck either parallel with the top of the cant strip or stepped to follow the roof incline or slope depending on the wall material. Where stepped, overlap at ends at least 6 inches.

Raggles and Nailing Strips in Concrete Walls—Provide a chamfered removable wood strip ½ inch wide by 1½ inches deep nailed to the forms parallel with the roof incline or slope.

At a point one (1) inch below the raggle provide a permanent, chamfered wood nailing strip 1 inch wide by 1½ inches deep, likewise nailed in the forms.

Raggle strip shall be removed with forms. Nailing strip shall remain in completed wall.

Raggles in Brick Walls—During construction lay in a removable chamfered wood strip ½ inch thick by 1½ inches deep, stepped to follow the roof inclines.

See Page 2 for New USG Complete Roof Service

USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 1

5-PLY GRAVEL OR SLAG SURFACED ROOFING OVER WOOD OR PRECAST GYPSUM TILE DECKS

- These roofs are approved for application on decks where the incline or slope does not exceed a two (2) inch rise in a twelve (12) inch run.
- These roofs are listed by the Underwriters' Laboratories as Class A.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 1-A, 1-B, 1-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

NO. 1-A—TAR SATURATED FELT and COAL TAR PITCH

NOS. 1-B and 1-C—ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 1-A—Five plies of USG **Tar** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 150 lbs. of USG **Coal Tar Pitch,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 1-A.

SPECIFICATION NO. 1-B—Five plies of USG **Asphalt** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 125 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 1-B.

SPECIFICATION NO. 1-C—Two plies of USG **Asphalt** Saturated **Rag** Felt and three plies of USG **Asphalt** Saturated **Asbestos** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 125 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 1-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Temperature of USG Coal Tar Pitch or Asphalt shall never exceed 400° F. in heating kettle.

Surfacing material (Gravel or Slag) shall be dry, free from sand or dirt, and graduated in size from one-quarter (¼) inch to five-eighths (⅝) inch in diameter. During cold weather Gravel or Slag shall be heated immediately preceding application to eliminate moisture.

All Tar Saturated Felts shall be 32 inches wide, and all Asphalt Saturated Felts shall be 36 inches wide.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. Felt shall be laid without wrinkles or buckles.

See Page 2 for New USG **Complete** *Roof Service*

DETAILS OF APPLICATION

SPECIFICATION NO. 1-A (Tar Saturated Felt and Coal Tar Pitch)

FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Lap paper two (2) inches and secure to the deck by occasional nailing.

SECOND—Apply two (2) plies of felt lapping each sheet seventeen (17) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Nail as required to hold the sheets in place until remaining felt is laid.

THIRD—Coat the surface of the felts thus laid with pitch, into which, while hot, apply three (3) plies of felt lapping each sheet twenty-two (22) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. (When the incline of roof exceeds 1" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge of the sheet. All nails shall be covered with not less than two plies of felt.) A uniform coat of pitch shall be applied to the full twenty-two (22) inch lap so that at no point shall felt touch felt.

FOURTH—Cover the entire roof surface with a uniform, heavy coat of pitch poured from a dipper or suitable pouring can, using not less than sixty (60) pounds of pitch to cover one hundred (100) square feet of roof surface. Into this flood coat, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

SPECIFICATIONS NOS. 1-B and 1-C (Asphalt Saturated Felt and Asphalt)

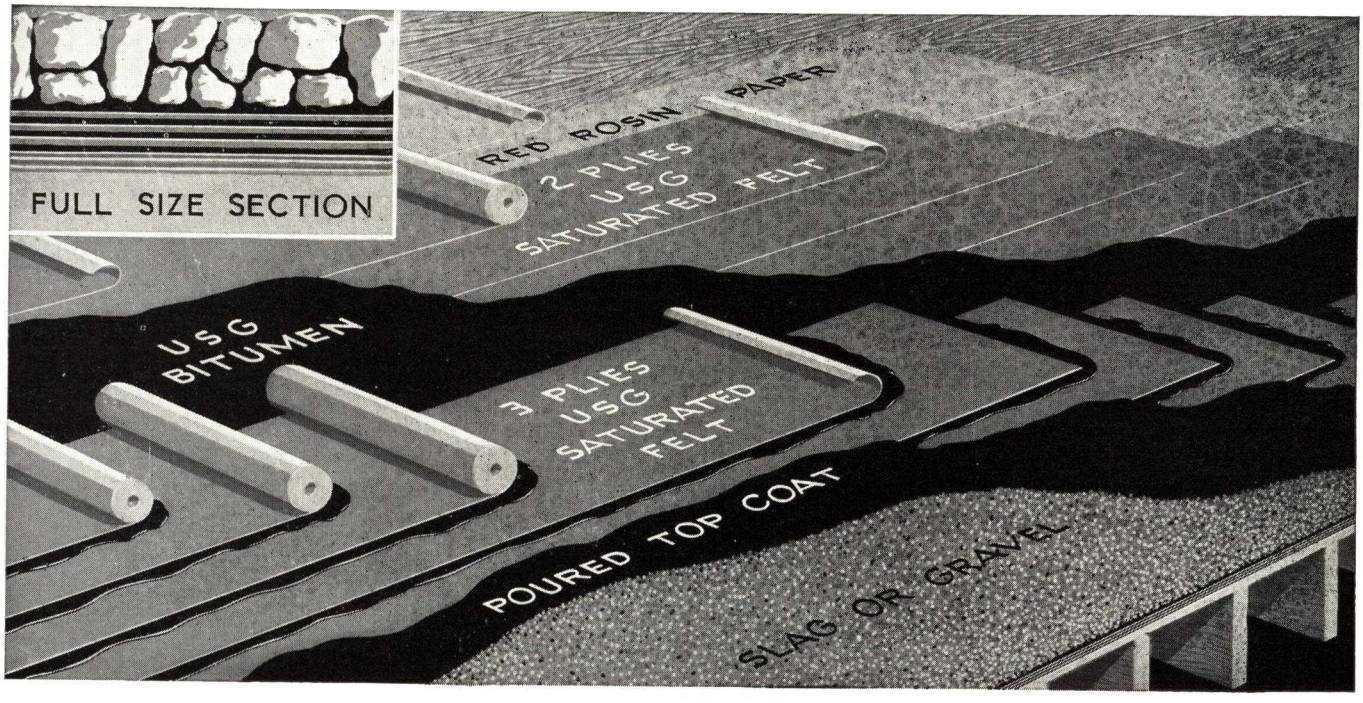
FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Lap paper two (2) inches and secure to the deck by occasional nailing.

SECOND—Apply two (2) plies of felt lapping each sheet nineteen (19) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Nail as required to hold sheets in place until remaining felt is laid.

THIRD—Mop the surface of the felts thus laid with asphalt, into which, while hot, shall be embedded three (3) plies of felt, lapping each sheet twenty-five (25) inches over preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (75 pounds total). (When the incline of roof exceeds 1" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge of the sheet. All nails shall be covered by not less than two plies of felt.)

FOURTH—Cover the entire roof surface with a uniform, heavy coat of asphalt poured from a dipper or suitable pouring can, using not less than fifty (50) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this top coating, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 1-A, 1-B, and 1-C



USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 2

4-PLY GRAVEL OR SLAG SURFACED ROOFING OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

- Approved for application on roof decks where the incline or slope does not exceed two (2) inches in twelve (12) inches.
- Roofs are listed by Underwriters' Laboratories as Class A.
- Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 2-A, 2-B, 2-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

NO. 2-A—TAR SATURATED FELT and COAL TAR PITCH

NOS. 2-B and 2-C—ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 2-A—Four plies of USG **Tar** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 200 lbs. of USG **Coal Tar Pitch,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 2-A.

SPECIFICATION NO. 2B—Four plies of USG **Asphalt** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 150 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 2-B.

SPECIFICATION NO. 2-C—Two plies of USG **Asphalt** Saturated **Rag** Felt and two plies of USG **Asphalt** Saturated **Asbestos** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 150 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 2-C.

GENERAL PROVISIONS—Temperature of USG Coal Tar Pitch or Asphalt shall never exceed 400° F. in heating kettle.

The surfacing material (Gravel or Slag) shall be dry, free from sand or dirt, and graduated in size from one-quarter (¼) inch to five-eighths (⅝) inch in diameter. During cold weather Gravel or Slag shall be heated immediately preceding application to eliminate moisture.

All Tar Saturated Felts shall be 32 inches wide, and all Asphalt Saturated Felts shall be 36 inches wide.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. Felt shall be laid without wrinkles or buckles.

See Page 2 for New USG Complete Roof Service

DETAILS OF APPLICATION

SPECIFICATION NO. 2-A (Tar Saturated Felt and Coal Tar Pitch)

FIRST—Coat the entire deck surface with pitch.

NOTE: *If Precast Concrete Slabs are used, strip mop each slab, staying back three (3) inches from all joints.*

SECOND—Apply two (2) plies of felt lapping each sheet seventeen (17) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Coat the surface of the felt thus laid with pitch, into which, while hot, shall be applied two (2) plies of felt, lapping each sheet seventeen (17) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. A uniform coat of pitch shall be applied to the full seventeen (17) inch lap of all four (4) sheets so that at no point shall felt touch felt.

NOTE: *The four (4) plies of felt may be laid in one operation lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet.*

THIRD—Cover the entire roof surface with a uniform, heavy coat of pitch poured from a dipper or suitable pouring can, using not less than sixty (60) pounds of pitch to cover one hundred (100) square feet of roof surface. Into this flood coat, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

SPECIFICATIONS NOS. 2-B and 2-C (Asphalt Saturated Felt and Asphalt)

FIRST—Mop the entire surface of the deck with asphalt.

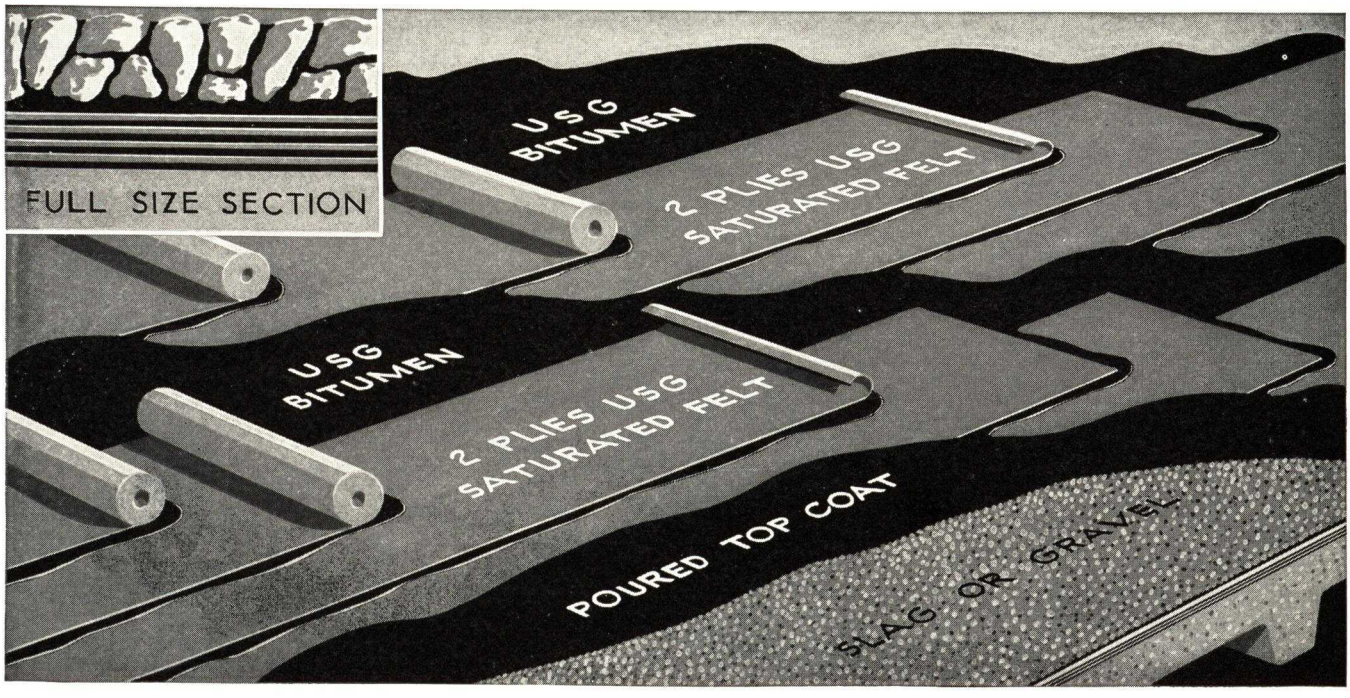
NOTE: *If Precast Concrete Slabs are used, strip mop each slab, staying back three (3) inches from all joints.*

SECOND—Into this mopping, while hot, shall be embedded two (2) plies of felt lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Mop the surface of the felt thus laid with asphalt, into which, while hot, shall be embedded two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (100 pounds total).

NOTE: *For No. 2-B the four (4) plies of felt may be laid in one operation lapping each sheet twenty-seven and one-half (27½) inches over the preceding sheet.*

THIRD—Cover the entire roof surface with a uniform, heavy coat of asphalt poured from a dipper or suitable pouring can, using not less than fifty (50) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this top coating, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 2-A, 2-B, and 2-C



USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 3

4-PLY GRAVEL OR SLAG SURFACED ROOFING OVER WOOD OR PRECAST GYPSUM TILE DECKS

- These roofs are approved for application on decks where the incline or slope does not exceed a two (2) inch rise in a twelve (12) inch run.
- These roofs are listed by the Underwriters' Laboratories as Class A.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 3-A, 3-B, 3-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

NO. 3-A—TAR SATURATED FELT and COAL TAR PITCH

NOS. 3-B and 3-C—ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 3-A—Four plies of USG **Tar** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 125 lbs. of USG **Coal Tar Pitch,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 3-A.

SPECIFICATION NO. 3-B—Four plies of USG **Asphalt** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 100 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 3-B.

SPECIFICATION NO. 3-C—Two plies of USG **Asphalt** Saturated **Rag** Felt and two plies of USG **Asphalt** Saturated **Asbestos** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 100 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 3-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Temperature of USG Coal Tar Pitch or Asphalt shall never exceed 400° F. in heating kettle.

Surfacing material (Gravel or Slag) shall be dry, free from sand or dirt, and graduated in size from one-quarter (¼) inch to five-eighths (⅝) inch in diameter. During cold weather Gravel or Slag shall be heated immediately preceding application to eliminate moisture.

All Tar Saturated Felts shall be 32 inches wide, and all Asphalt Saturated Felts shall be 36 inches wide.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. Felt shall be laid without wrinkles or buckles.

See Page 2 for New USG Complete Roof Service

DETAILS OF APPLICATION

SPECIFICATION NO. 3-A (Tar Saturated Felt and Coal Tar Pitch)

FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Lap paper two (2) inches and secure to the deck by occasional nailing.

SECOND—Apply two (2) plies of felt lapping each sheet seventeen (17) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Nail as required to hold the sheets in place until remaining felt is laid.

THIRD—Coat the entire surface of the felts thus laid with pitch, into which, while hot, apply two (2) plies of felt, lapping each sheet seventeen (17) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. (When the incline of roof exceeds 1" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge of the sheet. All nails shall be covered with one ply of felt.) A uniform coat of pitch shall be applied to the full seventeen (17) inch lap so that at no point shall felt touch felt.

FOURTH—Cover the entire roof surface with a uniform, heavy coat of pitch poured from a dipper or suitable pouring can, using not less than sixty (60) pounds of pitch to cover one hundred (100) square feet of roof surface. Into this flood coat, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

SPECIFICATIONS NOS. 3-B and 3-C (Asphalt Saturated Felt and Asphalt)

FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Lap paper two (2) inches and secure to the deck by occasional nailing.

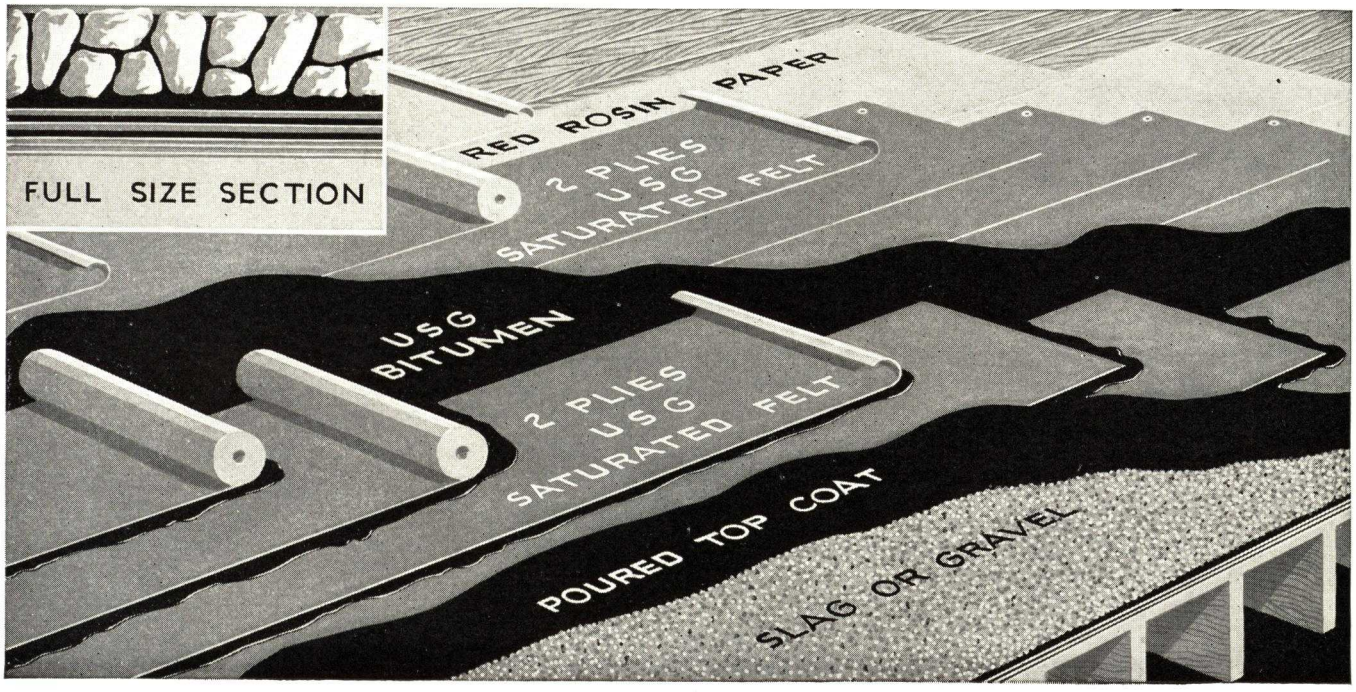
SECOND—Apply two (2) plies of felt lapping each sheet nineteen (19) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Nail as required to hold sheets in place until remaining felt is laid.

THIRD—Mop the surface of the felts thus laid with asphalt, into which, while hot, shall be embedded two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt.

There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (50 pounds total). (When the incline of roof exceeds 1" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge of the sheet. All nails shall be covered with one ply of felt.)

FOURTH—Cover the entire roof surface with a uniform, heavy coat of asphalt poured from a dipper or suitable pouring can, using not less than fifty (50) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this top coating, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 3-A, 3-B, and 3-C



See Page 2 for New USG Complete Roof Service

USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 4

3-PLY GRAVEL OR SLAG SURFACED ROOFING OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

- Approved for application on roof decks where the incline or slope does not exceed two (2) inches in twelve (12) inches.
- Roofs are listed by Underwriters' Laboratories as Class A.
- Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 4-A, 4-B, 4-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

. . .

NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

NO. 4-A—TAR SATURATED FELT and COAL TAR PITCH

NOS. 4-B and 4-C—ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 4-A—Three plies of USG **Tar** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 175 lbs. of USG **Coal Tar Pitch,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 4-A.

SPECIFICATION NO. 4-B—Three plies of USG **Asphalt** Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 125 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing 4-B.

SPECIFICATION NO. 4-C—One ply of USG **Asphalt** Saturated **Rag** Felt and two plies of USG **Asphalt** Saturated **Asbestos** Felt, each ply weighing 15 lbs. per 100 sq. ft., and not less than 125 lbs. of USG No. 135 **Flat Asphalt,** and 400 lbs. of Gravel or 300 lbs. of Slag shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 4-C.

GENERAL PROVISIONS—Temperature of USG Coal Tar Pitch or Asphalt shall never exceed 400° F. in heating kettle.

The surfacing material (Gravel or Slag) shall be dry, free from sand or dirt, and graduated in size from one-quarter (¼) inch to five-eighths (⅝) inch in diameter. During cold weather Gravel or Slag shall be heated immediately preceding application to eliminate moisture.

All Tar Saturated Felts shall be 32 inches wide, and all Asphalt Saturated Felts shall be 36 inches wide.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. Felt shall be laid without wrinkles or buckles.

See Page 2 for New USG ***Complete*** *Roof Service*

DETAILS OF APPLICATION

SPECIFICATION NO. 4-A (Tar Saturated Felt and Coal Tar Pitch)

FIRST—Coat the entire deck surface with pitch.

NOTE: *If Precast Concrete Slabs are used, strip mop each slab, staying back three (3) inches from all joints.*

SECOND—Into this coat, while hot, apply one (1) ply of felt lapping each sheet two (2) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Coat the surface of the felt thus laid with pitch, into which, while hot, shall be applied two (2) plies of felt, lapping each sheet seventeen (17) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Apply a uniform coat of pitch to the full seventeen (17) inch lap of each sheet so that at no point shall felt touch felt.

NOTE: *The three (3) plies of felt may be laid in one operation lapping each sheet twenty-two (22) inches over the preceding sheet.*

THIRD—Cover the entire roof surface with a uniform, heavy coat of pitch poured from a dipper or suitable pouring can, using not less than sixty (60) pounds of pitch to cover one hundred (100) square feet of roof surface. Into this flood coat, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

SPECIFICATIONS NOS. 4-B and 4-C (Asphalt Saturated Felt and Asphalt)

FIRST—Mop the entire surface of the deck with asphalt.

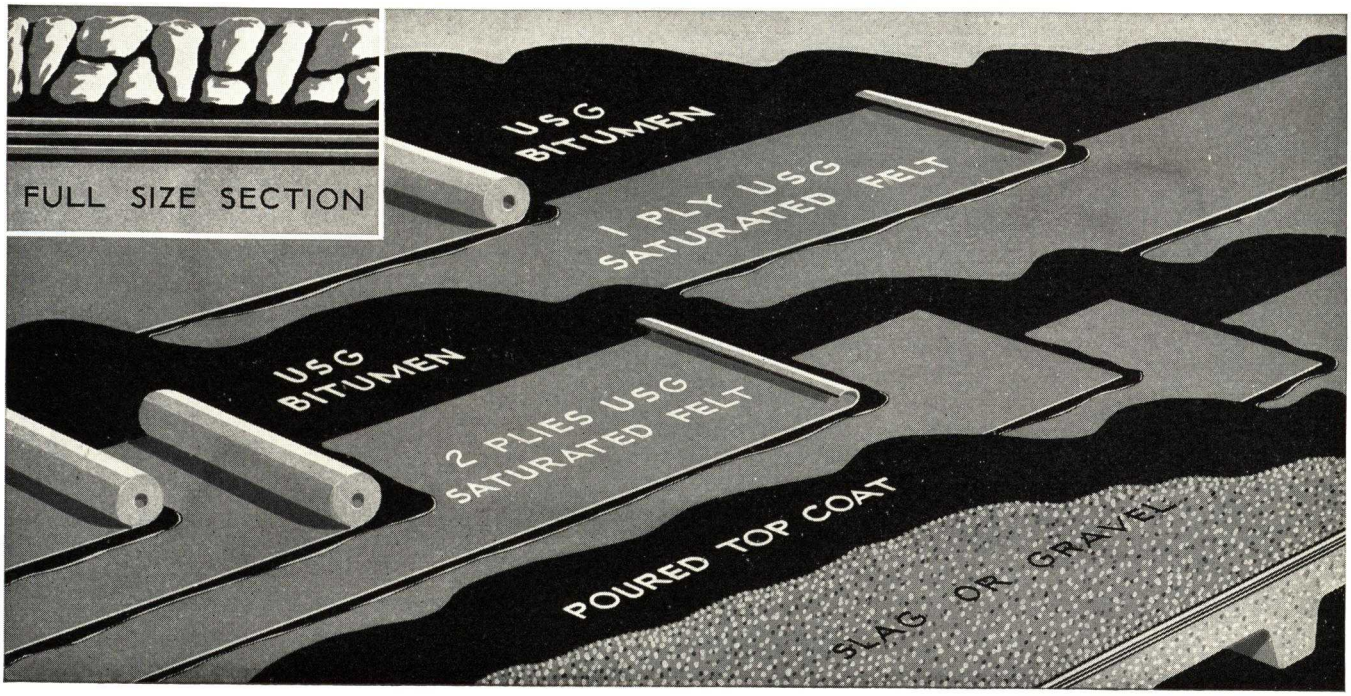
NOTE: *If Precast Concrete Slabs are used, strip mop each slab, staying back three (3) inches from all joints.*

SECOND—Into this mopping, while hot, shall be embedded one (1) ply of felt lapping each sheet two (2) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Mop the surface of the felt thus laid with asphalt, into which, while hot, shall be embedded two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (75 pounds total).

NOTE: *For No. 4-B the three (3) plies of felt may be laid in one operation lapping each sheet twenty-two (22) inches over the preceding sheet.*

THIRD—Cover the entire roof surface with a uniform, heavy coat of asphalt poured from a dipper or suitable pouring can, using not less than fifty (50) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this top coating, while hot, a complete covering of gravel or slag shall be thoroughly and uniformly embedded.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 4-A, 4-B, and 4-C



USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 5

ASPHALT SMOOTH SURFACED ROOFING • OVER • WOOD OR PRECAST GYPSUM TILE DECKS

- Approved for application in northern section of the United States on roof decks where the incline or slope exceeds 2 inches in 12 inches.
- Roofs are listed by the Underwriters' Laboratories as noted below.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 5-A, 5-B, 5-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

SPECIFICATIONS NOS. 5-A (Class C), 5-B (Class B) and 5-C (Class A)

ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

NOTE: *Due to the weight of the base sheet, these roofs are not recommended for use over insulation.*

SPECIFICATION NO. 5-A—One ply of USG Asphalt Saturated **Rag** Felt Base Sheet weighing 60 lbs. per 100 sq. ft.; three plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 5-A.

SPECIFICATION NO. 5-B—One ply of USG Asphalt Saturated **Rag** Felt Base Sheet weighing 60 lbs. per 100 sq. ft.; three plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 5-B.

SPECIFICATION NO. 5-C—One ply of USG Asphalt Saturated **Asbestos** Base Sheet weighing 60 lbs. per 100 sq. ft.; three plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 5-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

See Page 2 for New USG **Complete** *Roof Service*

DETAILS OF APPLICATION

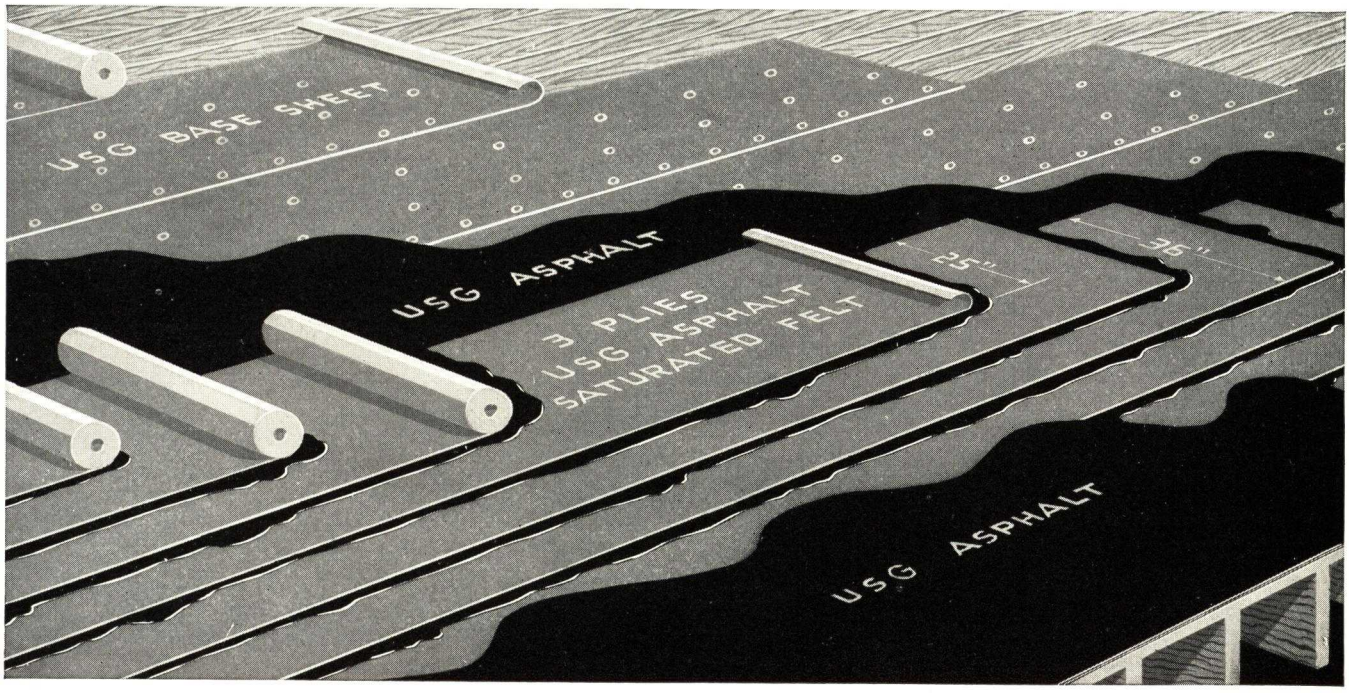
FIRST—Apply the one (1) ply base sheet lapping each sheet two (2) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Secure the base sheet to the roof deck by nailing along the side laps of the sheets, spacing the nails six (6) inches apart on centers. In addition, the base sheets shall be secured with two (2) staggered rows of nails spaced twelve (12) inches apart on centers located approximately twelve (12) inches from each edge of the sheet.

SECOND—Cover the entire surface of the base sheets thus laid with a uniform mopping of asphalt, into which, while hot, shall be embedded the three (3) plies of felt, lapping each sheet twenty-five (25) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (75 pounds total). (When the incline of roof exceeds 3" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge. All nails shall be covered by not less than two plies of felt.)

NOTE: *When the incline of the roof exceeds three (3) inches in twelve (12) inches, the three (3) plies of felt may be laid parallel to the incline of the roof (at right angles to the base sheets), and each sheet shall be securely nailed at the crest or ridge of the roof and, in addition, each shall be nailed with two parallel rows of nails spaced twenty-four (24) inches apart on centers. One row of nails shall be located not less than three (3) inches from the unexposed edge of the sheet and the second row of nails not less than twelve (12) inches from the unexposed edge.*

THIRD—Cover the entire surface of the felts thus laid with a uniform mopping of steep asphalt, using not more than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 5-A, 5-B, and 5-C



See Page 2 for New USG **Complete** Roof Service

USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 6

• SANDED SURFACE •
• ASPHALT ROOFING •
OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

• These roofs are approved for application on decks where the incline or slope exceeds two (2) inches in twelve (12) inches.
• Roofs are listed by Underwriters' Laboratories as noted below.
• Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
• For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 6-A, 6-B, 6-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

SPECIFICATIONS NOS. 6-A (Class C), 6-B (Class C), and 6-C (Class A) ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 6-A—One gallon of USG Asphalt Primer; three plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Rag** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 125 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 6-A.

SPECIFICATION NO. 6-B—One gallon of USG Asphalt Primer; three plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Asbestos** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 125 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 6-B.

SPECIFICATION NO. 6-C—One gallon of USG Asphalt Primer; three plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Asbestos** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 125 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 6-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

See Page 2 for New USG Complete Roof Service

DETAILS OF APPLICATION

FIRST—Coat the entire roof surface with asphalt primer, using not less than one (1) gallon of primer to cover one hundred (100) square feet of roof surface. Allow sufficient time to dry.

NOTE: *If Precast Concrete Slabs are used, strip prime each slab, staying back three (3) inches from all joints.*

SECOND—Mop the entire surface of the deck with asphalt. Into this mopping, while hot, shall be embedded three (3) plies of felt lapping each sheet twenty-five (25) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches.

Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (75 pounds total).

THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, into which, while hot, shall be embedded, coated side up, two (2) plies of cap sheet, lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or at all vertical surfaces.

Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of the cap sheet (50 pounds total).

NOTE: *Include clauses A, B, or C as they apply.*

(A) When the character of the roof permits nailing **(poured gypsum decks),** each cap sheet shall be nailed with two parallel rows of nails spaced twelve (12) inches apart on centers.

One row of nails shall be located not lower than three (3) inches from the top edge of the sheet and the second row of nails not lower than twelve (12) inches from the top edge of the sheet.

(B) When the character of the roof surface will not permit nailing **(poured concrete or precast concrete slab decks)** and nailing strips are provided parallel with the incline of the roof spaced four (4) feet apart on centers, each cap sheet shall be nailed to each nailing strip in two parallel rows.

One row of nails shall be located not lower than three (3) inches from the top edge of the sheet and the second row not lower than twelve (12) inches from the top edge.

(C) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof will not permit nailing **(poured concrete or precast concrete slab decks),** the cap sheet may be applied in continuous lengths parallel with the incline of the roof, **at right angles to the underlying felt,** nailed securely at the crest or ridge.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 6-A, 6-B, and 6-C

See Page 2 for New USG **Complete** Roof Service

USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 7

ASPHALT SMOOTH SURFACED ROOFING • OVER • WOOD OR PRECAST GYPSUM TILE DECKS

- Approved for application in northern section of the United States on roof decks where the incline or slope exceeds 2 inches in 12 inches.
- Roofs are listed by the Underwriters' Laboratories as noted below.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 7-A, 7-B, 7-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

SPECIFICATIONS NOS. 7-A (Class C), 7-B (Class C), and 7-C (Class A)

ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

NOTE: *Due to the weight of the base sheet, these roofs are not recommended for use over insulation.*

SPECIFICATION NO. 7-A—One ply of USG Asphalt Saturated **Rag** Felt Base Sheet weighing 45 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 7-A.

SPECIFICATION NO. 7-B—One ply of USG Asphalt Saturated **Rag** Felt Base Sheet weighing 45 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 7-B.

SPECIFICATION NO. 7-C—One ply of USG Asphalt Saturated **Asbestos** Base Sheet weighing 45 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 7-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angles to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

See Page 2 for New USG Complete Roof Service

DETAILS OF APPLICATION

FIRST—Apply the one (1) ply base sheet lapping each sheet two (2) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Secure the base sheet to the roof deck by nailing along the side laps of the sheets, spacing the nails six (6) inches apart on centers. In addition, the base sheets shall be secured with two (2) staggered rows of nails spaced twelve (12) inches apart on centers located approximately twelve (12) inches from each edge of the sheet.

SECOND—Cover the entire surface of the base sheets thus laid with a uniform mopping of asphalt, into which, while hot, shall be embedded the two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (50 pounds total). (When the incline of roof exceeds 3" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge. All nails shall be covered with one ply of felt.)

NOTE: *When the incline of the roof exceeds three (3) inches in twelve (12) inches, the two (2) plies of felt may be laid parallel to the incline of the roof (at right angles to the base sheets), and each sheet shall be securely nailed at the crest or ridge of the roof and, in addition, each shall be nailed with two parallel rows of nails spaced twenty-four (24) inches apart on centers. One row of nails shall be located not less than three (3) inches from the unexposed edge of the sheet and the second row of nails not less than twelve (12) inches from the unexposed edge.*

THIRD—Cover the entire surface of the felts thus laid with a uniform mopping of steep asphalt, using not more than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 7-A, 7-B, and 7-C

See Page 2 for New USG **Complete** Roof Service

USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 8

• SANDED SURFACE •
• ASPHALT ROOFING •
OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

- These roofs are approved for application on decks where the incline or slope exceeds two (2) inches in twelve (12) inches.
- Roofs are listed by Underwriters' Laboratories as noted below.
- Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS

APPLYING to SPECIFICATIONS NOS. 8-A, 8-B, 8-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

SPECIFICATIONS NOS. 8-A (Class C), 8-B (Class C), and 8-C (Class A) ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 8-A—One gallon of USG Asphalt Primer; two plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Rag** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 8-A.

SPECIFICATION NO. 8-B—One gallon of USG Asphalt Primer; two plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Asbestos** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 8-B.

SPECIFICATION NO. 8-C—One gallon of USG Asphalt Primer; two plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated and Sanded **Asbestos** Felt Cap Sheet, each ply weighing 34 lbs. per 100 sq. ft.; and not less than 100 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 8-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

See Page 2 for New USG ***Complete*** *Roof Service*

DETAILS OF APPLICATION

FIRST—Coat the entire roof surface with asphalt primer, using not less than one (1) gallon of primer to cover one hundred (100) square feet of roof surface. Allow sufficient time to dry.

NOTE: *If Pre-cast Concrete Slabs are used, strip prime each slab, staying back three (3) inches from all joints.*

SECOND—Mop the entire surface of the deck with asphalt. Into this mopping, while hot, shall be embedded two (2) plies of felt lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches.

Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (50 pounds total).

THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, into which, while hot, shall be embedded, coated side up, two (2) plies of cap sheet, lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or at all vertical surfaces.

Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of the cap sheet (50 pounds total).

NOTE: *Include clauses A, B, or C as they apply.*

(A) When the character of the roof permits nailing **(poured gypsum decks),** each cap sheet shall be nailed with two parallel rows of nails spaced twelve (12) inches apart on centers.

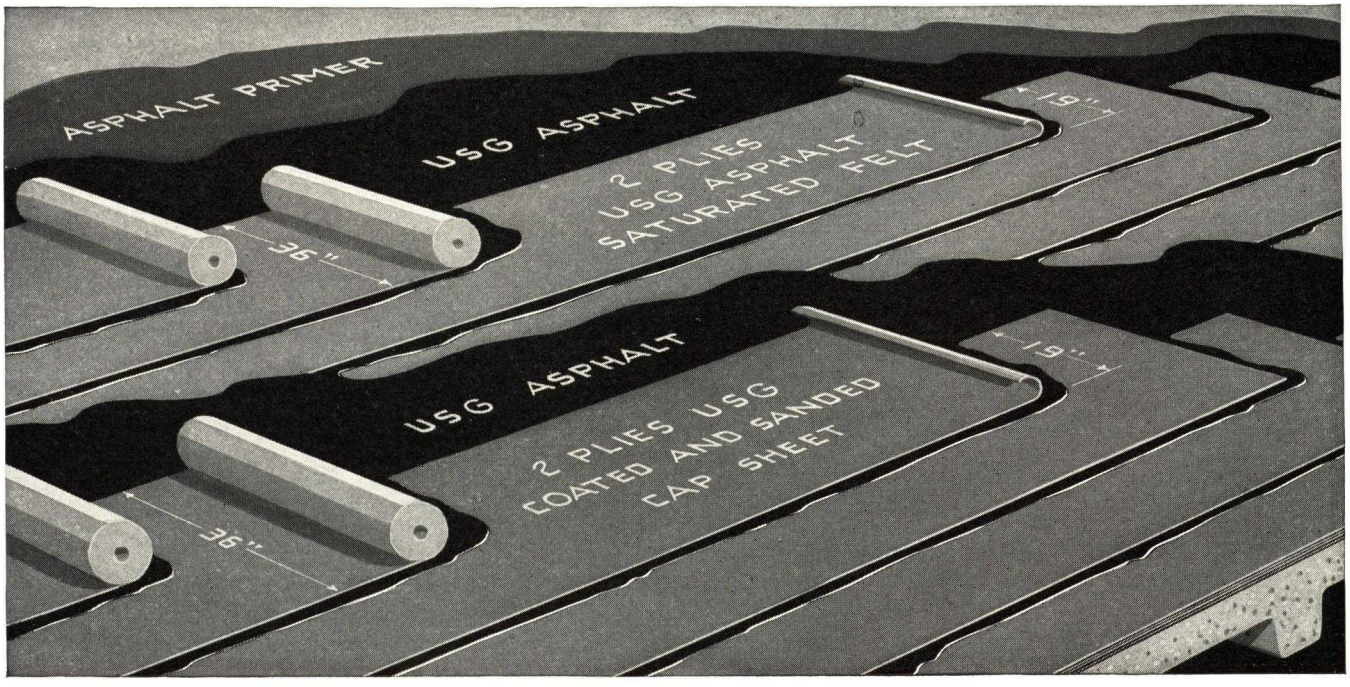
One row of nails shall be located not lower than three (3) inches from the top edge of the sheet and the second row of nails not lower than twelve (12) inches from the top edge of the sheet.

(B) When the character of the roof surface will not permit nailing **(poured concrete or precast concrete slab decks)** and nailing strips are provided parallel with the incline of the roof spaced four (4) feet apart on centers, each cap sheet shall be nailed to each nailing strip in two parallel rows.

One row of nails shall be located not lower than three (3) inches from the top edge of the sheet and the second row not lower than twelve (12) inches from the top edge.

(C) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof will not permit nailing **(poured concrete or precast concrete slab decks),** the cap sheet may be applied in continuous lengths parallel with the incline of the roof, **at right angles to the underlying felt,** nailed securely at the crest or ridge.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 8-A, 8-B, and 8-C



See Page 2 for New USG **Complete** Roof Service

USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 9

SEL-VI-LAP MINERAL SURFACED ROOFING OVER WOOD OR PRECAST GYPSUM TILE DECKS

- These roofs are approved for application on decks where the incline or slope exceeds a one (1) inch rise in a twelve (12) inch run.
- These roofs are listed by the Underwriters' Laboratories as Class C.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS
APPLYING to SPECIFICATION NO. 9

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gysum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION
MINERAL SURFACED CAP SHEET, ASPHALT SATURATED FELT and ASPHALT

SPECIFICATION—Three plies of USG Asphalt Saturated Rag Felt, each ply weighing 15 lbs. per 100 sq. ft., and one layer of USG Sel-Vi-Lap Mineral Surfaced Rag Felt Roofing weighing 85 lbs. per 100 sq. ft., and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 9.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches.

All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

DETAILS OF APPLICATION

FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

SECOND—Apply three (3) plies of felt lapping each sheet twenty-five (25) inches over the preceding sheet and embedded in a mopping of hot asphalt. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt the full width of the twenty-five (25)

See Page 2 for New USG **Complete** *Roof Service*

inch lap so that at no point shall felt touch felt. There shall be not less than twenty (20) pounds of asphalt used per one hundred (100) square feet in the individual moppings between plies of felt (40 pounds total). Felt shall be extended to the top of the cant strip or on all vertical surfaces four (4) inches. Each sheet shall be nailed every six (6) inches not lower than twelve (12) inches from the top edge. All nails shall be covered with not less than two plies of felt.

THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, using not less than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this mopping, while hot, shall be embedded the cap sheet roofing, applied in units approximately eight (8) feet long, preferably at right angles to the underlying felt.

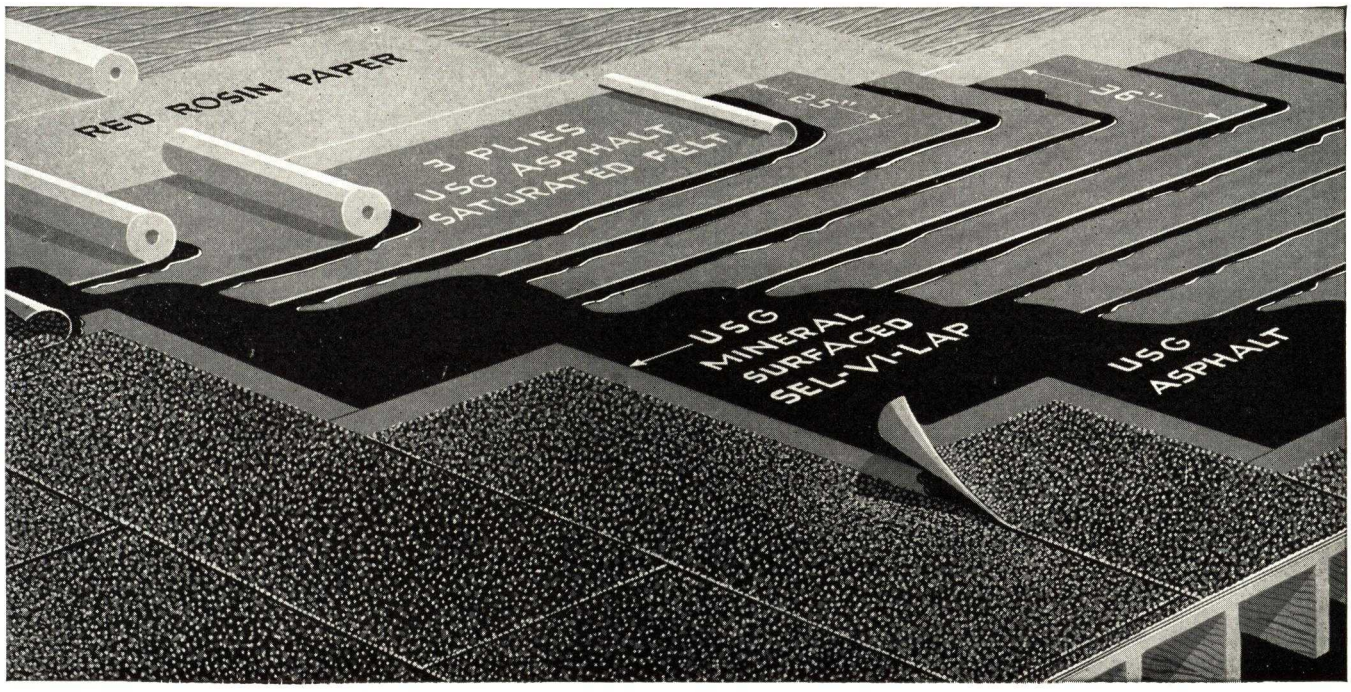
NOTE: *USG Sel-Vi-Lap Mineral Surfaced Cap Sheet Roofing shall be cut into sheets approximately 8 feet long. Cut the roll at right angels to the 4 inch longitudinal selvage to include one (1) 6-inch end selvage on each sheet. Stack the sheets flat in piles on the roof, mineral face down.*

Break joints of transverse end laps of units in alternate courses. Seal the full width of the four (4) inch longitudinal side lap and the six (6) inch transverse end lap with a mopping of asphalt, into which, while hot, the exposed edges of the next overlapping cap sheet shall be carefully embedded and firmly pressed down to assure complete, positive adhesion between plies along the selvages. Care must be used when mopping the selvage laps to avoid dripping asphalt on the exposed mineral surface of the preceding sheet.

NOTE: *Include clause (A) where it applies.*

(A) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches, the cap sheet shall be laid at right angles to the slope of the roof nailed every twelve (12) inches along the longitudinal selvage not more than two (2) inches from the edge of the sheet.

DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATION NO. 9



See Page 2 for New USG Complete Roof Service

USG 20-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 10

SEL-VI-LAP MINERAL SURFACED ROOFING OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

- Approved for application on roof decks where the incline or slope exceeds a one (1) inch rise in a twelve (12) inch run.
- Roofs are listed by Underwriters' Laboratories as Class C.
- Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS
APPLYING to SPECIFICATION NO. 10

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Twenty (20)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 20-Year Guaranty Bond on all roofs of 5000 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION
MINERAL SURFACED CAP SHEET, ASPHALT SATURATED FELT and ASPHALT

SPECIFICATION—One gallon of USG Asphalt Primer; three plies of USG Asphalt Saturated Rag Felt, each ply weighing 15 lbs. per 100 sq. ft.; one layer of USG Sel-Vi-Lap Mineral Surfaced Rag Felt Roofing weighing 85 lbs. per 100 sq. ft.; and not less than 105 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 10.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

DETAILS OF APPLICATION

FIRST—Coat the entire roof surface with asphalt primer, using not less than one (1) gallon of primer to cover one hundred (100) square feet of roof surface. Allow sufficient time to dry.

NOTE: *If Precast Concrete Slabs are used, strip prime each slab, staying back three (3) inches from all joints.*

SECOND—Mop the entire surface of the deck with asphalt. Into this mopping, while hot, shall be embedded the three (3) plies of felt, lapping each sheet twenty-five (25) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mop-

See Page 2 for New USG **Complete** *Roof Service*

ping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (75 pounds total).

THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, using not less than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this mopping, while hot, shall be embedded the cap sheet roofing, applied in units approximately eight (8) feet long, preferably at right angles to the underlying felt.

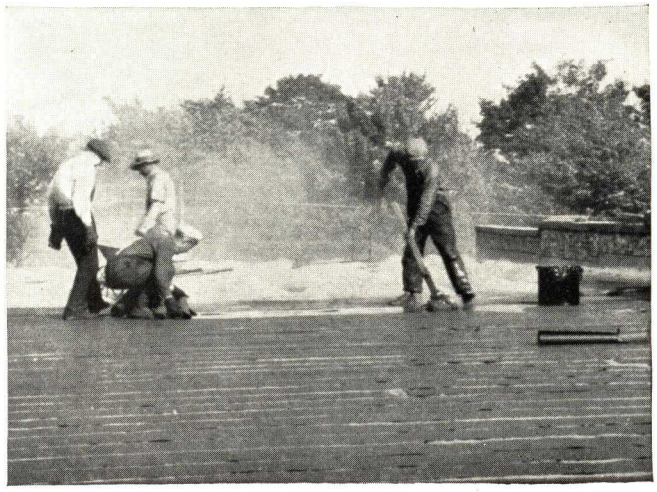
NOTE: *USG Sel-Vi-Lap Cap Sheet Roofing shall be cut into sheets approximately 8 feet long. Cut the roll at right angles to the 4-inch longitudinal selvage to include one (1) 6-inch end selvage on each sheet. Stack the sheets flat in piles on the roof, mineral face down.*

Break joints of transverse end laps of units in alternate courses. Seal the full width of the four (4) inch longitudinal side lap and the six (6) inch transverse end lap with a mopping of asphalt, into which, while hot, the exposed edges of the next overlapping cap sheet shall be carefully embedded and firmly pressed down to assure complete, positive adhesion between plies along the selvages. Care must be used when mopping the selvage laps to avoid dripping asphalt on the exposed mineral surface of the previously laid sheet.

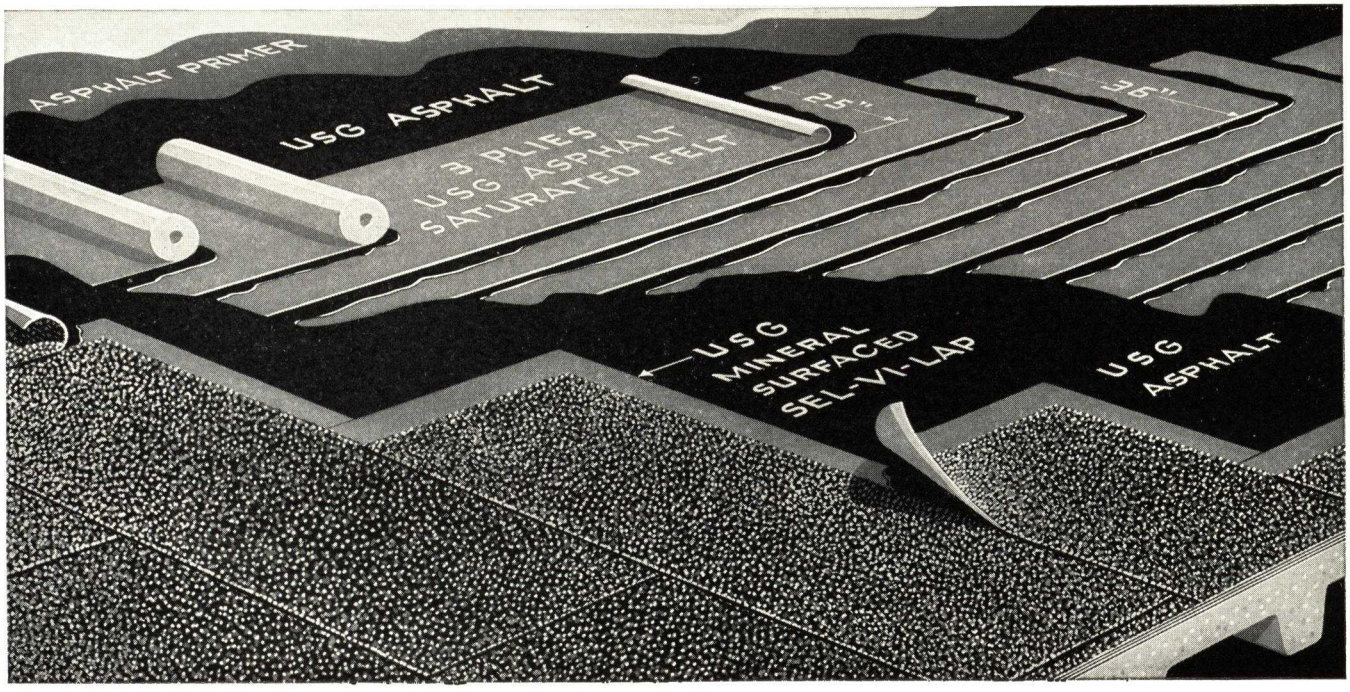
NOTE: *Include clauses (A) or (B) as they apply.*

(A) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof permits nailing **(poured gypsum decks),** the cap sheet shall be laid at right angles to the slope of the roof **(parallel with the underlying felt)** and shall be nailed every twelve (12) inches along the longitudinal selvage not more than two (2) inches from the edge of the sheet.

(B) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof will not permit nailing **(poured concrete or precast concrete slab decks),** the cap sheet will be furnished with the four (4) inch longitudinal selvage only (without transverse six (6) inch selvage end laps) and shall be applied in continuous lengths (not eight (8) foot units) parallel with the incline of the roof nailed securely at the crest or ridge.



DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATION NO. 10



See Page 2 for New USG **Complete** Roof Service

USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 11

SEL-VI-LAP MINERAL SURFACED ROOFING OVER WOOD OR PRECAST GYPSUM TILE DECKS

- These roofs are approved for application on decks where the incline or slope exceeds a one (1) inch rise in a twelve (12) inch run.
- These roofs are listed by the Underwriters' Laboratories as Class C.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS
APPLYING to SPECIFICATION NO. 11

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION
MINERAL SURFACED CAP SHEET, ASPHALT SATURATED FELT and ASPHALT

SPECIFICATION—Two plies of USG Asphalt Saturated Rag Felt, each ply weighing 15 lbs. per 100 sq. ft., and one layer of USG Sel-Vi-Lap Mineral Surfaced Rag Felt Roofing weighing 85 lbs. per 100 sq. ft., and not less than 50 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 11.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches.

All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

DETAILS OF APPLICATION

FIRST—Cover the roof deck with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

SECOND—Apply two (2) plies of felt lapping each sheet nineteen (19) inches over the preceding sheet and embedded in a mopping of hot asphalt. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt the full width of the nineteen (19) inch lap

See Page 2 for New USG **Complete** *Roof Service*

so that at no point shall felt touch felt. There shall be not less than twenty (20) pounds of asphalt used per one hundred (100) square feet in the individual moppings between plies of felt (20 pounds total). Felt shall be extended to the top of the cant strip or on all vertical surfaces four (4) inches. Each sheet shall be nailed every six (6) inches not lower than three (3) inches from the top edge of the sheet. All nails shall be covered with one ply of felt.

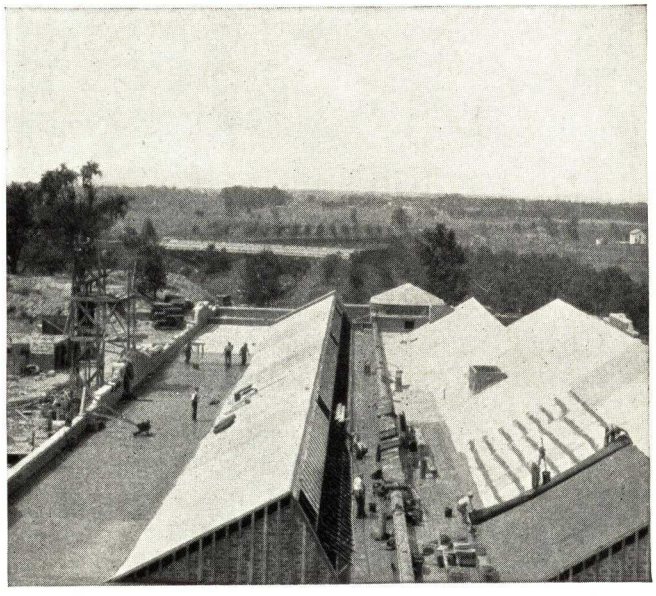
THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, using not less than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this mopping, while hot, shall be embedded the cap sheet roofing, applied in units approximately eight (8) feet long, preferably at right angles to the underlying felt.

NOTE: *USG Sel-Vi-Lap Mineral Surfaced Cap Sheet Roofing shall be cut into sheets approximately 8 feet long. Cut the roll at right angles to the 4-inch longitudinal selvage to include one (1) 6-inch end selvage on each sheet. Stack the sheets flat in piles on the roof, mineral face down.*

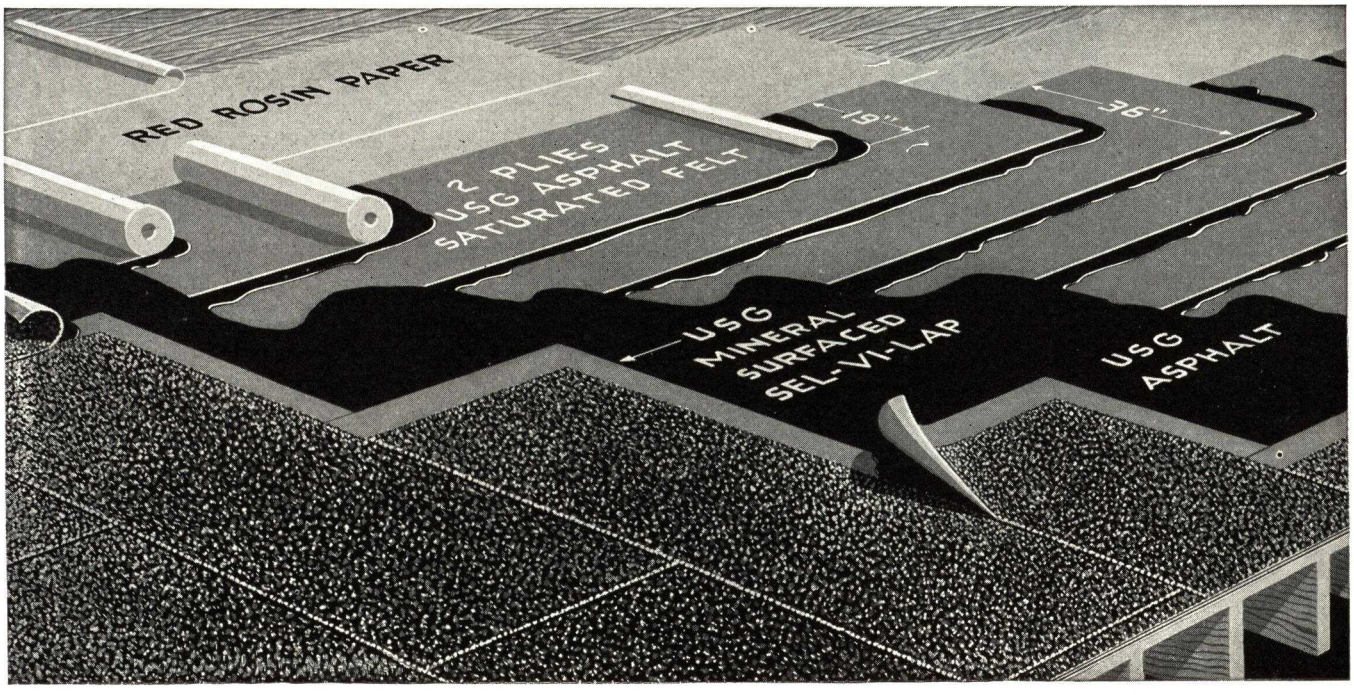
Break joints of transverse end laps of units in alternate courses. Seal the full width of the four (4) inch longitudinal side lap and the six (6) inch transverse end lap with a mopping of asphalt, into which, while hot, the exposed edges of the next overlapping cap sheet shall be carefully embedded and firmly pressed down to assure complete, positive adhesion between plies along the selvages. Care must be used when mopping the selvage laps to avoid dripping asphalt on the exposed mineral surface of the preceding sheet.

NOTE: *Include clause (A) where it applies.*

(A) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches, the cap sheet shall be laid at right angles to the slope of the roof nailed every twelve (12) inches along the longitudinal selvage not more than two (2) inches from the edge of the sheet.



DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATION NO. 11



See Page 2 for New USG **Complete** Roof Service

USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 12

SEL-VI-LAP MINERAL SURFACED ROOFING OVER POURED GYPSUM OR CONCRETE, PRECAST CONCRETE SLAB DECKS

- Approved for application on roof decks where the incline or slope exceeds a one (1) inch rise in a twelve (12) inch run.
- Roofs are listed by Underwriters' Laboratories as Class C.
- Preparation and other Requirements applying to these particular types of decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS
APPLYING to SPECIFICATION NO. 12

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

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NOTE—*The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION
MINERAL SURFACED CAP SHEET, ASPHALT SATURATED FELT and ASPHALT

SPECIFICATION—One gallon of USG Asphalt Primer; two plies of USG Asphalt Saturated Rag Felt, each ply weighing 15 lbs. per 100 sq. ft.; one layer of USG Sel-Vi-Lap Mineral Surfaced Rag Felt Roofing weighing 85 lbs. per 100 sq. ft.; and not less than 80 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 12.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches. All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

Where steep roofs join flat roofs, the roofing on the flat surfaces shall be carried up the steep surfaces not less than twenty-four (24) inches before the application of the roofing on the steep surfaces. The steep surface roofing shall be carried, full thickness, over this entire lapped juncture and, in addition, at least six (6) inches out over the flat roof surface.

DETAILS OF APPLICATION

FIRST—Coat the entire roof surface with asphalt primer, using not less than one (1) gallon of primer to cover one hundred (100) square feet of roof surface. Allow sufficient time to dry.

NOTE: *If Precast Concrete Slabs are used, strip prime each slab, staying back three (3) inches from all joints.*

SECOND—Mop the entire surface of the deck with asphalt. Into this mopping, while hot, shall be embedded the two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet, cutting the felt off at the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt

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so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (50 pounds total).

THIRD—Cover the entire surface of the felt thus laid with a uniform mopping of asphalt, using not less than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface. Into this mopping, while hot, shall be embedded the cap sheet roofing, applied in units approximately eight (8) feet long, preferably at right angles to the underlying felt.

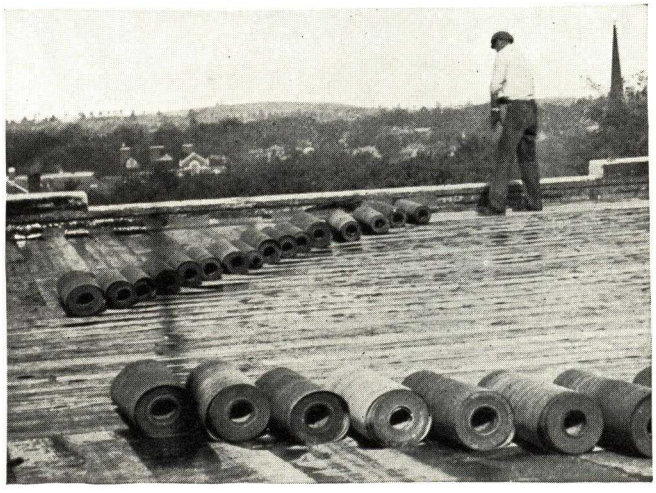
NOTE: *USG Sel-Vi-Lap Cap Sheet Roofing shall be cut into sheets approximately 8 feet long. Cut the roll at right angles to the 4-inch longitudinal selvage to include one (1) 6-inch end selvage on each sheet. Stack the sheets flat in piles on the roof, mineral face down.*

Break joints of transverse end laps of units in alternate courses. Seal the full width of the four (4) inch longitudinal side lap and the six (6) inch transverse end lap with a mopping of asphalt, into which, while hot, the exposed edges of the next overlapping cap sheet shall be carefully embedded and firmly pressed down to assure complete, positive adhesion between plies along the selvages. Care must be used when mopping the selvage laps to avoid dripping asphalt on the exposed mineral surface of the previously laid sheet.

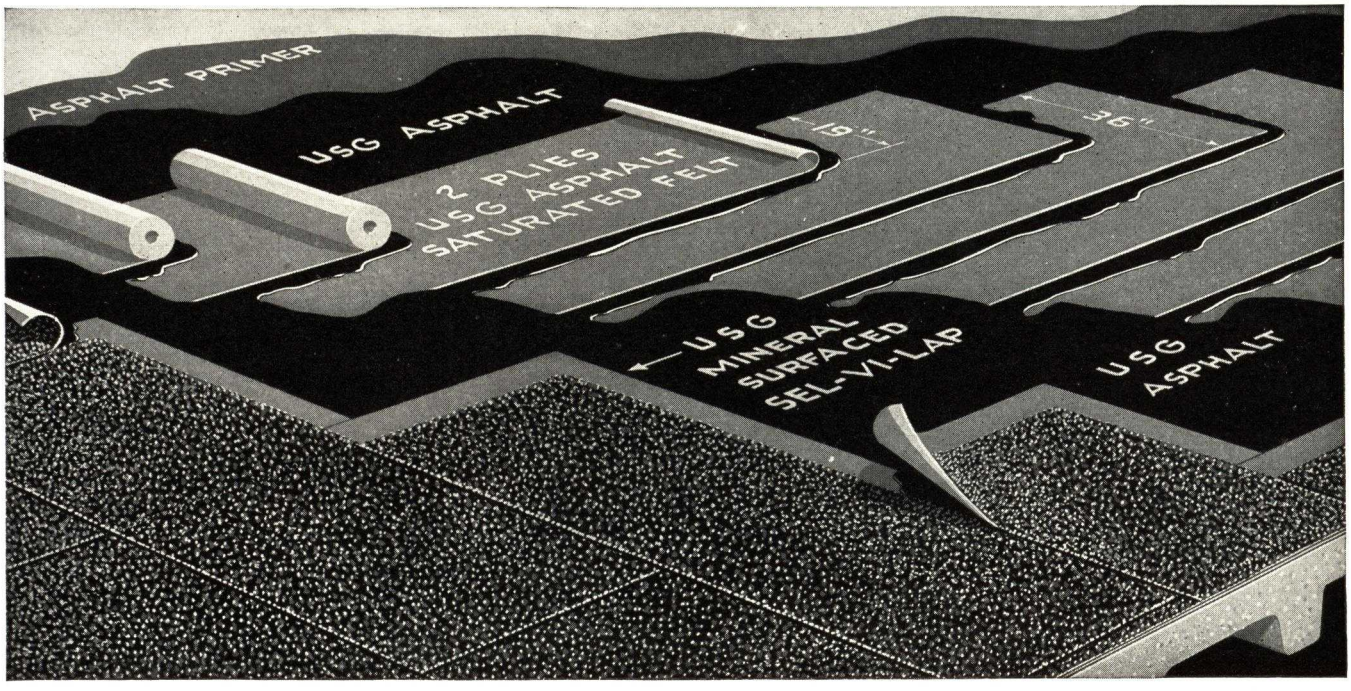
NOTE: *Include clauses (A) or (B) as they apply*

(A) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof permits nailing **(poured gypsum decks),** the cap sheet shall be laid at right angles to the slope of the roof **(parallel with the underlying felt)** and shall be nailed every twelve (12) inches along the longitudinal selvage not more than two (2) inches from the edge of the sheet.

(B) When the incline of the roof **exceeds** three (3) inches in twelve (12) inches and the character of the roof will not permit nailing **(poured concrete or precast concrete slab decks),** the cap sheet will be furnished with the four (4) inch longitudinal selvage only (without transverse six (6) inch selvage end laps) and shall be applied in continuous lengths (not eight (8) foot units) parallel with the incline of the roof nailed securely at the crest or ridge.



DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATION NO. 12



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USG 10-YEAR BONDED BUILT-UP ROOF . . . *Specification* No. 13

ASPHALT SMOOTH SURFACED ROOFING •OVER• WOOD OR PRECAST GYPSUM TILE DECKS

- Approved for application in northern section of the United States on roof decks where the incline or slope exceeds 2 inches in 12 inches.
- Roofs are listed by the Underwriters' Laboratories as noted below.
- Preparation and other Requirements applying to Wood and Precast Gypsum Tile Decks shall be in accordance with "Correlative Provisions," page 3 which are a part of these detailed specifications.
- For USG Built-up Bonded Roof Flashings, see pages 37 to 43 inclusive.

GENERAL REQUIREMENTS
APPLYING to SPECIFICATIONS NOS. 13-A, 13-B, 13-C

The Roofing Contractor shall examine all surfaces upon or against which roofing is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the roofing materials. He shall notify the Architect of any defects he considers detrimental to the installation of the roofing materials and shall make sure that all defects are corrected before he begins work. The application of roofing materials by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

BOND—The Roofing Contractor shall furnish a United States Gypsum Co. Ten (10)-Year Guaranty Bond issued by the National Surety Corp.

• • •

NOTE: *The United States Gypsum Company will furnish its 10-Year Guaranty Bond on all roofs of 2500 square feet or more in the United States where its inspection service is available. The roof must be applied by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Roof Specifications and subject to United States Gypsum Company inspection, acceptance, and approval*

MATERIALS AND APPLICATION
SPECIFICATIONS NOS. 13-A (Class C), 13-B (Class C), and 13-C (Class A)
ASPHALT SATURATED FELT (Rag or Asbestos as noted) and ASPHALT

SPECIFICATION NO. 13-A—One ply of USG Asphalt Saturated **Rag** Felt weighing 30 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Rag** Felt, each ply weighing 15 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 13-A.

SPECIFICATION NO. 13-B—One ply of USG Asphalt Saturated **Rag** Felt weighing 30 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 13-B.

SPECIFICATION NO. 13-C—One ply of USG Asphalt Saturated **Asbestos** Felt weighing 35 lbs. per 100 sq. ft.; two plies of USG Asphalt Saturated **Asbestos** Felt, each ply weighing 20 lbs. per 100 sq. ft.; and not less than 75 lbs. of USG No. 185 **Steep** Asphalt shall be used to construct 100 sq. ft. of USG Bonded Built-up Roofing No. 13-C.

GENERAL PROVISIONS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to nail the roofing to the deck. Nails shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks.

Application of all felts shall start at low points and be laid at right angle to slope of roof. All end laps shall be not less than six (6) inches.

All felts shall be 36 inches wide laid without wrinkles or buckles.

Temperature of USG Asphalt shall never exceed 400° F. in heating kettle.

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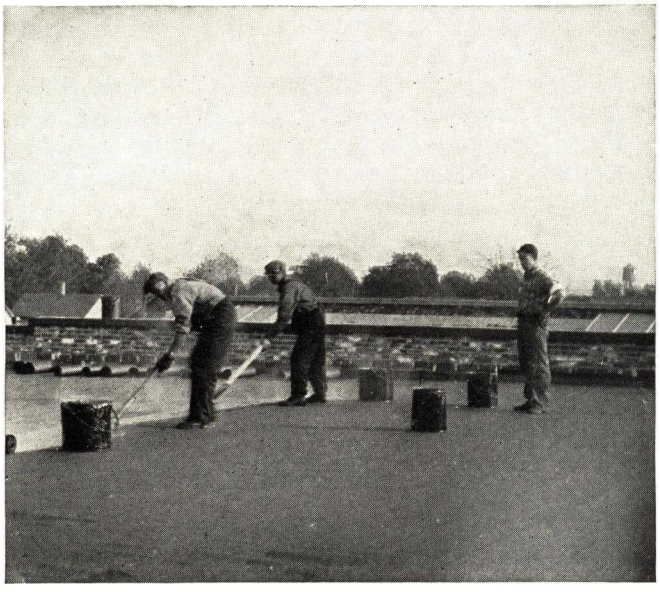
DETAILS OF APPLICATION

FIRST—Apply the one (1) ply of felt lapping each sheet two (2) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Secure the felt to the roof deck by nailing along the side laps of the sheets, spacing the nails six (6) inches apart on centers. In addition, the felt shall be secured with two (2) staggered rows of nails spaced twelve (12) inches apart on centers located approximately twelve (12) inches from each edge of the sheet.

SECOND—Cover the entire surface of the felts thus laid with a uniform mopping of asphalt. Into this mopping, while hot, shall be embedded the two (2) plies of felt, lapping each sheet nineteen (19) inches over the preceding sheet and extending up to the top of the cant strip or on all vertical surfaces four (4) inches. Roll each sheet immediately behind the mop to assure a solid mopping of asphalt so that at no point shall felt touch felt. There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings under and between plies of felt (50 pounds total). (When the incline of roof exceeds 3" in 12", each sheet shall be nailed every 18" not lower than 3" from the top edge. All nails shall be covered with one ply of felt.)

NOTE: *When the incline of the roof exceeds three (3) inches in twelve (12) inches, the two (2) plies of felt may be laid parrallel to the incline of the roof (at right angles to the base felt), and each sheet shall be securely nailed at the crest or ridge of the roof and, in addition, each shall be nailed with two parallel rows of nails spaced twenty-four (24) inches apart on centers. One row of nails shall be located not less than three (3) inches from the unexposed edge of the sheet and the second row of nails not less than twelve (12) inches from the unexposed edge.*

THIRD—Cover the entire surface of the felts thus laid with a uniform mopping of steep asphalt, using not more than twenty-five (25) pounds of asphalt to cover one hundred (100) square feet of roof surface.



DETAIL OF CONSTRUCTION FOR BUILT-UP ROOF SPECIFICATIONS NOS. 13-A, 13-B, and 13-C

See Page 2 for New USG Complete Roof Service

USG WEATHERWOOD INSULATION UNDER BUILT-UP ROOFING

COMPOSITION—USG Weatherwood Roof Insulation is a felted fiber product treated to make it highly moisture resistant. It is formed on a single cylinder which produces a homogeneous board free from laminations and any tendency to split parallel with the faces.

NOTE—*United States Gypsum Company has three Insulation Board manuracturing mills: St. Joseph, Missouri; Greenville, Mississippi; and Lisbon Falls, Maine. While the raw materials from which the St. Joseph Mill insulation is made are basically different from those of the Greenville and Lisbon Falls Mills, the physical characteristics of the products of all three mills are essentially the same.*

LOW THERMAL CONDUCTIVITY—The average established in tests is .33 B.t.u.'s per hour, per inch thickness, per square foot, per degree F. difference in temperature between the two sides.

RESISTANCE TO MOISTURE—NON-ABSORPTION—Tests show that this board, after being submerged in water for a period of two (2) hours, has an average water absorption of less than fifteen (15) per cent by weight.

STRUCTURAL STRENGTH—The tensile strength of USG Weatherwood Insulation is over 300 pounds per square inch and the modulus of rupture, over 400 pounds.

NON-COMPRESSIBILITY—RESILIENCE—When laid over roof decks under standard roofing materials, it is sufficiently firm to prevent fracture of the roofing under normal use.

THICKNESS AND SIZE— ½, 1, 1½, 2, 2½, 3, 3½, and 4 inches thick. It is homogeneous in the ½ inch thickness and can also be furnished 1 inch thick. On thicknesses greater than ½ inch, the insulation will be furnished in multiple thicknesses of ½ inch, waterproof glue or staple laminated. The area of the unit is 22 inches wide by 47 inches long.

Insulation Specifications

CORRELATIVE PROVISIONS APPLYING TO ROOF INSULATION

NOTE—*The construction of roof decks and provision for satisfactory surfaces to receive the roof insulation and various miscellaneous provisions by other trades are not a part of the Roofing Contractor's work and are, therefore, not included in the Roof Insulation Specifications. The following provisions, however, should be included as they apply under the proper headings of the specifications to be executed by others.*

ROOF DECK PROVISIONS—All provisions for the construction and finished condition of the various types of roof decks established under the heading "Correlative Provisions," pages 3 and 4, applying to "Built-up Roofing" shall apply likewise to "Roof Insulation."

Note particularly that steel decks must be insulated before the application of USG Bonded Built-up Roofing will be permitted.

WOOD NAILING STRIPS—The General Contractor will provide wood nailing strips to form a nailing base under all sheet metal flashing aprons and flanges of every nature. Strips shall be the full thickness of the insulation and at least 1 in. wider than the apron rigidly secured to the roof deck with nails, lag bolts, expansion bolts, or other means of attachment as best adapted to the particular construction.

CANT STRIPS—Allow for the full insulation thickness above the roof deck surface where cant strips are required. Cant strips shall be provided as set forth on page 4. Cant strips on wood decks shall be set on top of the insulation secured by nailing through the insulation to deck proper. On incombustible decks where the cant is formed with gypsum mortar or concrete, provide a square shoulder the full insulation thickness at the toe of the cant above which the standard cant shall be formed.

FLASHING RAGGLES—In establishing the height of flashing raggles and nailing strips, add the thickness of the insulation to the heights required for uninsulated roofs as set forth on page 4.

ANCHORS AND GUYS—All anchors, guys, struts, and similar stays for the support or bracing of heavy ventilators, standpipes, louver enclosures, and similar equipment above the roof shall be rigidly secured to the roof deck proper and not to the insulation.

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GENERAL REQUIREMENTS

APPLYING to APPLICATION of INSULATION

The Roofing Contractor shall examine all surfaces upon or against which the insulation is to be applied. He shall determine that the roof deck is properly prepared, slopes to drains are properly constructed, the roof deck is thoroughly dry, smooth, and free from projections above or depressions in the plane of the deck surface, the deck is free from rubbish and debris and ready to receive the insulation. He shall likewise check all nailing strips installed to form a nailing base under sheet metal flashing aprons and flanges and shall notify the Architect of any defects he considers detrimental to the installation of the insulation and shall make sure that all defects are corrected before he begins work. The application of insulation by the Roofing Contractor will be considered acceptance by him of the roof deck as constructed.

MATERIALS AND APPLICATION

APPLYING to SPECIFICATIONS NOS. 100, 200, 300 and 400

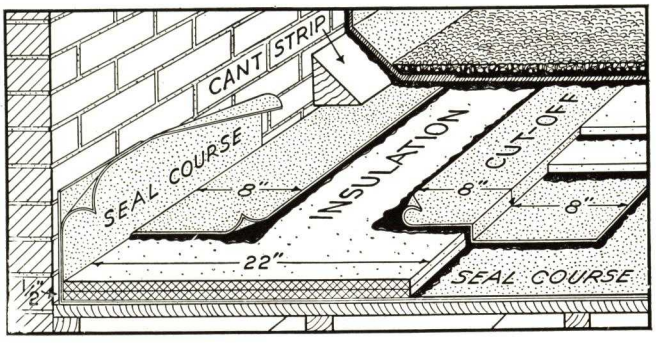
NOTE—*Notes in bold face type are explanatory or advisory only and should not be included in the specification. Wherever words or phrases occur in the body of the specification paragraph printed in bold face type enclosed in parentheses, choose that word or phrase which applies to the particular work, omitting those that are irrelevant. Wherever the word "Specify" occurs in bold face type enclosed in parentheses, add the particular word or clause applicable.*

WORK INCLUDED—

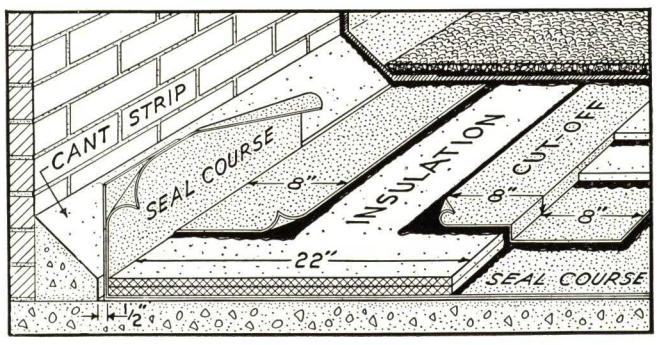
NOTE—*List and locate the roof areas to be insulated. If more than one thickness of insulation is required on various roof areas, list and locate each separately.*

INSULATION MATERIAL—Insulation shall be USG Weatherwood Roof Insulation as made by United States Gypsum Company, Chicago. Insulation shall be **(specify)** thick, laid in **(one) (two)** layer(**s**) **(waterproof glue laminated) (staple laminated).** Units shall be not larger than 22x47 inches in area. Insulation shall be kept dry before, during, and after application. Units shall be free from surface abrasions, curled or broken edges and corners.

NAILS—Nails shall be Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs. Nails for paper and felt shall be ⅞ in. long for wood decks and 1¾ in. long for gypsum decks. Nails for insulation shall be of sufficient length to pass through the insulation and penetrate into but not through the deck construction.



DETAILS OF CANT STRIPS AND SEAL COURSES



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APPLICATION OF INSULATION—Only as much insulation shall be laid over the roof area as can be covered by the finished roofing in any one day.

Lay the insulation in **(one) (two)** layer**(s)** over the entire roof area. Adjoining edges of the insulation units shall be brought to a moderate contact but shall not be forced into place. Where the insulation meets vertical surfaces, such as parapets, penthouses, and curbs, the insulation units shall be cut in a neat, workmanlike manner allowing at least ½ in. clearance. Insulation units shall be laid with the length at right angles to the slope of the roof in parallel courses with end joints in each course breaking with those of adjoining courses.

Where insulation is laid in two (2) layers, the insulation units of the second layer shall be laid parallel with those of the first layer, and all joints of the second layer shall break with those of the first layer.

WATER CUT-OFFS—The insulation, whether laid in one (1) or two (2) layers, shall be cut to the line designated for the water cut-off.

Water cut-offs shall consist of strips of **(tar) (asphalt)** saturated roofing felt weighing 15 lbs. per 100 sq. ft. not less than 16 in. wide. One half (½) the width of the strip shall be thoroughly and firmly embedded in hot bitumen to the deck and the remaining one half (½) carried up and over the edge of the insulation and thoroughly and firmly embedded in hot bitumen to the top surface of the insulation.

Cut-offs shall be located approximately 22 in. from and parallel with all vertical walls, such as parapets, penthouses, curbs, and around all leader heads, down spouts, soil pipes, vents, and ventilators. The body or field of the roof insulation shall be divided into rectangular areas approximately 30 ft. on a side, each area isolated with a water cut-off. Insert a water cut-off surrounding each day's work if the stop is not made at the designated water cut-off.

The first layer of the finished roofing shall be mopped to the water cut-off each night.

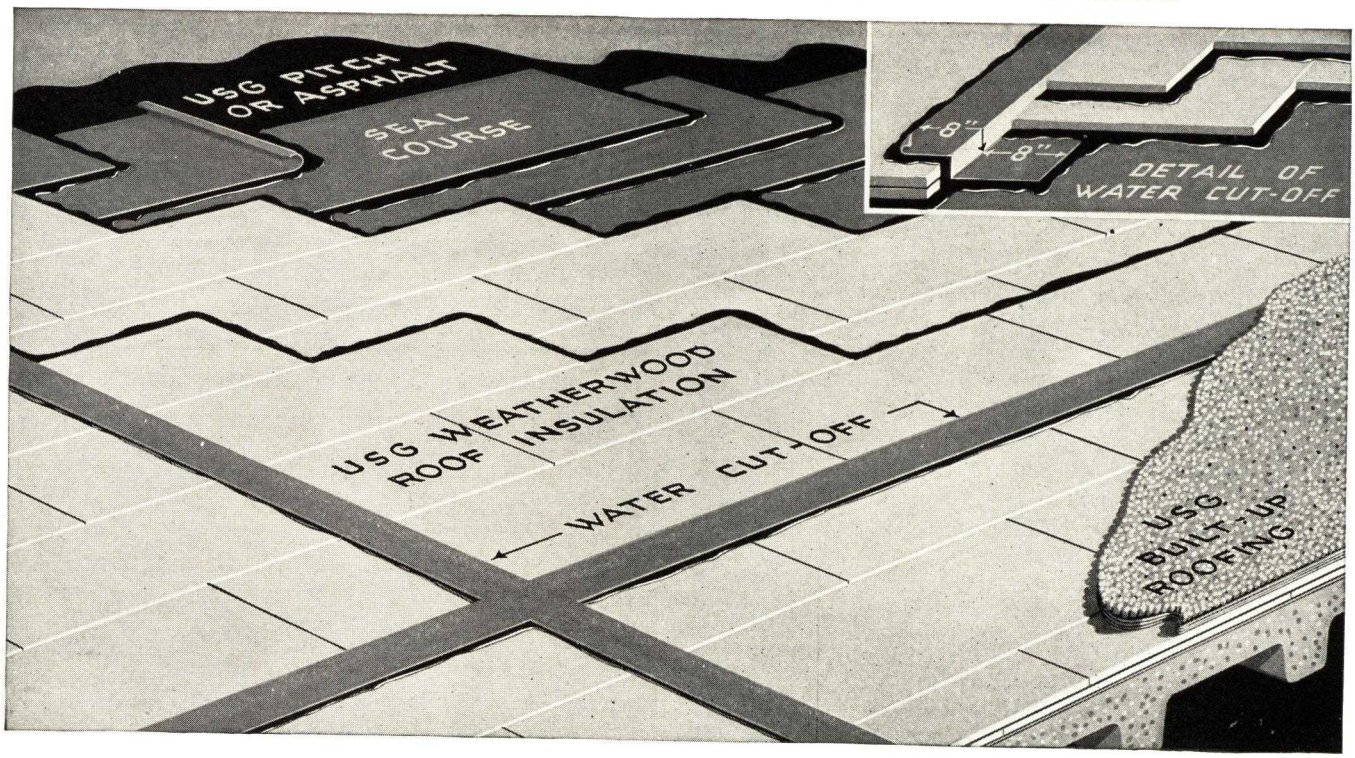
NOTE—*Water cut-offs are customarily omitted where insulation is laid over a wood deck not first covered by a seal course as in Specification No. 100.*

TEMPERATURE OF BITUMEN—Temperature of USG **(Coal Tar Pitch) (Asphalt)** shall never exceed 400° F. in the heating kettle.

APPLICATION OF USG BUILT-UP ROOFING OVER INSULATION

NOTE—*Any USG Built-up Roofing designed for application over Poured Gypsum, Poured Concrete, or Precast Concrete Slab Decks may be applied over the insulation. Apply USG Built-up Roofing, Specifications No. 2 and No. 4 (pages 7 and 11 respectively) exactly as written. In the case of USG Built-up Roofing Specifications Nos. 6, 8, 10, and 12, omit the First Operation—the surface of the insulation requires no primer. See pages 15, 19, 23 and 27 respectively.*

DETAILS OF WATER CUT-OFFS USED IN CONJUNCTION WITH INSULATION



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Specification No. 100

WEATHERWOOD INSULATION OVER WOOD ROOF DECKS UNDER USG BUILT-UP ROOFING WHERE HIGH HUMIDITIES ARE NOT A FACTOR

BUILDING PAPER—The roof deck shall be covered with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

NOTE—*Building paper may be omitted when insulation is laid in two (2) layers.*

APPLICATION OF INSULATION—Each insulation unit shall be secured in place by nailing. Space nails approximately twelve (12) inches apart on centers not less than one (1) inch from each edge (each corner of each unit must be securely nailed). In addition, nail along the longitudinal center line.

Nailing of two (2) layer insulation shall be through the second or top layer only. Do not nail first layer.

Specification No. 200

WEATHERWOOD INSULATION OVER WOOD ROOF DECKS UNDER USG BUILT-UP ROOFING WHERE HIGH HUMIDITIES ARE MAINTAINED

BUILDING PAPER—The roof deck shall be covered with a layer of Red Rosin Sized Sheathing Paper weighing not less than five (5) pounds per one hundred (100) square feet. Paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

NOTE—*Building Paper must be used under the Seal Course where a Gravel or Slag Surfaced Built-up Roofing laid over the insulation requires a low melting point bitumen, such as for USG Built-up Roofing, Specifications No. 2 and No. 4. Building Paper may be omitted where USG Built-up Roofing, Specifications Nos. 6, 8, 10, or 12 are laid over the insulation.*

SEAL COURSE—Apply two (2) plies of USG **(Tar) (Asphalt)** Saturated Rag Felt weighing fifteen (15) pounds per one hundred (100) square feet, single thickness, lapping each sheet over the preceding sheet seventeen (17) inches for thirty-two (32) inch felt or nineteen (19) inches for thirty-six (36) inch felt. Extend felt up on all vertical surfaces not less than eight (8) inches. Application of felts shall start at low points and be laid at right angles to the slope of the roof. All end laps shall be not less than six (6) inches. Felts shall be laid without wrinkles or buckles and shall be secured to the deck with occasional nailing. Apply a uniform coat of USG **(Coal Tar Pitch) (Asphalt)** to the full lap so that at no point shall felt touch felt.

After the insulation has been laid over the Seal Course, the turned up eight (8) inch extensions at all vertical surfaces shall be turned down over the exposed surface of the insulation thoroughly and firmly embedded in a uniform coat of hot bitumen.

NOTE—*Where tar saturated felts are used, use coal tar pitch. Where asphalt saturated felts are used, use asphalt. Felts and bitumens of the Seal Course should match those selected for the built-up roofing to be applied over the insulation.*

APPLICATION OF INSULATION—Mop the entire surface of the Seal Course with a uniform coating of USG **(Coal Tar Pitch) (Asphalt)** into which, while hot, the insulation units shall be firmly and completely embedded.

When insulation is laid in two (2) layers, mop the entire surface of the first layer with a uniform coating of bitumen into which, while hot, the second layer shall be firmly and completely embedded.

Only sufficient area to provide embedment for a single insulation unit shall be mopped at a time.

There shall be not less than twenty-five (25) pounds of bitumen used per one hundred (100) square feet in the individual moppings.

Each insulation unit shall be secured in place by nailing. Space nails approximately twelve (12) inches apart on centers not less than one (1) inch from each edge (each corner of each unit must be securely nailed). In addition nail along the longitudinal center line.

Nailing of two (2) layer insulation shall be through the second or top layer only. Do not nail first layer.

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Specification No. 300

WEATHERWOOD INSULATION OVER POURED GYPSUM or CONCRETE, PRECAST GYPSUM TILE, and PRECAST CONCRETE SLAB DECKS UNDER USG BUILT-UP ROOFING

PRIMER—Coat the entire roof surface with USG Asphalt Primer, using not less than one (1) gallon of primer to cover one hundred (100) square feet of roof surface. Allow sufficient time to dry.

NOTE—*Omit primer if low melting point bitumens, either Coal Tar Pitch or Asphalt, are used as required for Gravel or Slag Surfaced Built-up Roofing laid over the insulation (USG Built-up Roofing, Specifications No. 2 and No. 4). Felts and bitumens used in the Seal Course should match those used in the Built-up Roofing selected for application over the insulation.*

NOTE—*If asphalt saturated felt and high melting point asphalt are used over Precast Tile or Slabs in the Seal Course, strip prime each unit staying back (3) inches from all joints.*

SEAL COURSE—Mop the entire surface of the deck with USG **(Coal Tar Pitch) (Asphalt).** Into this mopping, while hot, shall be embedded two (2) plies of USG **(Tar) (Asphalt)** Saturated Rag Felt weighing fifteen (15) pounds per one hundred (100) square feet, single thickness, lapping each sheet over the preceding sheet seventeen (17) inches for thirty-two (32) inch felt or nineteen (19) inches for thirty-six (36) inch felt. Extend felt up on all vertical surfaces not less than eight (8) inches. Application of felts shall start at low point and be laid at right angles to the slope of the roof. Lay felts without wrinkles or buckles. All end laps shall be not less than six (6) inches. As each ply of felt is laid, apply a uniform coat of USG **(Coal Tar Pitch) (Asphalt)** to the full lap so that at no point shall felt touch felt.

NOTE—*If low melting point bitumens are used over Precast Tile or Slabs, strip mop each unit staying back three (3) inches from all joints. (USG Built-up Roofing, Specifications No. 2 and No. 4). Felts and bitumens of the Seal Course should match those selected for the built-up roofing to be applied over the insulation.*

After the insulation has been laid over the Seal Course, the turned up eight (8) inch extensions at all vertical surfaces shall be turned down over the exposed surface of the insulation, thoroughly and firmly embedded in a uniform coat of hot bitumen.

APPLICATION OF INSULATION—Mop the entire surface of the **(Seal Course) (deck)** with a uniform coating of USG **(Coal Tar Pitch) (Asphalt)** into which, while hot, the insulation units shall be firmly and completely embedded.

When insulation is laid in two (2) layers, mop the entire surface of the first layer with a uniform coating of bitumen into which, while hot, the second layer shall be firmly and completely embedded.

Only sufficient area to provide embedment for a single insulation unit shall be mopped at a time.

There shall be not less than twenty-five (25) pounds of bitumen used per one hundred (100) square feet in the individual moppings.

When the incline of the roof exceeds three (3) inches in twelve (12) inches and the character of the roof permits nailing (poured gypsum or precast gypsum tile), each insulation unit shall be secured in place by nailing. Space nails approximately twelve (12) inches apart on centers not less than one (1) inch from each edge (each corner of each unit must be securely nailed). In addition, nail along the longitudinal center line. Nailing of two layer insulation shall be through the second or top layer only. Do not nail first layer.

When the incline of the roof exceeds three (3) inches in twelve (12) inches and the character of the roof surface will not permit nailing (poured concrete or precast concrete slab decks) and nailing strips are provided parallel with the incline of the roof spaced four (4) feet apart on centers, insulation units shall be secured to each nailing strip with nails spaced approximately twelve (12) inches apart on centers. Nailing of two (2) layer insulation shall be through the second or top layer only. Do not not nail first layer of insulation.

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Specification No. 400

WEATHERWOOD INSULATION OVER STEEL ROOF DECKS UNDER USG BUILT-UP ROOFING

NOTE—*Steel decks must be insulated before the application of USG Bonded Built-up Roofing will be permitted.*

NOTE—*Use only steep asphalt and asphalt saturated felts in constructing seal courses, applying insulation, and constructing built-up roofing over steel decks.*

NOTE—*Always include a Seal Course if high humidity is present beneath the steel roof deck.*

SEAL COURSE—Mop the entire surface of the deck with USG Asphalt. Into this mopping, while hot, shall be embedded two (2) plies of USG Asphalt Saturated Rag Felt weighing fifteen (15) pounds per one hundred (100) square feet, single thickness, lapping each sheet over the preceding sheet seventeen (17) inches for thirty-two (32) inch felt or nineteen (19) inches for thirty-six (36) inch felt. Extend felt up on all vertical surfaces not less than eight (8) inches. Application of felts shall start at low point and be laid at right angles to the slope of the roof. All end laps shall be not less than six (6) inches. Felts shall be laid without wrinkles or buckles. Apply a uniform coat of USG Asphalt to the full lap so that at no point shall felt touch felt.

After the insulation has been laid over the Seal Course, the turned up eight (8) inch extensions at all vertical surfaces shall be turned down over the exposed surface of the insulation, thoroughly and firmly embedded in a uniform coat of asphalt.

APPLICATION OF INSULATION—Mop the entire surface of the **(Seal Course) (deck)** with a uniform coating of USG Asphalt into which, while hot, the insulation units shall be firmly and completely embedded.

Where insulation is laid in two (2) layers, mop the entire surface of the first layer with a uniform coating of asphalt into which, while hot, the second layer shall be firmly and completely embedded.

Only sufficient area to provide embedment for a single insulation unit shall be mopped at a time.

There shall be not less than twenty-five (25) pounds of asphalt used per one hundred (100) square feet in the individual moppings.

When the incline of the roof exceeds three (3) inches in twelve (12) inches, the insulation shall be substantially secured to the steel deck with proper devices provided by the steel deck manufacturer.

See Page 2 for New USG Complete Roof Service

USG 20 and 10-YEAR BONDED . . . BUILT-UP ROOF FLASHINGS

USG Built-up Roof Flashings are approved for application throughout the United States when installed in connection with USG Bonded Built-up Roofs.

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INTRODUCTION

ESSENTIALS OF WATER-TIGHT WALLS ABOVE THE ROOF

PARAPET WALLS—Parapet walls to which built-up roof flashings are attached are one of the most vulnerable parts of a building. The walls are exposed to rain at the top and on both sides, and at times are subjected to freezing temperatures necessitating, as nearly as possible, water-tight construction.

Bureau of Standards' research paper R. P. 683, "A Study of the Properties of Mortars and Bricks and their Relation to Bond," establishes the weakest point in brick work to be at the junction of the solid masonry unit and the mortar.

Parapet walls should be built of the best materials. For all ordinary construction, regardless of the absorption rates of the masonry units, tests and numerous field observations made by competent authorities indicate that parapet walls can be made water-tight by the proper use of mortars which form a solid bond with the masonry units. Mortar mixes shown in the following table prepared by the National Lime Association are eminently satisfactory for this purpose:

STANDARD MORTAR PROPORTIONS FOR ALL TYPES OF MASONRY

TYPE OF MASONRY	Parts by Volume		
	Lime	Cement	Sand
For all weather-tight unit masonry above grade	2	1	9
Same, richer for increased mortar strength	2	1	7 or 8

Lime, 7 or 8 cu. ft. of putty per 180 lbs. of quicklime or 2.25 cu. ft. of putty per 100 lbs. of hydrate.
Cement, 94 lbs. per cu. ft.
Sand, 80-85 lbs. per cu. ft. loose and moist.

WALL COPING—A water-tight coping is equally as important as the kind of masonry materials used in the wall. For a water-tight job, the coping should be laid tight on a full bed of mortar, thoroughly pointed up and properly pitched for drainage.

Copings should be provided with undercut drips. Continuous through wall flashings of fabric or non-corrosive metal should be placed between the coping and the brick work; or, in lieu of continuous flashings, unit pan flashings centered under the coping joints should be provided to prevent infiltration of water into the wall through the coping joints.

FLASHINGS—To be permanently efficient, flashing must:

1. Prevent water from entering the wall at the junction of the wall and the roof deck.
2. Prevent water from entering the wall through open joints in the coping.

The use of properly constructed roof flashings for these purposes cannot be too fully emphasized.

Most roof flashings have been designed to exclude water from the parapet wall, but the methods used have generally failed, resulting in the retention of the moisture that does get into the wall.

The application of hot asphalt, coal tar pitch, roofing felt or metallic materials over one face of the wall or across the top and continued down over one face of the wall actually accelerates disintegration of the masonry beneath the covered surface. If it is assumed that water does enter the wall, provision for its exit must also be considered. Therefore, covering one face of the wall reduces by one-half the area through which the water confined in the wall can escape.

Both faces of parapet walls should be exposed to the weather to permit maximum drying. Roof flashings should not be extended higher than is necessary to guard against the possible accumulation of water on the roof surface under unusual rainfall conditions.

BITUMENS AND FELTS—Specify the same bitumen and felts throughout. Where coal tar pitch is used, all felts should be saturated with the same material. Where asphalt is used, use asphalt saturated felts.

See Page 2 for New USG ***Complete*** *Roof Service*

USG FABRIC ROOF COUNTER-FLASHING • • DESCRIPTION

USG Built-up Flashings are manufactured from heavy woven cotton fabric, thoroughly saturated and coated with hot bituminous compound into which is pressed a uniform layer of mineral surfacing. The mineral surface retards rapid drying out of the saturants in the fabric and protects the exposed surface of the flashings from abrasive injury. Copper devices attached to the fabric provide anchorage in the raggle.

Flashing Specifications

CORRELATIVE PROVISIONS APPLYING TO ROOF FLASHINGS

NOTE—*The construction of deck roofs, parapet walls, curbs, and other vertical surfaces upon or against which flashings are to be applied are not a part of the Roofing Contractor's work and are, therefore, not included in the USG Built-up Flashing Specifications. The following provisions, however, should be included as they apply under the proper heading of the specifications to be executed by others:*

ROOF DECK PROVISIONS—All provisions for the construction and finished condition of the various types of roof decks established under the heading "Correlative Provisions," pages 3 and 4, applying to "Built-up Roofing" shall apply likewise to "Roof Flashings."

FLASHING RAGGLES—The Masonry Contractor shall provide flashing raggles ½ in. wide by 1½ in. deep in all brick or concrete parapet walls, curbs, and other vertical walls above the roof deck surface in strict accordance with specifications established under this heading in "Correlative Provisions," page 4.

NOTE—*On saw-tooth and monitor curbs beneath the sash it is customary for the roofer to extend only the full thickness of the roofing up these inclined slopes without additional flashing reinforcement. While this construction is theoretically satisfactory, additional counter-flashing is needed over the roofing at these points to prevent damage by workmen performing the customary maintenance duties required over these particular sections of the roof.*

NOTE—*Where flashing raggles are to be provided in an existing wall, such as a party or parapet wall surrounding an old roof, the raggle can readily be cut by using a portable electric circular saw, substituting a carborundum disc for the steel saw blade. At re-entrant angles the raggles, obviously, will have to be raked out by hand.*

NAILING STRIPS—The Masonry Contractor shall provide permanent wooden nailing strips in all concrete parapet walls, curbs, or other vertical walls above the roof surface. Nailing strips are to be embedded in and flush with the face of the wall and located 1 inch below and parallel with the raggle groove in strict accordance with specifications established under this heading in "Correlative Provisions," page 4.

CANT STRIPS—Cant strips shall be provided by the General or Masonry Contractor at the junction of the roof deck with all vertical walls and curbs in strict accordance with specifications established under this heading in "Correlative Provisions," page 4.

GENERAL REQUIREMENTS

APPLYING TO APPLICATION OF ROOF FLASHING

The Roofing Contractor shall consult with the General and Masonry Contractors at the time parapet walls, curbs, and other vertical walls are being erected and shall furnish the General and Masonry Contractors with sufficient information as to proper location of flashing nailing strips and raggles to assure their proper location and construction in relation to saddles or crickets installed later to effect drainage.

The Roofing Contractor shall also examine all walls or curbs upon or against which roof flashings are to be applied. He shall determine that the walls or curbs are properly constructed, are smooth and free from sharp projections above or depressions in the plane of the wall or curb surface. He shall check the location and construction of flashing raggles and nailing strips to be certain that they are free from mortar, debris, and forming material and ready to receive the roof flashing. He shall notify the Architect of any defects he considers detrimental to the installation of the roof flashings and shall make sure that all defects are corrected before he begins work.

See Page 2 for New USG Complete Roof Service

BOND—The Roofing Contractor shall furnish a United States Gypsum Company Built-up Roof Flashing Endorsement attached to the United States Gypsum Company Guaranty Roof Bond as called for under specifications for Built-up Roofing.

NOTE—*The United States Gypsum Company will issue its Built-up Roof Flashing Endorsement not to exceed the term of the Guaranty Built-up Roof Bond in all localities of the United States where its inspection service is available and whenever USG Bonded Built-up Flashings Nos. 20F or 10F are installed in connection with any USG Bonded Built-up Roof. The roofing and flashings must be installed by a Roofing Contractor approved by the United States Gypsum Company in strict accordance with its Bonded Built-up Roof and Flashing Specifications and subject to the United States Gypsum Company inspection, acceptance, and approval.*

MATERIALS AND APPLICATION

USG Built-up Base Flashing

APPLYING TO SPECIFICATIONS NOS. 20F, 10F, 20M, 10FM

NAILS—Simplex flat head roofing nails or galvanized roofing nails driven through flat tin discs shall be used to secure the base flashings to the nailing strips or mortar joints in the wall. Nails shall be not less than 1½ in. long.

TEMPERATURE OF BITUMEN—Temperature of USG **(Coal Tar Pitch) (Asphalt)** shall never exceed 400 degrees Fahrenheit in the heating kettle.

GENERAL—All felt and fabric shall be laid without wrinkles or buckles.

All end laps of felt and fabric shall be not less than six (6) inches breaking joints in various plies.

All end laps of metal base and cap flashings shall be single or double lock seam construction.

NOTE—*Deck Roofing Felts have been extended to the top of the cant strip or on all vertical walls four (4) inches under the various specifications for Built-up Roofs.*

BASE FLASHING—Apply three (3) plies of USG **(Tar) (Asphalt)** Saturated Rag Felts weighing fifteen (15) pounds per one hundred (100) square feet, single thickness, embedded in individual moppings of hot USG **(Coal Tar Pitch) (Asphalt).** Felts shall be applied in hot bitumen in separate strips not more than ten (10) feet in length and in unbroken widths extending from the lower edge of the raggle, down the wall, across the face of the cant strip, and out over and joined to the deck roofing in feathered edge construction. The first ply shall be extended out on the deck roofing not less than two (2) inches beyond the toe of the cant strip. The second and third plies shall both be extended not less than three (3) inches beyond the toe of the cant strip.

The base flashing felts shall be nailed at the top every eight (8) inches **(in the horizontal or vertical mortar joints) (to the wood nailing strip)** immediately below the raggle groove.

The exposed edge of the third or top ply of the base flashing extending out on the deck roofing shall be covered and additionally reinforced with a strip of felt not less than six (6) inches wide thoroughly and firmly embedded in and top coated with hot bitumen.

• • •

Specification No. 20F

USG 20-YEAR BONDED FABRIC COUNTER-FLASHING

(FOR DETAIL, SEE PAGE 41)

The counter-flashing shall extend from the raggle, down the wall, across the face of the cant strip and out over the deck roofing not less than two (2) inches.

Install USG 2 Ply Mineral Surfaced Extra Heavy Fabric Counter-flashing by bending the copper fastening device and inserting it full depth into the raggle in such manner that the flat base of the copper fastener shall set flush upon the lower lip of the raggle and the prongs on the upper section of the copper fastener shall make permanently tight contact with the upper lip of the raggle.

Completely fill the raggle groove with USG Plastic Roof Cement forced or pressed into the groove with a trowel or wooden paddle.

The unattached flaps or sections of the counter-flashing shall be carefully lifted to permit a complete uniform mopping of hot bitumen to be applied over the surface of the underlying base flashing and between the two plies of the fabric counter-flashing. Into these moppings, while hot, the individual plies of the fabric counter-flashing shall be pressed and embedded so that at no point shall fabric touch felt or fabric touch fabric.

See Page 2 for New USG **Complete** Roof Service

Specification No. 10F

USG 10-YEAR BONDED FABRIC COUNTER-FLASHING

(FOR DETAIL, SEE PAGE 41)

The counter-flashing shall extend from the raggle, down the wall, across the face of the cant strip and out over the deck roofing not less than two (2) inches.

Install USG 1 Ply Mineral Surfaced Extra Heavy Fabric Counter-flashing by bending the copper fastening device and inserting it full depth into the raggle so that the flat base of the fastener shall set flush upon the lower lip of the raggle and the prongs on the upper section of the fastener shall make tight contact with the upper lip of the raggle.

Completely fill the raggle groove with USG Plastic Roof Cement forced or pressed into the groove with a trowel or wooden paddle.

The unattached flap or section of the counter-flashing shall be carefully lifted to permit a complete uniform mopping of hot bitumen to be applied over the surface of the underlying base flashing. Into this mopping, while hot, the fabric counter-flashing shall be pressed and embedded so that at no point shall fabric touch felt.

Specification No. 20M

METAL BASE and CAP-FLASHING

(FOR DETAIL, SEE PAGE 41)

Install a **(16 oz. cold rolled copper) (specify metal)** metal base flashing in strips not more than ten (10) feet long and in unbroken widths extending from the lower edge of the raggle, down the wall, across the face of the cant strip, and out over the deck roofing not less than four (4) inches. Metal base flashing shall be set and firmly embedded in a mopping of hot USG **(Coal Tar Pitch) (Asphalt)** and nailed to the roof deck every eight (8) inches. The full width of the edge on the deck roofing and the nails shall be covered with two (2) strips of **(Tar) (Asphalt)** saturated felt not less than eight (8) inches wide embedded in and top coated with a complete mopping of hot bitumen.

A **(16 oz. cold rolled copper) (specify metal)** Metal Cap-Flashing with a four (4) inch exposed apron, having a hemmed edge at the bottom, shall be installed and securely anchored in the raggle.

Completely fill the raggle groove with USG Plastic Caulking Compound forced or pressed into the groove with a trowel or wooden paddle.

NOTE—*A Through Wall Flashing with a four (4) inch exposed apron, having a hemmed edge at the bottom, may be substituted for the cap-flashing set in a raggle above specified.*

Specification No. 10FM

FELT ROOFING BASE and METAL CAP-FLASHING

(FOR DETAIL, SEE PAGE 41)

Apply one (1) ply of 75 lb. USG Mineral Surfaced Roofing embedded in a uniform mopping of USG **(Coal Tar Pitch) (Asphalt).** The mineral Surfaced Roofing Base Flashing shall be applied in strips not more than ten (10) feet in length and in unbroken widths extending from the lower edge of the raggle, down the wall, across the face of the cant strip and out over the deck roofing not less than six (6) inches. The Mineral Surfaced Base Flashing shall be nailed at the top every eight (8) inches **(in the horizontal or vertical mortar joints) (to the wood nailing strip)** immediately below the raggle groove. This may be done at the same time that the underlying felt base flashing is nailed.

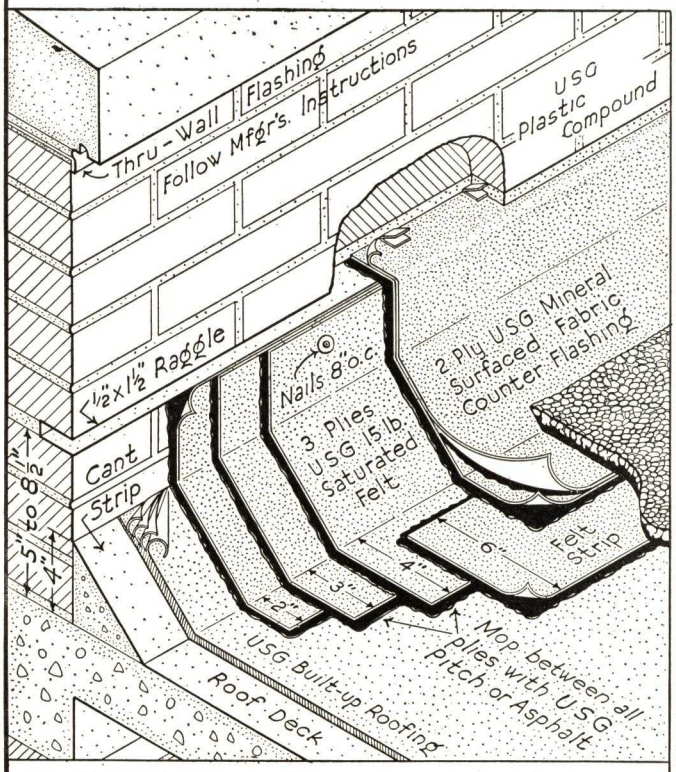
A **(16 oz. cold rolled copper) (specify metal)** Metal Cap-Flashing with a four (4) inch exposed apron, having a hemmed edge at the bottom, shall be installed and securely anchored in the raggle.

Completely fill the raggle groove with USG Plastic Roof Cement forced or pressed into the groove with a trowel or wooden paddle.

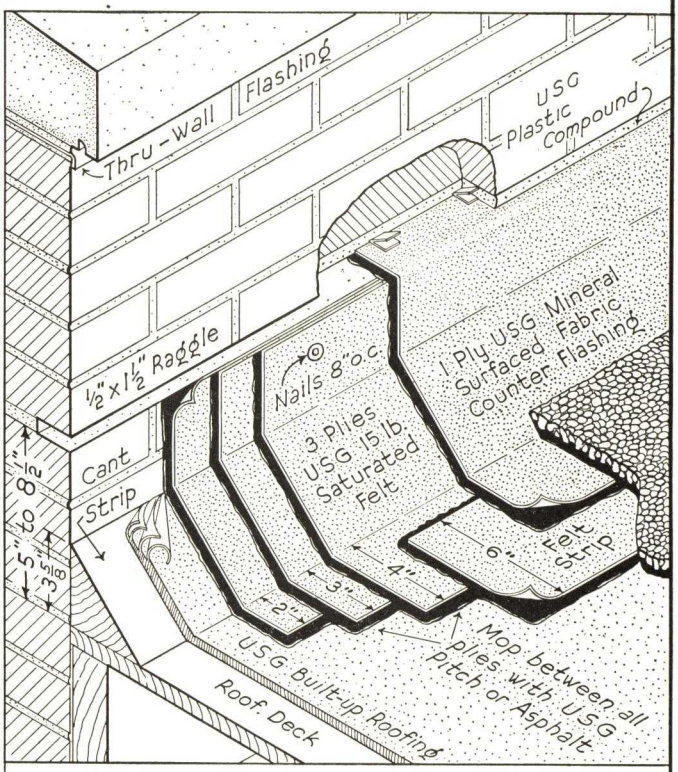
NOTE—*A Through Wall Flashing with a four (4) inch exposed apron, having a hemmed edge at the bottom, may be substituted for the cap-flashing set in a raggle above specified.*

See Page 2 for New USG **Complete** Roof Service

USG FLASHING DETAILS



SPECIFICATION NO. 2OF USG 20 YEAR BONDED FABRIC COUNTER FLASHING



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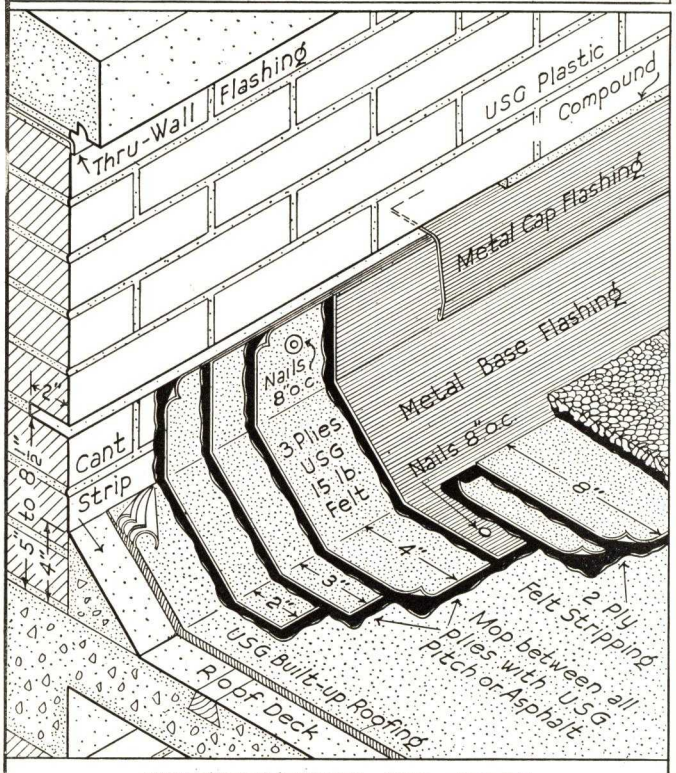
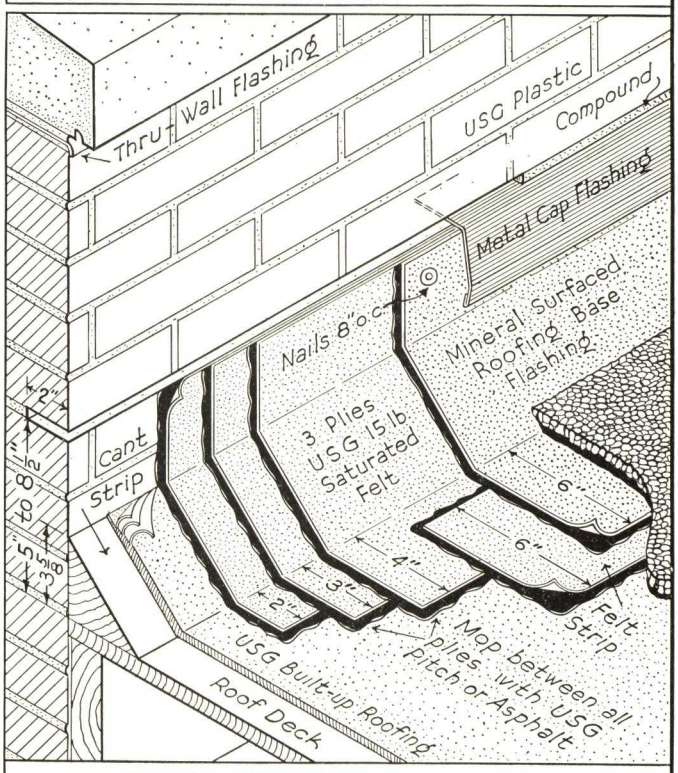


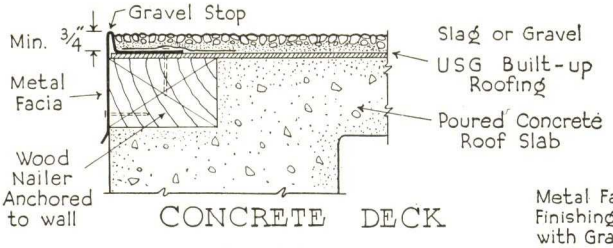
SPECIFICATION NO 2OM METAL BASE AND CAP FLASHING



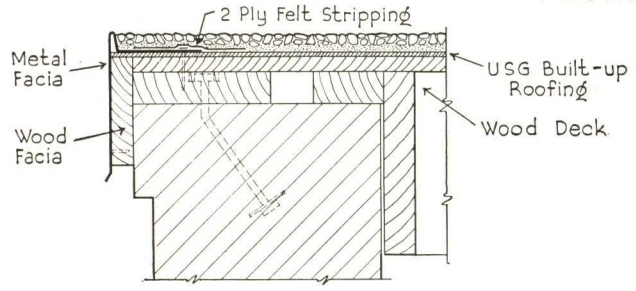
SPECIFICATION NO. 1OFM FELT BASE - METAL CAP FLASHING

See Page 2 for New USG Complete Roof Service

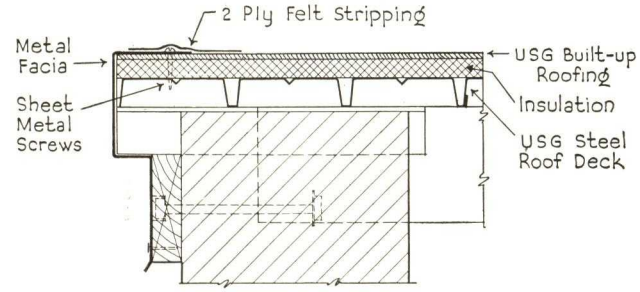
USG FLASHING DETAILS



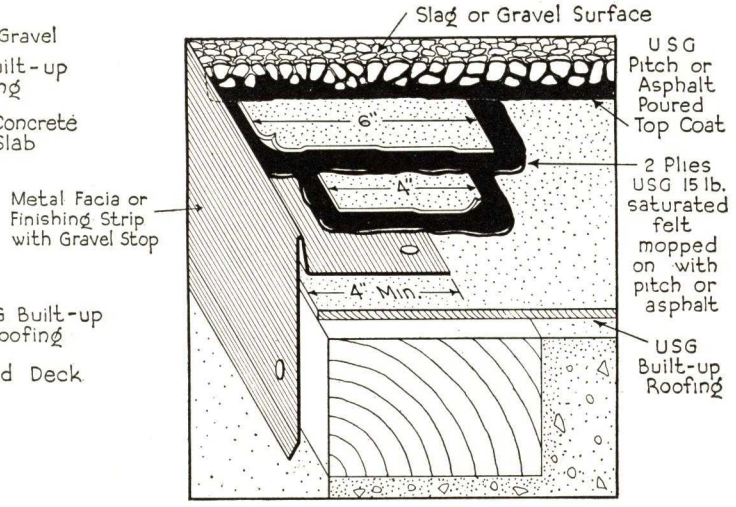
CONCRETE DECK



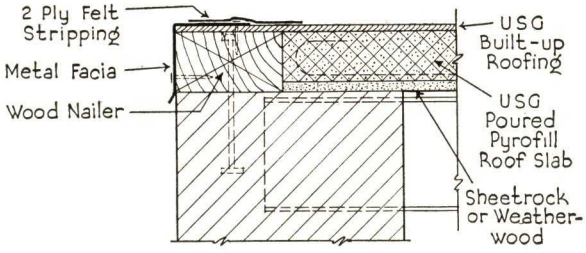
WOOD DECK



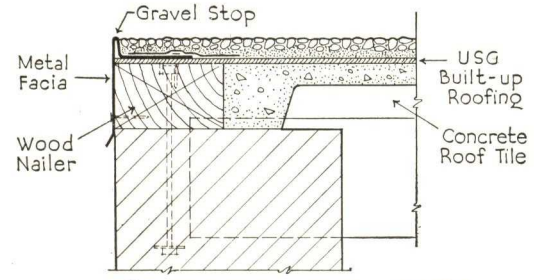
METAL DECK



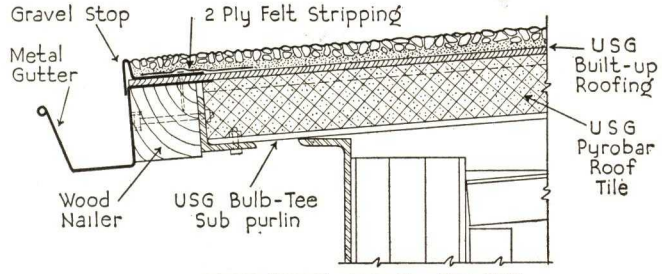
DETAIL OF METAL FACIA SHOWING 2 PLY FELT STRIPPING



POURED GYPSUM DECK

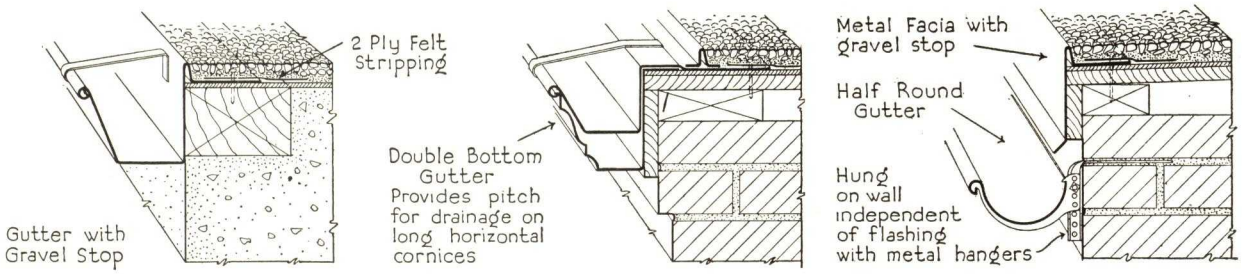


CONCRETE TILE DECK



GYPSUM TILE DECK

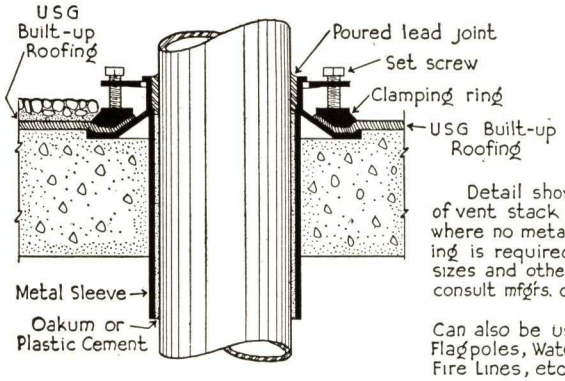
DETAILS OF ENDS AND EAVES OF VARIOUS TYPES OF ROOF DECKS



GUTTER DETAILS

See Page 2 for New USG **Complete** Roof Service

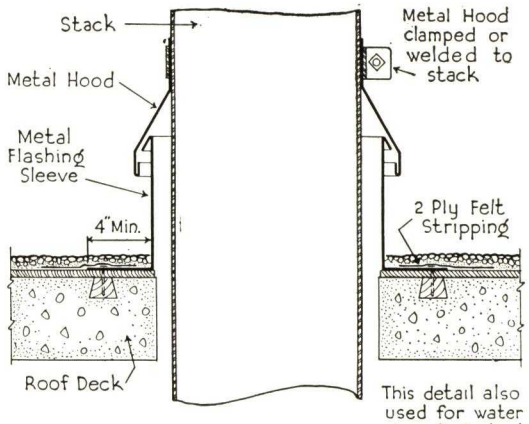
USG FLASHING DETAILS



Detail shows type of vent stack sleeve where no metal flashing is required. For sizes and other types consult mfgrs. catalogs.

Can also be used for Flagpoles, Water Pipes Fire Lines, etc.

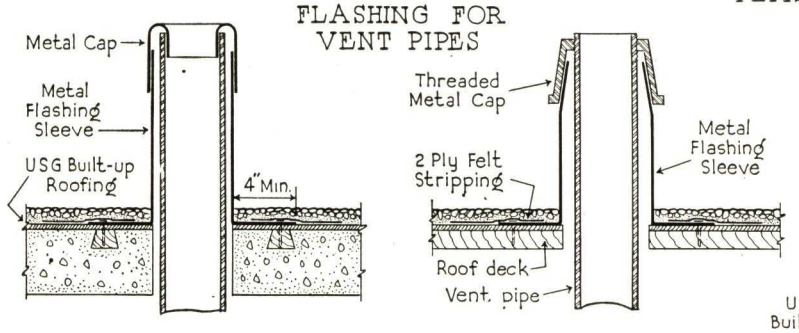
VENT STACK SLEEVE

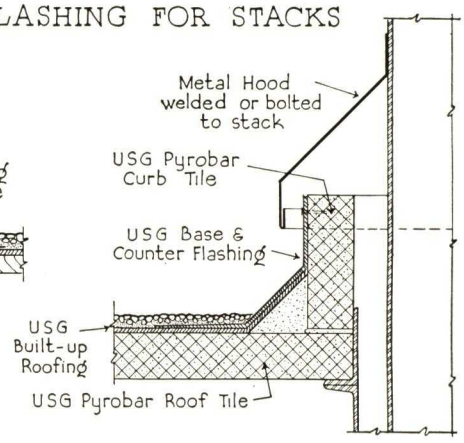


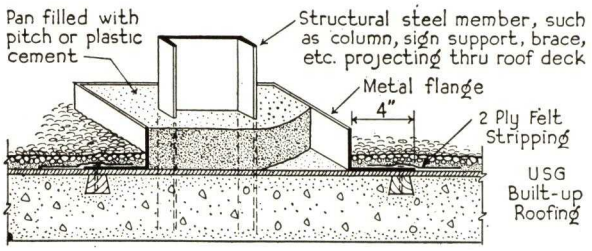
This detail also used for water pipes, flagpole, etc.

FLASHING FOR STACKS

FLASHING FOR VENT PIPES



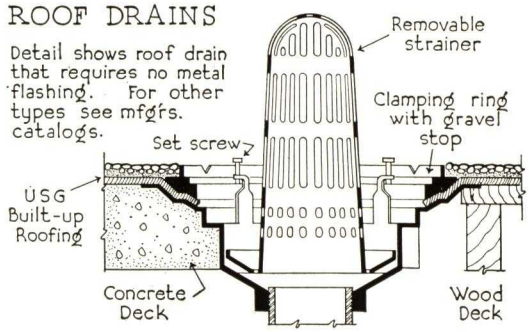


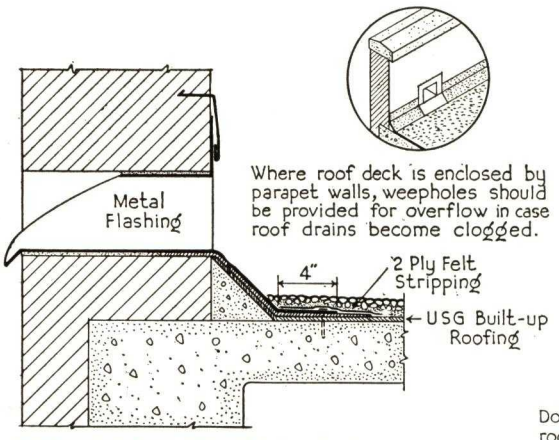


FLASHING FOR STRUCTURAL MEMBERS

ROOF DRAINS

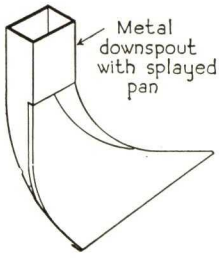
Detail shows roof drain that requires no metal flashing. For other types see mfgrs. catalogs.





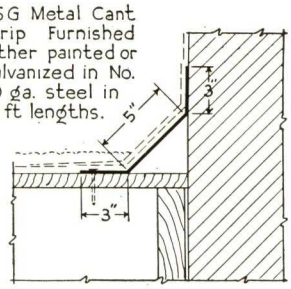
Where roof deck is enclosed by parapet walls, weepholes should be provided for overflow in case roof drains become clogged.

WEEPHOLE IN PARAPET WALL



Downspouts emptying on gravelled roofs should have splayed outlets to spread force of water.

USG Metal Cant Strip Furnished either painted or galvanized in No. 20 ga. steel in 8 ft lengths.



METAL CANT STRIP

See Page 2 for New USG Complete Roof Service

USG ROOFING PRODUCTS

In addition to the USG Built-up Roofing materials described in previous pages, USG manufactures a complete line of Asphalt Roofing Products, including strip and individual shingles, smooth and mineral surfaced roll roofings, sheathing and building papers, roof coatings and cements.

FOR EVERY TYPE OF BUILDING

USG Roofing Products are adaptable for use on every type of building. For residences, USG Asphalt Shingles are available in a wide variety of types, sizes, weights, and colors to meet the specific requirements of both traditional and modern architecture. Also available for homes, barns, sheds, and other buildings of either permanent or temporary construction are many types of mineral surfaced and smooth roll roofings, all of which efficiently protect the types of structures for which they were designed.

FIRE RESISTANT

USG Asphalt Shingles are made of mineral granules, firmly cemented to a tough felt base by waterproof asphalt. Sparks from chimneys or flying embers from other buildings falling on roofs of this type burn themselves out before any damage is done. USG Asphalt Shingles carry the Class "C" label of the Underwriters' Laboratories, Inc. as proof of their fire resisting qualities. Insurance companies in most states offer lower rates on the entire insured valuation when buildings are protected with an asphalt shingle roof instead of those types that do not prevent or reduce losses under fire insurance policies.

IN EVERY DESIRABLE COLOR

No type of shingle lends itself so well to the use of color as does the asphalt shingle. The wide variety of colors and blends available provides every opportunity for architects to select a color for the roof that will harmonize perfectly with any exterior decorative plan. The exacting demands of clients find lasting satisfaction in the colorful beauty of USG Asphalt Shingles.

ENDURING QUALITY

USG operates its own mills for the manufacture of all roofing products, and the same high quality that has distinguished all USG products in the building materials field will be found in the USG roofing line. Years of manufacturing experience and contacts with every phase of the building industry have developed standards that are reflected in the continuous patronage of architects and builders and the complete satisfaction of owners. Important to everyone interested in building is the fact that the enduring quality of USG Asphalt Shingles is obtained without excessively increasing their weight, and USG Asphalt Shingle Roofs, therefore, do not require costly roof structures to support them.

AVAILABLE EVERYWHERE

USG roofing mills are located to provide prompt delivery to every part of the country. Established dealers throughout the United States are qualified by their complete understanding of roof requirements to render quick and efficient service.

USG ASBESTOS CEMENT SHINGLES AND SIDING

USG also manufactures a complete line of Asbestos Cement Shingles and Siding. Fireproof, maintenance free, and of extreme long life, there are no restrictions on their use in any city where they are available. Made in many attractive colors and having a texture that duplicates the natural characteristics of wood, these extremely popular roofing and siding shingles greatly increase the charm and beauty of any building on which they are used.

See Page 2 for New USG ***Complete*** *Roof Service*

SALES OFFICES

Atlanta, Ga. . . . . 1440 Citizens and Southern Bank Bldg.
Baltimore, Md. . . . . Standard Oil Bldg.
Birmingham, Ala. . . . . 1201 Comer Bldg.
Boston, Mass. . . . . 731 Statler Office Bldg., 20 Providence St.
Buffalo, N. Y. . . . . 514 Brisbane Bldg.
Cincinnati, Ohio . . . . . 3015 Carew Tower
Cleveland, Ohio . . . . . 627-629 Hanna Bldg.
Dallas, Tex. . . . . 1301 Santa Fe Bldg.
Denver, Colo. . . . . Continental Oil Bldg.
Detroit, Mich. . . . . (At Mill) River Rouge, Mich.
Houston, Tex. . . . . 4616 Main St.
Indianapolis, Ind. . . . . 815 Architects' and Builders' Bldg.
Kansas City, Mo. . . . . 438 Ward Parkway
Los Angeles, Calif. . 507 Architects Bldg., 5th St. at Figueroa
Milwaukee, Wis. . . . . (At Mill) 439 W. Oregon St.
Minneapolis, Minn. . . . . 1308 Foshay Tower
New York, N. Y. . . . . 30 Rockefeller Plaza
Omaha, Neb. . . . . 312 Woodmen of the World Bldg.
Philadelphia, Pa. . . . . 1616 Walnut St.
Pittsburgh, Pa. . . . . 712 Grant Bldg.
Portland, Ore. . . . . 706 Spalding Bldg.
St. Louis, Mo. . . . . 806 Louderman Bldg.
San Francisco, Calif. . . . . 2501 Harrison St.
Washington, D. C. . Investment Bldg., 15th and K Sts., N. W.

Samson Plaster Board Company
Sales Agents for United States Gypsum Company
Crosby Building, Buffalo, N. Y.

●

ROOFING PLANTS

Jersey City, N. J. North Tonawanda, N. Y.
South Bend, Ind. St. Paul, Minn.
South Gate (Los Angeles), Calif.

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SECTION 6

CONTINUED ⟶

BIRD & SON, inc.

Manufacturers of Bird Asphalt Shingles and Siding

MILLS AND GENERAL OFFICES
EAST WALPOLE, MASS.

CHICAGO OFFICE AND PLANT: 1472 West 76th Street — NEW YORK OFFICE: 295 Fifth Ave.
SHREVEPORT, LA., Office and Plant: Aero Drive
CANADA: Building Products Ltd., HAMILTON, ONT., MONTREAL, QUE.

For Catalog on Built-up Roofing and Flashings, see File Index

QUALITY HIGHLIGHTS OF BIRD SHINGLES AND SIDING

Specially Prepared Felt

The felt used in Bird roofing is made by a special felting machine and the fibres are actually felted, allowing the felt to be thoroughly saturated.

Complete Saturation

The Immersion Process used in saturating Bird Felt permits 190% to 200% saturation, well above Underwriters' Laboratory Specifications. A completely saturated felt is essential because this is the foundation on which the roofing is built.

Special Shatter-Resistant Coating

This quality is obtained by special preparation of the coating asphalt and gives a more workable and durable product.

Every Granule Firmly Embedded

The Mineral granules used in surfacing Bird shingles and sidings are thoroughly cleaned and primed with oil to assure a firm embedding of every granule. This firm embedding gives better appearance and greater durability.

Durable Color

Because of particular selection and Bird controlled coloring process, all surfacing granules used in Bird shingles are durable.

Wide Distribution

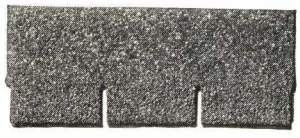
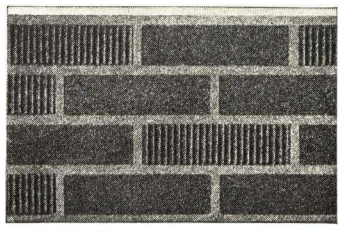
Bird Shingles, Sidings, and Building Materials are stocked in all parts of the United States, east of the Rocky Mountains, by reputable dealers.

Climatic Resistance

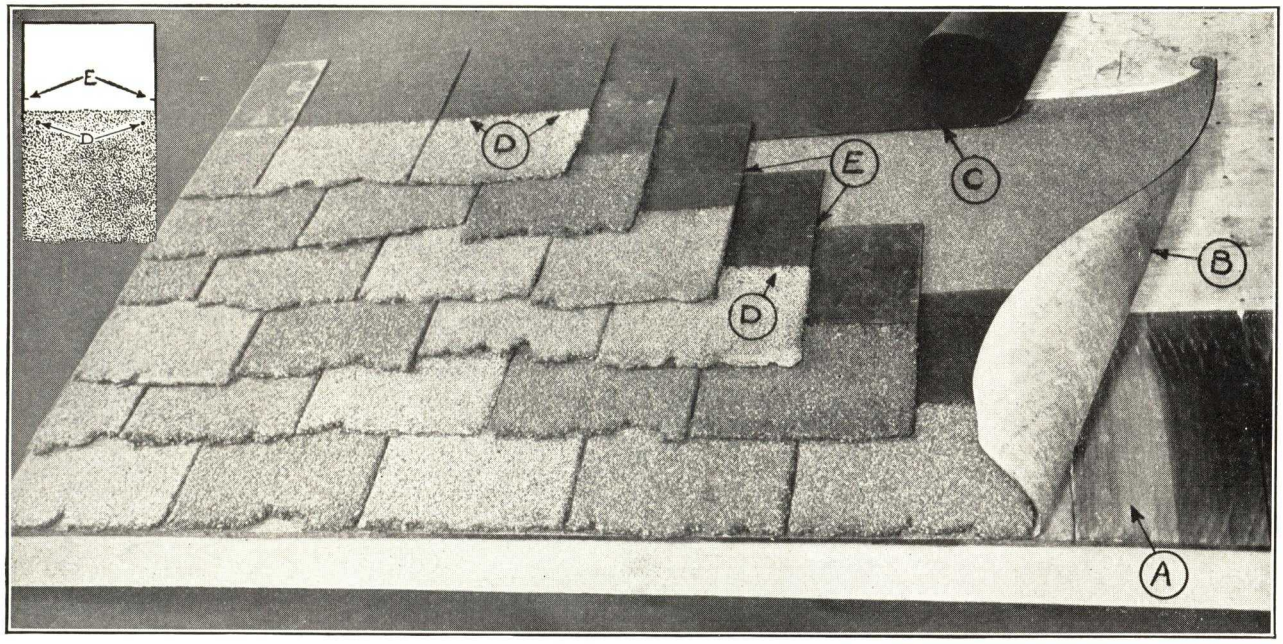
Bird Asphalt Slate Surfaced Shingles and Siding will meet every climatic resistance.

High, low, and extraordinary temperature changes will not impair their protective efficiency, beauty, and durability.

TYPES AND SPECIFICATIONS OF BIRD ASPHALT SHINGLES THAT ARE OF SPECIAL INTEREST TO ARCHITECTS

Name	Shape of Shingle	Color	Size, in.	Approx. Wt., lbs.	No. Shingles per sq.	Head Lap, in.	Exposure, in.
CUSTOM BUILT SHINGLES		Slate Blend, a blend of soft colors like hand hewn slate. Made to order in any colored granules regularly available.	12x18	400	172	4	7
WEATHER-TEX 3 in 1 Thick Butt SHINGLES		Green Dura Green Slate Blende	12x36	210	80	2	5
SPECIAL 3 in 1 Thick Butt SHINGLES		Bright Red, Green, Dura Green, Black, Russett Glo, Slate Blende, Sunset Blende, Mt. Green Blende.	15x36	251	80	5	5
INSULATED BRICK SIDING		Bright Red White Mortar Blende B. White Mortar	12 wide 8½ ft. long	194	12		
		An exterior finish of brick design with a ½ in. of insulating board.					
NEPONSET BLACK BUILDING PAPER		Saturated and coated. 500 sq. ft. to roll.	36 wide	50			
		A sheathing paper standard with Architects for years.					

BIRD CUSTOM BUILT SHINGLES



General Appearance and Method of Laying

The points as outlined below and illustrated above should be followed to insure a tight roof:

A. At eaves lay a course of wooden shingles extending over facia board ⅜ in.

B. Directly over the starter course of wooden shingles lay a 36-in. strip of Bird Black Slate Surfaced Roofing.

C. We recommend that a layer of Bird Neponset Black Waterproof Building Paper be laid horizontally and lapped not less than 2 in. beneath all shingles.

D. Nail shingles through the two holes provided.

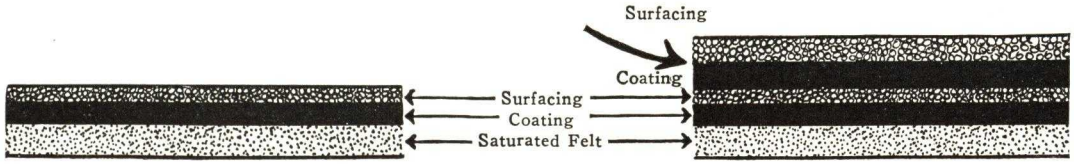
E. The marker on the edge of the shingles when lined up with the top of the underlying shingle will give 7-in. exposure.

General Description of Bird Custom Built Shingles

The massive butts and irregular edges of Bird Custom Built Shingles give a distinctive touch which greatly adds to the beauty of the roof. Each shingle is hand made by a skilled craftsman, assuring extraordinary construction, durability, and beauty.

BIRD THICK BUTT SHINGLES

Have Additional Layers of Real Protection



Cross Section of Ordinary Shingle Construction

Cross Section of Bird Thick Butt Construction

Advantages of Bird Thick Butts

1. Added life because there are double layers of asphalt and surfacing mineral on the exposed portion.

2. Added beauty because the black background showing through the cut-outs more clearly defines the units of color and gives deeper shadow effects.

3. Added weight and massiveness where most needed.

4. Added fire resistance because of extra mineral.

5. Added thickness of butt makes them conform better to roof deck.

6. Added protection because the extra weight on exposed portion holds them firmly in place.

Special Treatment of Mineral

The mineral used in the surfacing of Bird Shingles is specially treated with a low volatile, free flowing, colorless oil. This oil application cleans and primes the granule, thereby allowing a perfect bonding with the asphalt coating. The mineral is then heated to insure firm embedding in the asphalt coating.

"Shatter-Resistant" Coating

The coating asphalt used in Bird Shingles to seal the saturated felt base and hold the mineral surfacing in place is so treated that it is rendered "Shatter-Resistant." This makes Bird Shingles easier to handle in cold weather and more durable because the ice forming on them will not tear off the mineral surfacing as it melts and slides down the roof.

This special process permits the application of a greater percentage of mineral surfacing. This accounts for the famous "Shatter-Resistant" coating, well known in Bird Thick Butt Shingles.

SERVICISED PRODUCTS CORPORATION

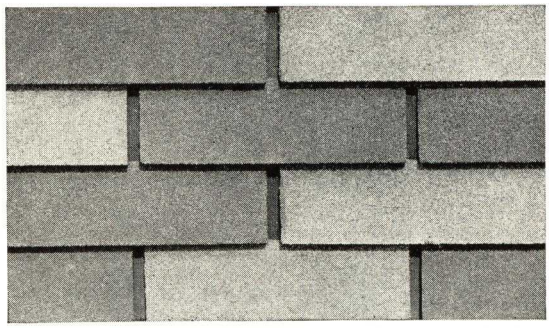
Custom Built Roofing
6051 West 65th Street
CHICAGO, ILL.

For Servicised Rubber Tile Flooring, Greenhouses and Industrial Flooring, see File Index

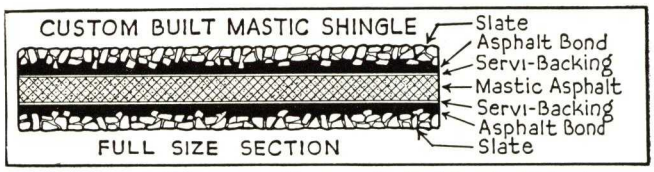
DISTINCTIVE AND EXCLUSIVE CUSTOM BUILT ROOFING

Our roofings are designed for the discerning home owner and those who want something different—not just another roof—but a distinctive, individual roof which will enhance the beauty of the artistic house in its setting.

Servicised Custom Built Roofing is created by the use of special fibrated bituminous materials, carefully selected and blended under patented formulae. The result is a resilient material, waterproof by nature, free from cracking, checking and will not "alligator." In addition to these undeniable advantages, it is not subject to decay, and general deterioration. Vermin, termites and the like have no effect on the material. Actual tests prove the material retains its perfect character even submerged in water—the proof of absolute water protection.



Actual Photograph of 12 x 18 In. Individual Custom Built Mastic Shingle. Note the Heavy Shadow Effect and the Truly Massive Appearance

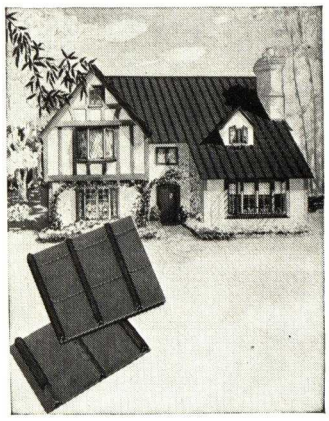


Condensed Data on Custom Built Mastic Shingle

Standard size—12x18 in., approximately ⅜ to 7/16 in. thick; 500 lbs. per square; multiple color selections; head lap 6 and 4 in.; exposure 6 and 7 in.; 172 to 200 units per square.

Special Japanese Design

Another exclusive deluxe Servicised Product. This unusual effect is produced with a heavy mastic strip material prepared as an underlay, over which individual strips are applied. These cover all "exposed nails" insuring long trouble-free service.



Japanese Shingle

Ragged Butt Shingles

Ragged Butt Shingles are the giant individual type designed for the finest type homes. Give the appearance of broken edge slate and laid with either five or seven inch exposure. Ideal when there is a desire to create a rugged continental effect.

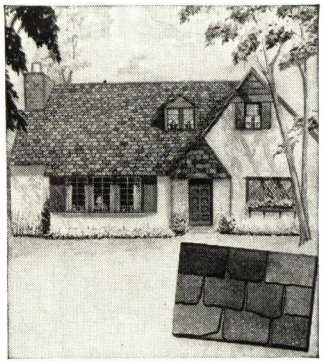
Service

Our engineers and research technicians will cooperate with Architects, Engineers and Contractors on any problem and the development of new ideas. Address Servicised Products Corporation, Roofing Department, 6051 West 65th Street, Chicago, Illinois.

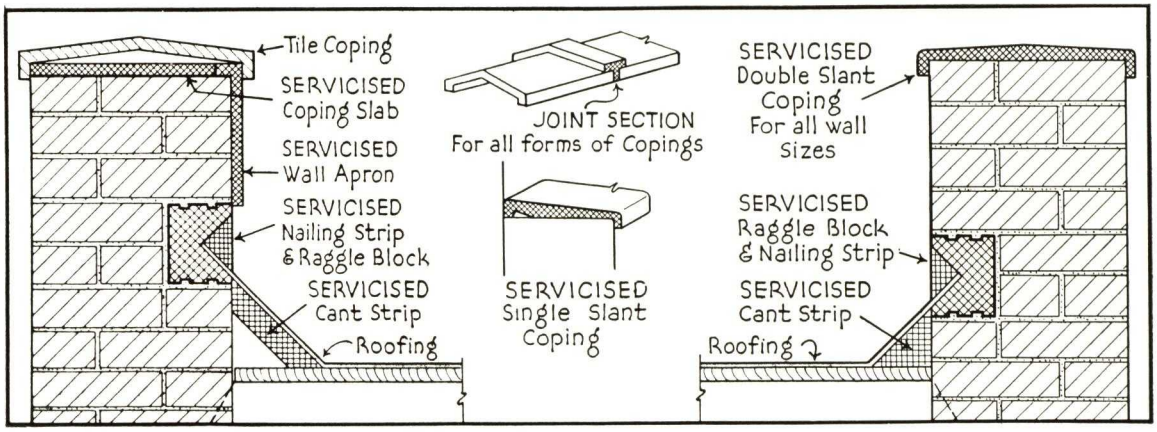
Other Products

Illustrated below are a few miscellaneous roof construction items, all of which have been tested and approved for long service and make for perfect hermetic roof seals.

We also recommend asphalt lath either standard or tapered for flashings and to prepare houses for asphalt or asbestos siding.



Ragged Butt Shingle



PRODUCT DATA

FLINTKOTE

ASPHALT *and* ASBESTOS SHINGLES *and* SIDINGS · BUILT-UP ROOFING · ROLL ROOFING ROCK WOOL *and* BOARD INSULATION

FLINTKOTE ASPHALT • •

Flintkote Asphalt Shingles

The chart on this page describes the four major types of Asphalt Shingles that are available and gives comparative information concerning them.

Asphalt Shingles are made of:

(1) FELT, a durable fabric that forms their foundation.

(2) A SATURANT of asphalt, the waterproofing agent which penetrates the felt and forms a protective coating around the fibres.

(3) A COATING of specially prepared asphalt on top and back that seals in the saturant and makes the Shingle weatherproof.

(4) A SHIELD of weather and fire resistant colored minerals firmly imbedded in the outer coating, which combines beauty with safety and forms the final protection against the weather.

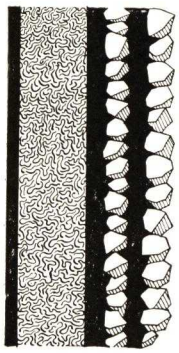
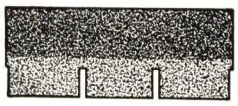
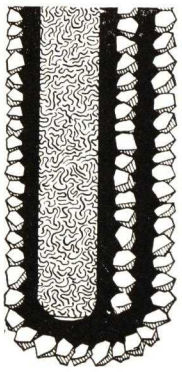
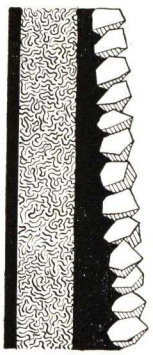
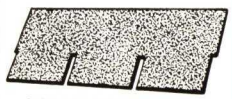
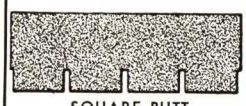
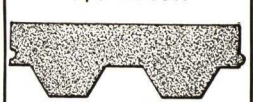
Flintkote Products

Asphalt Shingles and Siding
Asbestos Shingles and Siding
Built-Up Roofing
Roll Roofing
Rock Wool Insulation
Insulation Board
Hard Board
Asphalt Emulsions
Protective Coatings
(See File Index)

Sales Offices

NEW YORK, N. Y......50 W. 50th St.
ATLANTA, GA.....1215 Sylvan Rd., S.W.
BOSTON, MASS...826 Park Square Bldg.
CHICAGO, ILL....624 So. Michigan Ave.
DETROIT, MICH....14201 Schaefer Hwy.
NEW ORLEANS, LA......
.....Poland and Galvez St.
WACO, TEX......Superior Life Bldg.

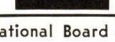
Products of the same high quality are sold by the Beckman-Dawson Roofing Company and Richardson Roofing, affiliates of The Flintkote Company.

Types and Descriptive Data	Product	
 **THIKBUT SHINGLES** The drawing at the left is a cross section of the butt of a *Thikbut* Shingle. Thikbut Shingles are standard shingles that have an extra protective coating of asphalt and an additional surfacing of mineral thus providing twice as much material on the exposed portion of the shingle. This is the most satisfactory and economical type of Asphalt Shingle.	12 IN. THICKBUT  15 IN. THICKBUT	**Strips** 12 in. Thikbut 15 in. Thikbut ▲
 **SETAB SHINGLES** The drawing at the left is a cross section of the butt of a *Setab* Shingle. Setab Shingles are standard shingles that have been hand dipped in asphalt and minerals thus completely sealing the felt at the exposed edge.	STANDARD SETAB TAPERED SETAB	**Strips** Standard Tapered Setab †
 **TAPERED SHINGLES** The drawing at the left is a cross section through the butt of a *Tapered* Shingle. Tapered Shingles are standard shingles with a tapered coating of asphalt on the exposed side of the shingle thus providing extra thickness at the butt.	TAPERED  WINTHROP TAPERED	**Individuals** Tapered ★ † ▲ **Strips** Winthrop Tapered †
STANDARD SHINGLES The drawing at the left is a cross section through the butt of a *Standard* type of shingle. Standard Shingles are composed of one layer of felt saturated with asphalt and surfaced on the top surface with fire resisting materials.	SUPER GIANT  SQUARE BUTT  SPECIAL HEXAGON	**Individuals** Dutch Lap Super Giant **Strips** 10 in. Square Butt 12½ in. Square Butt ▲ 12 in. Giant Square Butt † ▲ 11⅓ in. Spec. Hexagons 12⅓" Spec. Hexagons ⊙ ▲

★ Not available in East.
† Not available in South.
⊙ Not available in Middlewest.
▲ Not available in Pacific Coast Zone.

*Subject to change without notice.

• • SHINGLE PRODUCT DATA*

Dimensions Inches	Shingles Per Sq.	Bundles Per Sq.	Aver. Approx. Wt.	Underwriters' Label**	Headlap Inches	Exposure Inches	Relative Cost Material Only (See Footnote)	Colors (Note: Numerals refer to color reproductions on rear cover)
12 x 36	80	3	210#	"C"	2	5		Blue Black (2), Tile Red (3), Clover Green (7), Mottled Red (1), Mottled Green (8), Mottled Gray (4).
15 x 36	80	3	250#	"C"	5	5		Blue Black (2), Tile Red (3), Clover Green (7), Mottled Red (1), Mottled Green (8).
12 x 36	80	3	230#	"C"	2	5		Blue Black (2), Tile Red (3), Clover Green (7), Canyon Red (1), Canyon Green (8), Canyon Brown (5), Canyon Gray (4), Georgian Green (8).
12 x 36	80	4	355#	"C"	2	5		
10 x 13½	300	4	360#	"C"	4½	4½		Blue Black (2), Tile Red (3), Clover Green (7), Green (6), Antique Brown, Slate Blend (4), Red Blend (1), Green Blend (8).
12 x 36	80	3	275#	"C"	2	5		Blue Black (2), Tile Red (3), Clover Green (7), Green (6), Warm Blend (1), Kool Blend (8).
12 x 16	113	2	162#	"C"	2	10 x 13		Blue Black (2), Tile Red (3), Clover Green (7), Green (6), Antique Brown, Red Blend (1), Green Blend (8), Dusk Blue.
12 x 16	226	4	325#	"C"	6	5		
10 x 36	100	2	210#	"C"	2	4		Blue Black (2), Tile Red (3), Clover Green (7), Green (6), Warm Blend (1), Kool Blend (8).
12½ x 36	100	3	266#	"C"	4½	4		
12 x 36	80	3	257#	"C"	2	5		Blue Black (2), Tile Red (3), Clover Green (7), Green (6), Spring Blend (8), Autumn Blend (1).
11⅓ x 36	86	2	167#	"C"	2	4⅔		
12⅓ x 36	86	2	186#	"C"	3	4⅔		

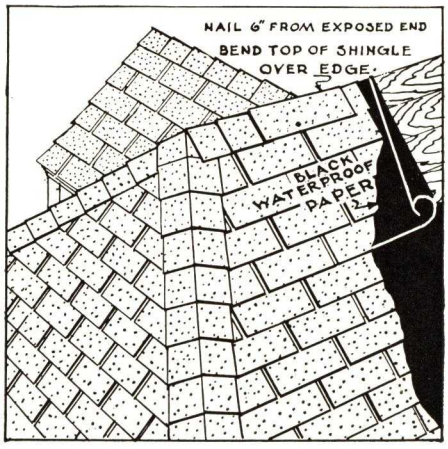
**All products listed above carry the approved Class "C" Label of the National Board of Fire Underwriters.

NOTE—The graphs in the "Relative Cost" column above represent the relative sales prices of material only. Labor costs are not included. The longer the line, the more expensive the product.

ASPHALT SHINGLES • • •

General Information

Asphalt shingles must be applied on slopes having an incline of 4 in. or more to the foot. Asphalt Saturated Felt or Black Waterproof Paper should be applied over the deck before applying shingles. Only well seasoned boards of narrow width and uniform thickness should be used. While plaster is drying, adequate ventilation in the building should be provided to prevent warpage or swelling of roof sheathing. Chalk lines should be established from ridge to eaves and across roof to assure proper exposure and alignment of shingles. Shingle cutouts may be broken in thirds or halves. As with all quality materials good performance depends upon proper application, therefore, the detailed application Directions included in each square of shingles should be followed.



HIPS AND RIDGES

Individual shingles of the same color should be used to cover all hips and ridges, applied in overlapping manner (Boston style) with not more than 5 in. exposed, and nailed 6 in. from the exposed edges on each side of hip or ridge. No nails should be exposed. Shingles should be warmed in the sun before bending over ridges. If individual shingles of the same color are not available, strip shingles may be cut into individuals and used. The exposed portion of the shingles should be applied away from prevailing winds.

VALLEYS

Valleys should be laid with two thicknesses of mineral surfaced roofing, one 9 in. wide with another 18 in. wide on top, applied before shingles are laid so that shingles will overlap valleys. Shingles should be trimmed to leave a trough 6 in. wide at the ridge and 8 in. wide at the eaves, and nailed 2 in. apart and 1 in. from the valley with all nail heads covered with Flintkote Plastic Fibrated Cement. Shingles should be sealed to valleys with Flintkote Plastic Cement applied in ribbons 2 in. wide. Chimneys, dormers, skylights, etc., should be flashed with prepared roofing and Flintkote Plastic Fibrated Cement. Flashings should extend well under shingles. All counter flashings should be of metal.

EAVES AND STARTERS

On all eaves a galvanized iron drip edge 12 in. wide, painted on both sides should be applied. Over this, 18 in. mineral surface Roll Roofing should be applied as a starter course, flush with eave. It should be nailed at 24 in. intervals along eave about 3 in. from edge. Shingles may then be applied as specified in the direction sheets.

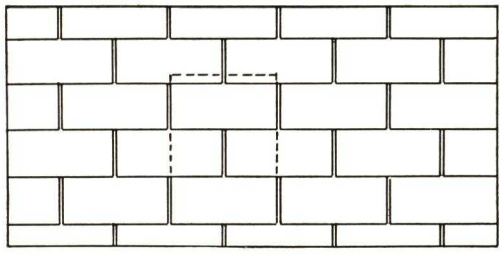
• • • APPLICATION AND DETAILS

Individuals

There are three common methods employed in applying individual shingles—the American Method, the Wide Space Method, and the Dutch Lap Method. All methods make a good roof, but differ in appearance and life. (The drawings explain the appearance and method of application.) 1½ in. x 12 gauge galvanized iron nails with 7/16 in. heads should be used.

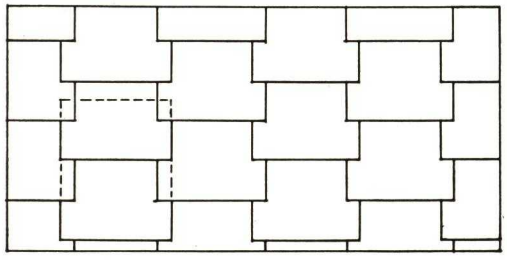
AMERICAN METHOD

The American Method illustrated at the right is the most commonly used. While the American Method is the most pleasing in appearance, it required the maximum amount of material. Requires 3 lbs. of nails per square.



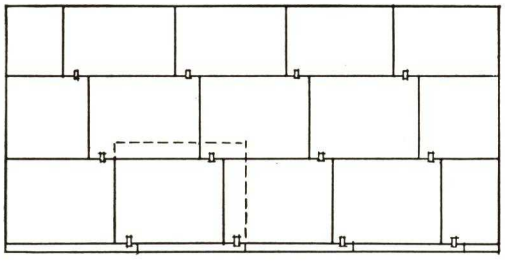
WIDE SPACE METHOD

The Wide Space Method shown at the right, while less pleasing in appearance, assures a safe roof and uses only two-thirds as much material. Requires 2¼ lbs. of nails per square.



DUTCH LAP METHOD

The Dutch Lap Method is the most economical since it requires only one-half as much material as the American Method. This method requires the use of copper clips under one corner and has a head lap of 2 in. and a side lap of 3 in. Requires 1½ lbs. of nails per square.

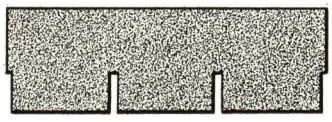


Strip Shingles

Strip Shingles are 36 in. long and vary in width from 10 to 15 in. and comprise three (and sometimes four) shingles in one piece of material. These naturally are more economical to apply than Individual Shingles since three (or four) shingles may be laid in about the same time as one Individual. There are two general classes of Strip Shingles—Square Butt Shingles and Hexagonal.

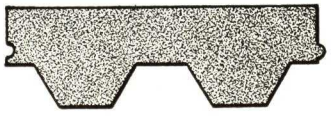
SQUARE BUTT STRIP SHINGLES

The cut at the right shows a Square Butt Strip Shingle. When these are applied on the roof they have the appearance of American Method Shingles and give the same coverage. Four 1 in. x 11 gauge with 7/16 in. head galvanized iron nails should be used with each shingle nailed through the shingle ½ in. directly above the cutout.



HEXAGON STRIP SHINGLES

The cut at the right shows a Hexagon Strip Shingle. This is a very economical product providing good protection. Hexagon Strip Shingles are best suited where low cost is of great importance. Four 1 in. x 11 gauge 7/16 in. head galvanized iron nails are required for each shingle. Nails should be located ½ in. above cutout and end nails ¾ in. from edge of shingle.



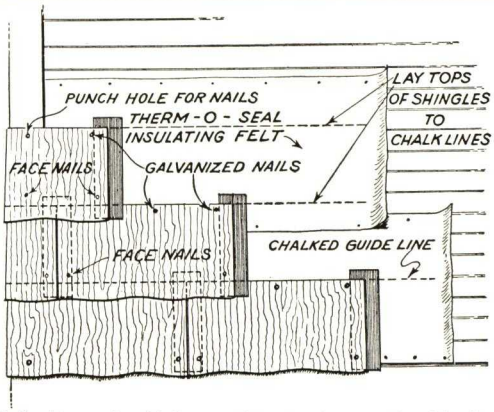
ASBESTOS CEMENT • • •

Characteristics

Flintkote Asbestos roofing and siding materials are manufactured from Pure Asbestos fibres and Portland Cement which are formed into the various shingle shapes under hydraulic pressure. Both of these materials are non-combustible, thus resulting in fireproof products. These permanent materials will last almost indefinitely and do not require painting or staining to preserve their life. Asbestos Roofing Shingles are available in natural gray, green, brown, red and blue-black; Asbestos Sidings in silver gray, white, Colonial green and Rustic brown, and in the several different styles shown in the table below.

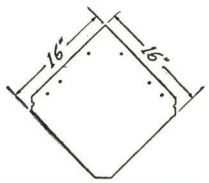
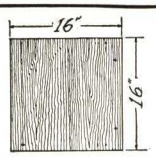
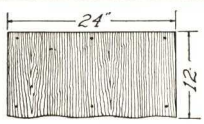
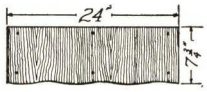
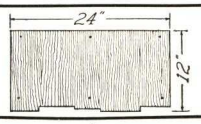
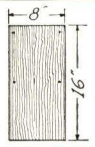
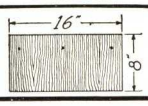
GENERAL APPLICATION INFORMATION

All surfaces over which Asbestos Shingles are to be applied should be smooth and true. Asbestos Shingles should always be kept in a dry place until applied. All cutting or punching of Asbestos Shingles should be done with an Asbestos Shingle Cutter, which is especially designed for this purpose. The use of a waterproof felt under shingles is necessary. Detailed application directions are included in each square of the shingles and should be followed for satisfactory results.



All valleys and flashings should be of the metal most durable for the locality. Special starting shingles are available where required. The drawing above illustrates the method of applying Asbestos Siding.

PRODUCT DATA — FLINTKOTE ASBESTOS CEMENT ROOFING AND SIDING*

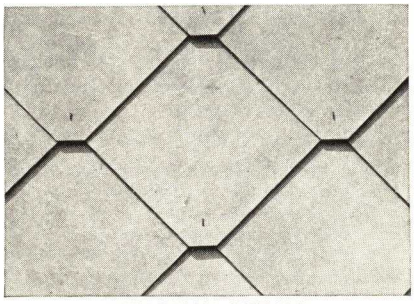
Product		Dimensions Inches	Approx. Weight per sq.	Shingles per sq.	Head Lap Inches	Side Lap Inches	Exposure Inches
ROOFING SHINGLES							
Hexagonal French Method No. 10		16 x 16 x 5/32	265#	86	.....	3	13 x 13
Dutch Lap Method No. 20		16 x 16 x 5/32	280#	92	3	4	12 x 13
SIDING SHINGLES							
Waveline No. 60**		12 x 24 x 5/32	195#	57	1½	.....	10½ x 24
Waveline No. 70**		7¾ x 24 x 5/32	218#	96	1½	.....	6¼ x 24
Shake No. 80**		12 x 24 x 5/32	205#	60	1¼-2	.....	10 x 24
Wide Space No. 100		8 x 16 x 5/32	245#	160	2	1½	Top 7 x 5 Butt 7 x 8
Top Lap No. 150		8 x 16 x 5/32	255#	165	2½	.....	5½ x 16

*Subject to change without notice.
**Vertical Joint Strips and face nails are supplied in package.

• • ROOFING AND SIDING PRODUCTS

HEXAGONAL METHOD ROOFING SHINGLES

Hexagonal Roofing Shingles are smooth surfaced shingles sixteen inches square, laid as shown in the illustration at the right. A small copper storm anchor is used at the lower end of the shingle holding it securely in place. Special starting course shingles are available and should be used.



HEXAGONAL METHOD

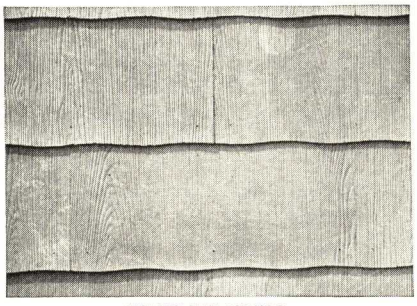
DUTCH LAP METHOD ROOFING SHINGLES

Dutch Lap Method Roofing Shingles are sixteen inches square with the grain of cypress reproduced as a surface pattern and are laid as shown in the illustration at the right. A small copper clip is used at the lower corner. Dutch Lap Method Roofing Shingles may be laid with 1/4 or 1/3 side lap. With the 1/3 side lap vertical joints break directly above each other in every other course similar to the American Method of application.

DUTCH LAP METHOD

WOODGRAIN SIDING SHINGLES

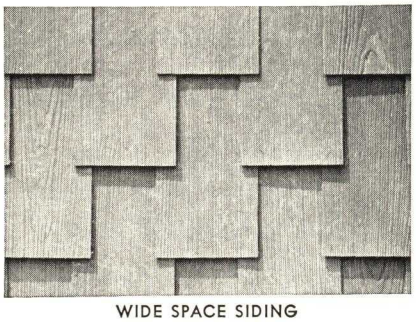
The illustration at the right shows the appearance of woodgrain Asbestos Siding Shingles. The product shown is our 12 x 24 in. Waveline material. This same type siding material is also available with a Shake design on the butt, and the Waveline is furnished in narrower widths (see table). Asphalt coated felt strips 3 in. wide are supplied for use under joints. Special cadmium plated face nails are supplied with each square of shingles.



WAVELINE SIDING

WIDE SPACE SIDING SHINGLES

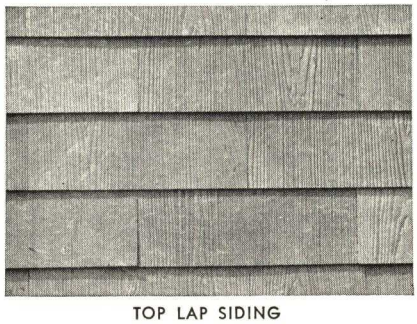
The Wide Space Siding Shingles shown at the right provide an interesting and different pattern. They may be applied with space fillers between shingles which may be flush with exposed butt or dropped one inch to make more interesting effects. These shingles are applied without felt strips or face nails.



WIDE SPACE SIDING

TOP LAP SIDING SHINGLES

Top Lap Siding Shingles are smaller units being only 8 x 16 in. and are laid with a narrow exposure. They have a straight edge in contrast to the Waveline and Shake Designs. No face nails are required with this product. All 24 in. long Asbestos Siding Shingles are packaged in cardboard containers with steel straps to protect them.



TOP LAP SIDING

FLINTKOTE BUILT-UP ROOFING

ENGINEERING SERVICES BY ROOFING ENGINEERS

Flintkote Sales Engineers are prepared to furnish definite recommendations as to the correct type of roof to be used with any type of construction. Any special problem may be referred to them with assurance of cooperation.

BUILT-UP ROOFING MATERIALS AND APPLICATION

Flintkote Built-up Roofing Materials are manufactured in our own plants according to our strict specifications. With this control of manufacture quality of product is certain and identical in all respects from all of our factories.

Flintkote Bonded Built-up Roofs are applied only by Flintkote approved roofers insuring a roof built to exact specifications as required by THE FLINTKOTE COMPANY.

TYPES AND FINISHES OF BUILT-UP ROOFS

Flintkote specifications have been made complete by incorporating the following types of built-up roofing construction, each for a specified term of years:

(1) Smooth Surfaced Asphalt Roofs; **(2)** Gravel or Slag Surfaced Asphalt Roofs; **(3)** Crushed Slate Surfaced Asphalt Roofs; **(4)** Coal Tar Felt and Pitch Roofs.

All of the above roofs will be bonded if desired.

BOND FOR BUILT-UP ROOF AND FLASHINGS

If a Flintkote Bond is required, the roof shall be inspected by an authorized Flintkote Inspector. Such bonds will be given only when the roof is laid by an approved Flintkote Franchise Roofer in strict accordance with specifications.

Flintkote Standard Flashing Specifications used in conjunction with a bonded roof specification, will carry a flashing endorsement for a period of years corresponding to the type of flashing used.

VISKALT COMPOUND

Viskalt Compound is an especially refined asphalt used where a superior product is desired and is particularly required for smooth surface roofs.

FLINTKOTE VISKALT SATURATED FELT

Viskalt Saturated Felt is the highest quality type of felt in both material and manufacture for use in built-up roofing. The high quality of this felt is maintained because of the fact that it is super-saturated with the same type of bitumen used in the production of Viskalt. This felt carries the Underwriters' Label as provided for built-up roofing purposes.

Made in weights of 14 lbs., 15 lbs. and 30 lbs. per 100 sq. ft.

TABULATED SPECIFICATIONS FOR VARIOUS TYPES OF FLINTKOTE BUILT-UP ROOFING †

Period of bond—years	Specification Designation	Page No.	Limitations of roof incline in inches per foot	Surface finish	Construction: Number of plies of felt	Construction: Layers of bitumen	Material weights: Primer	Sheathing paper	Base sheet	Asphalt felt	Tarred felt	Rex construction	Cap sheet	Asphalt	Pitch	Viskalt	Static roof coating	Gravel	Slag	Smooth	Weight per square: Mineral surfaced	Gravel surfaced	Slag surfaced	Underwriters classification
Standard Specifications for Wood or Precast Gypsum Decks																								
20	**A-3-W**	9	¼ up to 3	Gravel or slag	One 30-lb. felt (asphalt) Three 15-lb. felts (asphalt)	4	....	....	32	49	....	....	....	140	....	....	....	400	300	....	....	621	521	A
20	**A-4-W**	9	¼ up to 2	Gravel or slag	Five 15-lb. felts (tar) One sheathing paper	4	....	5	....	....	81	....	....	....	150	....	....	400	300	....	....	636	536	A
15	**B-3-W**	9	¼ up to 3	Gravel or slag	One 30-lb. felt (asphalt) Two 15-lb. felts (asphalt)	3	....	....	32	32	....	....	....	110	....	....	....	400	300	....	....	574	474	A
15	**B-4-W**	9	¼ up to 2	Gravel or slag	Four 15-lb. felts (tar) One sheathing paper	3	....	5	....	....	65	....	....	....	125	....	....	400	300	....	....	595	495	A
15	**B-2-W**	9	3 up to 9	Mineral	Three 15-lb. felts (asphalt) Rex Construction	4	....	....	....	49	....	110	....	120	....	....	....	....	....	....	279	....	....	C
10	**C-3-W-S****	9	3 up to 6	Gravel or slag	Five 15-lb. felts (asphalt)	5	....	....	....	81	....	....	....	125	....	....	....	325	250	....	....	531	456	C
10	**C-1-W-C**	9	¾ up to 3	Cap sheet	One 34-lb. base sheet Two 15-lb. felts One 34-lb. cap sheet	3	....	....	35	32	....	....	34	90	....	....	....	....	....	191	....	....	....	C
10	**C-2-W**	9	3 up to 9	Mineral	Two 15-lb. felts (asphalt) Rex Construction	2	....	....	....	32	....	110	....	60	....	....	....	....	....	....	202	....	....	C
10	**C-1-W**	9	¾ up to 3	Viskalt	One 30-lb. felt (asphalt) Two 15-lb. felts (asphalt)	3	....	....	32	32	....	....	....	....	....	90	....	....	....	154	....	....	....	C
10	**C-1-W-E**	9	¾ up to 3	Static roof coating	One 30-lb. felt (asphalt) Two 15-lb. felts (asphalt)	3	....	....	32	32	....	....	....	60	....	....	30	....	....	154	....	....	....	C
Standard Specifications for Non-combustible Decks																								
20	**A-3-C**	10	¼ up to 3	Gravel or slag	Four 15-lb. felts (asphalt)	5	9*	....	....	65	....	....	....	180	....	....	....	400	300	....	....	654	554	A
20	**A-4-C**	10	¼ up to 2	Gravel or slag	Four 15-lb. felts (tar)	5	....	....	....	....	65	....	....	....	200	....	....	400	300	....	....	665	565	A
15	**B-3-C**	10	¼ up to 3	Gravel or slag	Three 15-lb. felts (asphalt)	4	9*	....	....	49	....	....	....	150	....	....	....	400	300	....	....	608	508	A
15	**B-4-C**	10	¼ up to 2	Gravel or slag	Three 15-lb. felts (tar)	4	....	....	....	....	49	....	....	....	175	....	....	400	300	....	....	624	524	A
15	**B-2-C**	10	3 up to 9	Mineral	Two 15-lb. felts (asphalt) Rex Construction	4	9	....	....	32	....	110	....	120	....	....	....	....	....	....	271	....	....	C
10	**C-3-C-S****	10	3 up to 6	Slag or gravel	Four 15-lb. felts (asphalt)	5	9*	....	....	65	....	....	....	125	....	....	....	325	250	....	....	624	449	C
10	**C-1-C-C**	10	¾ up to 3	Cap sheet	Three 15-lb. felts (asphalt) One 34-lb. cap sheet	4	9	....	....	49	....	....	34	120	....	....	....	....	....	212	....	....	....	C
10	**C-2-C**	10	3 up to 9	Mineral	One 15-lb. felt (asphalt) Rex Construction	3	9	....	....	15	....	110	....	90	....	....	....	....	....	....	224	....	....	C
10	**C-1-C**	10	¾ up to 3	Viskalt	Three 15-lb. felts (asphalt)	4	9	....	....	49	....	....	....	....	....	120	....	....	....	178	....	....	....	C
10	**C-1-C-E**	10	¾ up to 3	Static roof coating	One 30-lb. felt (asphalt) Two 15-lb. felts	4	9	....	32	32	....	....	....	90	....	....	30	....	....	193	....	....	....	C
Standard Specifications for Under Promenade Tile																								
10	**C-1-P**	11	Up to 1	Tile	Five 15-lb. felts (asphalt)	6	9	....	....	81	....	....	....	180	....	....	....	....	....	270	....	....	....	....
10	**C-4-P**	11	Up to 1	Tile	Five 15-lb. felts (tar)	6	....	....	....	....	81	....	....	....	200	....	....	....	....	281	....	....	....	....

*Primer required only on gypsum decks.

**A similar type of specification for steep inclines is available for 20-yr. bond period.

Over steel decks with at least ½-in. layer of insulation any specification for non-combustible decks may be used, provided that on all decks having inclines of over 3 in. per foot provision for nailing is made.

Note: Specifications for use in the eleven western states are different from above, and can be obtained from offices of PIONEER-FLINTKOTE COMPANY (see page 2 for addresses, etc.). No bonds are issued in Pacific Coast area. Slag or gravel surfaced roofs are recommended for use in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma as we will not bond smooth surfaced asphalt roofs in that area.

†Subject to change without notice.

Architects' Condensed Specifications

BUILT-UP ROOFING OVER WOOD OR PRECAST GYPSUM DECKS

SPECIFICATION A-3-W (BOND: 20 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Asphalt.
Deck—Wood (or precast gypsum).
Incline—¼-in. up to 3-in. per foot.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification A-3-W applied as follows subject to the Flintkote detailed specification. Apply a Flintkote 30-lb. Viskalt Saturated Felt (or two layers of 15-lb. Viskalt Saturated Felt lapped 19 in.) laid dry and nailed. Over this base apply three layers of 15-lb. Viskalt Saturated Felt in shingle construction lapped 24¾ in. and solidly cemented with Flintkote Roofing Asphalt. Coat surface with a heavy pouring of Flintkote Roofing Asphalt and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 20 years.

SPECIFICATION A-4-W (BOND: 20 YEARS)

Type—Slag or Gravel Surface Tarred Felts, Rex Blended Pitch.
Deck—Wood (or precast gypsum).
Incline—¼-in. up to 2-in. per foot.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification A-4-W applied as follows subject to Flintkote detailed specification. Apply one layer of sheathing paper and over this apply two layers of Flintkote 15-lb. Tarred Felt laid dry in shingle construction, lapped 17 in. and nailed. Over these dry felts apply three additional layers of 15-lb. Tarred Felts in shingle construction, lapped 22 in. and solidly cemented with Flintkote Rex Blended Pitch. Coat surface with a heavy pouring of Flintkote Rex Blended Pitch and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 20 years.

SPECIFICATION B-3-W (BOND: 15 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Asphalt.
Deck—Wood (or precast gypsum).
Incline—¼-in. up to 3-in. per foot.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-3-W applied as follows subject to the Flintkote detailed specification. Apply a Flintkote 30-lb. Viskalt Saturated Base Felt (or two layers of 15-lb. Viskalt Saturated Felt, lapped 19 in.) laid dry and nailed. Over this base apply two layers of 15-lb. Viskalt Saturated Felt in shingle construction, lapped 19 in., and solidly cemented with Flintkote Roofing Asphalt. Coat surface with a heavy pouring of Flintkote Roofing Asphalt and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION B-4-W (BOND: 15 YEARS)

Type—Slag or Gravel Surface Tarred Felts, Rex Blended Pitch.
Deck—Wood (or precast gypsum).
Incline—¼-in. up to 2-in. per foot.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-4-W applied as follows subject to the Flintkote detailed specification. Apply one layer of sheathing paper and over this apply two layers of 15-lb. Tarred Felts laid dry in shingle construction, lapped 17 in. and nailed. Over these dry felts apply two additional layers of 15-lb. Tarred Felts in shingle construction, lapped 17 in., and solidly cemented with Flintkote Rex Blended Pitch. Coat surface with a heavy pouring of Flintkote Rex Blended Pitch and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION B-2-W (BOND: 15 YEARS)

Type—Mineral surfaced Rex Construction, Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Wood (or precast gypsum).
Incline—3 in. up to 9 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-2-W applied as follows subject to the Flintkote detailed specification. Apply one layer of 15-lb. Viskalt Saturated Felt laid dry and nailed. Over this felt apply two additional layers of 15-lb. Viskalt Saturated Felt lapped, 19 in. and cemented solidly to the first felt and to each other with Flintkote Roofing Asphalt. Over these felts apply Rex Construction Roofing in two layers, solidly cemented to each other with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION C-3-W-S (BOND: 10 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Wood (or precast gypsum).
Incline—3 in. up to 6 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-3-W-S applied as follows subject to the Flintkote detailed specification. Apply five layers of 15-lb. Viskalt Saturated Felts in shingle construction, lapped 29¼ in., nailed as specified, and cemented solidly between laps for a distance of 25 in. with Flintkote Roofing Asphalt. Coat surface with a heavy pouring of Flintkote Roofing Asphalt and embed 325 lbs. of gravel or 250 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: A similar type of specification is available for 20-year bond period.

SPECIFICATION C-1-W-C (BOND: 10 YEARS)

Type—Smooth Surface 34-lb. Flintkote Cap Sheet, Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Wood (or precast gypsum).
Incline—¾ in. up to 3 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-W-C applied as follows subject to the Flintkote detailed specification. Apply one layer of Flintkote 35-lb. base sheet laid dry and nailed. Over this felt apply two layers of 15-lb. Viskalt Saturated Felts, lapped 19 in., and solidly cemented with Flintkote Roofing Asphalt. Over these felts apply one layer of Flintkote 34-lb. Cap Sheet, lapped 6 in., and solidly cemented with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

SPECIFICATION C-2-W (BOND: 10 YEARS)

Type—Mineral Surfaced Rex Construction, Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Wood (or precast gypsum).
Incline—3 in. up to 9 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-2-W applied as follows subject to the Flintkote detailed specification. Apply two layers of 15-lb. Viskalt Saturated Felts laid dry, lapped 19 in., and nailed. Over these felts apply Rex Construction Roofing in two layers solidly cemented with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.

SPECIFICATION C-1-W (BOND: 10 YEARS)

Type—Smooth Surfaced Viskalt Saturated Felts, Flintkote Viskalt Roofing Compound.
Deck—Wood (or precast gypsum).
Incline—¾ in. up to 3 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-W applied as follows subject to the Flintkote detailed specification. Apply a Flintkote 30-lb. Viskalt Saturated Base Felt laid dry and nailed. Over this base apply two layers of 15-lb. Viskalt Saturated Felts in shingle construction; lapped 19 in., and solidly cemented with Flintkote Viskalt Roofing Compound. Felts shall be surfaced with a heavy coating of Viskalt Roofing Compound.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

SPECIFICATON C-1-W-E (BOND: 10 YEARS)

Type—Smooth Surfaced, Viskalt Saturated Felts, Flintkote Roofing Asphalt, top surfaced with Static Roof Coating.
Deck—Wood (or precast gypsum).
Incline—¾ in. up to 3 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-W-E applied as follows subject to the Flintkote detailed specification. Apply a Flintkote 30-lb. Viskalt Saturated Felt laid dry and nailed. Over this base apply two layers of 15-lb. Viskalt Saturated Felt in shingle construction, lapped 19 in., and solidly cemented with Flintkote Roofing Asphalt. Felt shall be surfaced with Static Roof Coating (Fibrated) three gallons per 100 sq. ft.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

THE FLINTKOTE COMPANY

BUILT-UP ROOFING — NON-COMBUSTIBLE DECKS

SPECIFICATION A-3-C (BOND: 20 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Asphalt.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book tile).
Incline—Form ¼ in. up to 3 in. per foot (wood nailing strips on 4-ft. centers required on inclines over 2 in. per foot unless surface of deck allows nailing).
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification A-3-C applied as follows subject to the Flintkote detailed specification. (Where deck is of gypsum, prime surface with asphalt primer.) Apply four layers of 15-lb. Flintkote Viskalt Saturated Felts laid in shingle construction, lapped 27½ in., and solidly cemented with Roofing Asphalt. Coat surface with heavy pouring of Flintkote Roofing Asphalt and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 20 years.

SPECIFICATION A-4-C (BOND: 20 YEARS)

Type—Slag or Gravel Surface Tarred Felts, Rex Blended Pitch.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book tile).
Incline—From ¼ in. up to 1 in. per foot on poured or precast concrete or book tile; from ¼ in. up to 2 in. per foot on poured gypsum.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification A-4-C applied as follows subject to the Flintkote detailed specification. Apply four layers of Flintkote 15-lb. Tarred Felts in shingle construction, lapped 24½ in., and solidly cemented with Flintkote Rex Blended Pitch. Coat surface with heavy pouring of Flintkote Rex Blended Pitch and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 20 years.

SPECIFICATION B-3-C (BOND: 15 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Asphalt.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book tile).
Incline—From ¼ in. up to 3 in. per foot (wood nailing strips on 4-ft. centers required on inclines over 2 in. per foot unless surface of deck allows nailing).
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-3-C laid as follows subject to the Flintkote detailed specification. (Where deck is of gypsum prime surface with asphalt primer.) Apply three layers of 15-lb. Flintkote Viskalt Saturated Felts in shingle construction, lapped 24¾ in., and solidly cemented with Flintkote Roofing Asphalt. Coat surface with heavy pouring of Flintkote Roofing Asphalt and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION B-4-C (BOND: 15 YEARS)

Type—Slag or Gravel Surfaced Tarred Felts, Rex Blended Pitch.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book tile).
Incline—From ¼ in. up to 1 in. per foot on poured or precast concrete or book tile; from ¼ in. up to 2 in. per foot on poured gypsum.
Classification—Underwriters' "A."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-4-C laid as follows subject to the Flintkote detailed specification. Apply three layers of Flintkote 15-lb. Tarred Felts in shingle construction, lapped 22 in., and solidly cemented with Flintkote Rex Blended Pitch. Coat surface with heavy pouring of Flintkote Rex Blended Pitch and embed 400 lbs. of gravel or 300 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION B-2-C (BOND: 15 YEARS)

Type—Mineral Surfaced Rex Construction Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Non-combustible (poured concrete or poured gypsum).
Incline—3 in. up to 9 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification B-2-C laid as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer. Apply two layers of 15-lb. Viskalt Saturated Felt lapped 19 in. and solidly cemented in Flintkote Roofing Asphalt. Over these felts apply Rex Construction Roofing in two layers, solidly cemented to each other with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 15 years.

SPECIFICATION C-3-C-S (BOND: 10 YEARS)

Type—Slag or Gravel Surface Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Non-combustible.
Incline—3 in. up to 6 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-3-C-S laid as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer and apply four layers of 15-lb. Viskalt Saturated Felt, lapped 27½ in., solidly cemented with Flintkote Roofing Asphalt. Coat surface with a heavy pouring of Flintkote Roofing Asphalt and embed with 325 lbs. of gravel or 250 lbs. of slag.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: A similar type of specification is available for 20-year bond period.

SPECIFICATION C-1-C-C (BOND: 10 YEARS)

Type—Smooth Surfaced Cap Sheet, Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Non-combustible.
Incline—¾ in. up to 3 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-C-C laid as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer. Apply three layers of 15-lb. Viskalt Saturated Felts lapped 24¾ in. and solidly cemented with Flintkote Roofing Asphalt. Over these felts apply one layer of Flintkote 34-lb. Cap Sheet lapped 6 in. and cemented solidlv with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

SPECIFICATION C-2-C (BOND: 10 YEARS)

Type—Mineral Surfaced Rex Construction, Viskalt Saturated Felts, Flintkote Roofing Asphalt.
Deck—Non-combustible (poured concrete or poured gypsum).
Incline—3 in. up to 9 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-2-C laid as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer. Apply one layer of 15-lb. Viskalt Saturated Felt solidly cemented with Flintkote Roofing Asphalt. Over this felt apply Rex Construction roofing in two layers solidly cemented with Flintkote Roofing Asphalt.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.

SPECIFICATION C-1-C (BOND: 10 YEARS)

Type—Smooth Surfaced Viskalt Saturated Felt and Flintkote Roofing Asphalt.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book-tile).
Incline—From ¾ in. up to 3 in. per foot.
Classification—Underwriters' "C."
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-C applied as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer. Apply three layers of 15-lb. Viskalt Saturated Felts in shingle construction, lapped 24¾ in., and solidly cemented with Flintkote Viskalt Roofing Compound. Felts shall be surfaced with Viskalt Roofing Compound.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

SPECIFICATION C-1-C-E (BOND: 10 YEARS)

Type—Smooth Surfaced Viskalt Saturated Felt and Flintkote Roofing Asphalt, top surfaced with Static Roof Coating.
Deck—Non-combustible (poured or precast concrete, poured gypsum or book tile).
Incline—¾ in. up to 3 in. per foot.
Classification—Underwriters' "C".
Insert Under "Roofing"—Built-up Roofing shall be a Flintkote Specification C-1-C-E applied as follows subject to the Flintkote detailed specification. Prime the deck with Flintkote Asphalt Primer. Apply one layer of 30-lb. Viskalt Saturated Felt cemented solidly with Flintkote Roofing Asphalt. Over this base apply two layers of 15-lb. Viskalt Saturated Felt in shingle construction, lapped 19 in. and sclidly cemented with Flintkote Roofing Asphalt. Felt shall be surfaced with Static Roof Coating (Fibrated) three gallons per 100 sq. ft.
Flashing—A Flintkote standard flashing shall be used.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.
Note: Bond on this specification not issued in or south of the states of South Carolina, Georgia, Tennessee, Arkansas and Oklahoma.

BUILT-UP ROOFING UNDER PROMENADE TILE

SPECIFICATION C-1-P (BOND: 10 YEARS)

Type—Viskalt Saturated Felts and Flintkote Roofing Asphalt.
Deck—Concrete.
Incline—Not over 1 in. per foot.
Insert Under "Roofing"—Built-up Roofing under Promenade Tile shall be a Flintkote Specification C-1-P applied as follows subject to the Flintkote detailed specification. Apply five layers of Flintkote 15-lb. Viskalt Saturated Felts in two, two, and one ply construction, solidly cemented with Flintkote Roofing Asphalt and surfaced with a heavy coating of Flintkote Roofing Asphalt.
Flashing—Copper Cap and Base Flashing shall be used, reinforced with three plies of 15-lb. Viskalt Saturated Felts cemented solidly with Flintkote Roofing Asphalt.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.

SPECIFICATION C-4-P (BOND: 10 YEARS)

Type—Tarred Felts and Rex Blended Pitch.
Deck—Concrete.
Incline—Not over 1 in. per foot.
Insert Under "Roofing"—Built-up Roofing under Promenade Tile shall be a Flintkote Specification C-4-P applied as follows subject to the Flintkote detailed specification. Apply five layers of Flintkote 15-lb. Tarred Felt in two, two and one ply construction, solidly cemented with Flintkote Rex Blended Pitch and surfaced with a heavy coating of Rex Blended Pitch.
Flashing—Copper Cap and Base Flashing shall be used, reinforced with three plies of 15-lb. Viskalt Saturated Felts solidly cemented with Flintkote Roofing Asphalt.
Bond—Manufacturers' bond on roofing shall be furnished for a period of 10 years.

RECOMMENDATIONS WHERE INSULATION IS USED

Insulation Used Under Pitch and Gravel Roofs—Over Wood Decks—*Normal Conditions*—Apply two layers of 6-lb. rosin sheathing paper over wood deck. Nail insulation into wood deck. Over insulation apply respective specification as over non-combustible decks.

Humid Conditions in the Building Itself—Before application of insulation apply one layer of sheathing paper and two layers of 15-lb. tarred felts laid dry and nailed. Apply insulation mopped solid in pitch and over insulation apply respective specification as over non-combustible decks, mopping all felts solidly to insulation. Where more than one layer of insulation is used each successive layer shall be mopped solidly with pitch to the preceding layer. Where incline is over 3 in. per foot insulation should also be nailed into deck.

Insulation Used Under Asphalt Types of Roofs—Over Wood Decks—*Normal Conditions*—Apply two layers of 6-lb. sheathing paper laid dry. Nail insulation into deck and over insulation apply respective specifications as over non-combustible deck, mopping all felts solidly to insulation.

Humid Conditions in the Building Itself—Before application of insulation apply two layers of 15-lb. felt laid dry, lapped 19 in. Apply insulation mopped solid in asphalt and over insulation apply respective specification as over non-combustible decks, mopping all felts solidly to insulation. Where more than one layer of insulation is used each successive layer shall be mopped solidly with asphalt to the preceding layer. Where incline is over 3 in. per foot insulation should also be nailed into deck.

Insulation Used Under Asphalt or Pitch and Gravel Roofs—Over Non-combustible Decks—*Normal Conditions*—Insulation shall be solidly cemented to deck which has previously been primed and on inclines over 3 in. per foot nailing should be provided. Where more than one layer of insulation is used, each successive layer shall be cemented solidly with asphalt to the preceding layer if an asphalt specification is used (or with pitch if a pitch and gravel specification is used). Over insulation apply respective specification as over non-combustible decks, mopping all felts solidly to insulation.

Humid Conditions in the Building Itself—Over the primed deck apply a heavy mopping of roofing asphalt (or pitch) and embed two layers of 15-lb. felt solidly cemented with asphalt if an asphalt specification is used (or with pitch if a pitch and gravel specification is used). On inclines of 3 in. per foot, nailing should be provided. Where more than one layer is used, each successive layer should be cemented solidly with asphalt or pitch to the preceding layer. Over insulation apply respective specification as over non-combustible decks, mopping all felts solidly to insulation.

REQUIREMENTS WHERE STEEL DECKS ARE USED

All steel decks shall be primed with asphalt primer if not provided with a shop coat and shall be covered with at least one ply of rigid insulation mopped solid with roofing asphalt. Over insulation apply the respective specification as over non-combustible decks. Where incline is over 3 in. per foot, means of fastening insulation to steel decks should be provided.

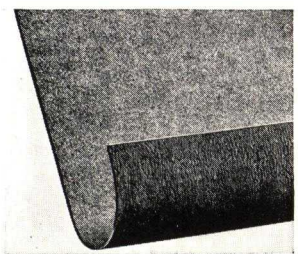
FLINTKOTE ROLL ROOFINGS

Flintkote Roll Roofings are available either with mineral surfacing or smooth surface. Both types of roofing are made on heavy felts that have been saturated with a special asphalt, coated on both sides with coating asphalt and surfaced either with colored granules or with talc or mica. A special corrugated surface on smooth-surface roofings is also available. Roll roofings of this type are primarily intended for use on farm buildings, sheds, industrial plants and other types of buildings where a low cost roofing is required.

DATA ON FLINTKOTE MINERAL SURFACED ROOFING*

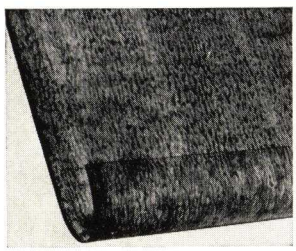
Av. wt. roll, lb.	Approx. sq. ft. per roll	Approx. width roll, in.	Underwriters label, class	Colors
75	108	36		Green, Red, Blue-black and Clover Green
90	108	36	C	Green, Red, Clover Green and Tile Red, Blue-Black.

"REX FLINTKOTE"



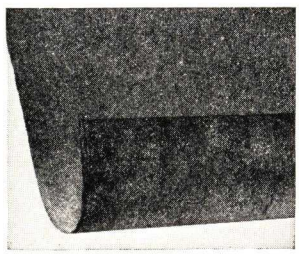
"Rex Flintkote" is a smooth Roll Roofing of the highest quality material surfaced with "Rayflex" finish on one side and corrugated mica finish on the other. Nails and cement furnished (see table).

FLINTKOTE "STALWART"



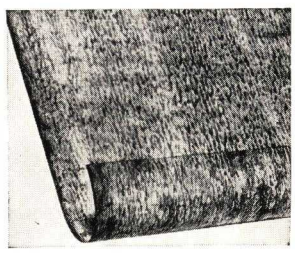
Flintkote "Stalwart" is a smooth Roll Roofing that meets government railroad specifications. Gunmetal corrugated finish on both sides (see table).

FLINTKOTE "RELIANCE"



Flintkote "Reliance" is a smooth Roll Roofing surfaced with mica on both sides (see table).

FLINTKOTE "GUARDIAN"

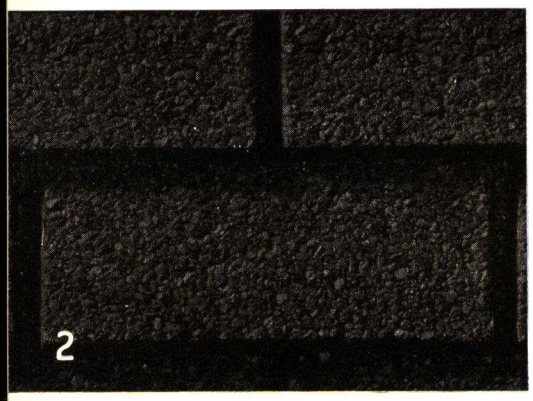


Flintkote "Guardian" is a moderately priced smooth Roll Roofing, corrugated with talc finish both sides. Most suitable where permanency is not paramount (see table).

DATA ON FLINTKOTE SMOOTH SURFACE ROLL ROOFING*

Rex Flintkote				Stalwart				Reliance				Guardian			
Av. wt. per roll, lb.	Approx. sq. ft. per roll	Approx. width of roll, in.	Underwriters' label, class	Av. wt. per roll, lb.	Approx. sq. ft. per roll	Approx. width of roll, in.	Underwriters' label, class	Av. wt. per roll, lb.	Approx. sq. ft. per roll	Approx. width of roll, in.	Underwriters' label, class	Av. wt. per roll, lb.	Approx. sq. ft. per roll	Approx. width of roll, in.	Underwriters' label, class
55	108	36	C	45	108	36	C	35	108	36	..	35	108	36	..
65	108	36	C	55	108	36	C	45	108	36	..	45	108	36	..
75	108	36	C	65	108	36	C	55	108	36	C	55	108	36	..
..	...	..	..	..	...	..	..	65	108	36	C	..	...	..	..
..	...	..	..	..	...	..	..	75	108	36	C	..	...	..	..

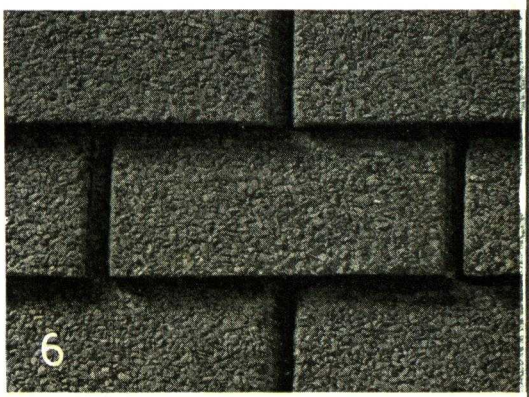
*Subject to change without notice.



COLOR CHART OF FLINTKOTE ASPHALT SHINGLES

To simplify the presentation of the numerous colors and blends in which Flintkote Asphalt Shingles are available, four basic plain colors and four basic blends are reproduced herewith. Each panel is numbered in its lower left corner. These numbers are keyed to the tabulated information presented on page three of this catalog. Please refer to page three for detailed color specifications of Flintkote Asphalt Shingles.

Note: These colors are as faithful as can be obtained by modern printing. Some variations are to be expected because of reproduction limitations and slight differences in the manufacturing processes of the various products.



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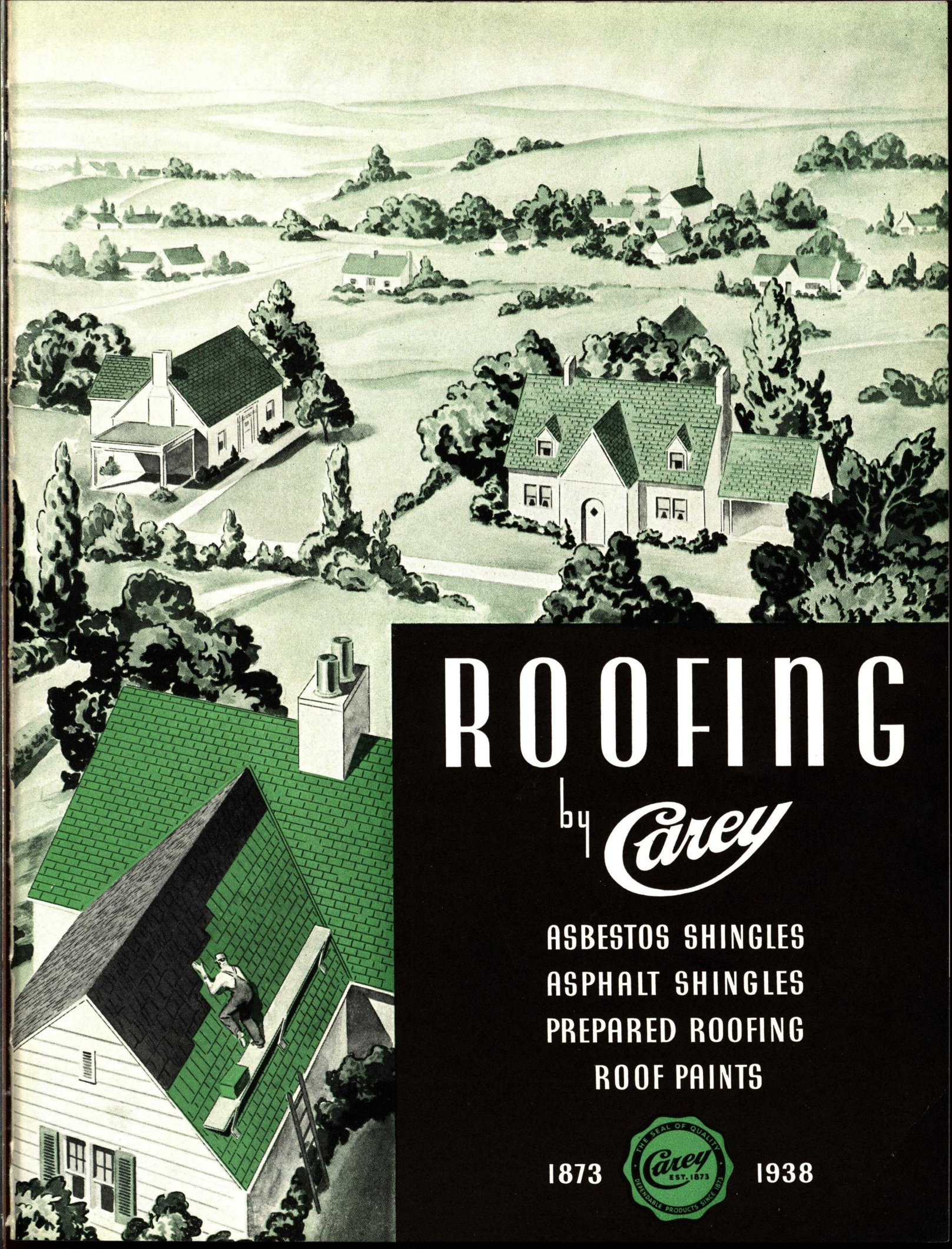


ROOFING

by Carey

ASBESTOS SHINGLES
ASPHALT SHINGLES
PREPARED ROOFING
ROOF PAINTS

1873 1938

6/14

THERE'S A Carey ROOF FOR EVERY BUILDING

The Philip Carey Company through more than sixty years of experience in the manufacture and application of roofing materials and accessories has developed a complete line of roofs.

From the smallest temporary shed to the finest type of permanent construction there is a Carey Roof to meet your exact requirements. In this book are described the various types, weights and finishes of Carey Prepared Roofing materials, including:

SELECTION TABLE

GROUP	SHAPE	NAME	Sizes, In.	Exposure, In.	Head-lap, In.	Weight per sq., lb.	Under-writers' Label	Page
Careystone ASBESTOS-CEMENT SHINGLES	(A) (B) (C) (D)	(A) Scotch-American No. 20	12 x24	9x20	3	260	Class "B"	4
		(B) Shakes No. 37	8 x16	7	9	465	Class "A"	5
		(C) Scotch No. 30	16x16x 3/16	12x13	4	290	Class "B"	5
		(D) French No. 70	16x16x 5/32	13	3	260	Class "B"	5
Careystone ASBESTOS-CEMENT SIDING	(E) (F) (G)	(E) Old Colony Duo Edge—No. 210	12 x24	10½x24	1½	180		6
		(F) Duo "8"—No. 220	9½x24	8x24	1½	190		7
		(G) Colonial Clapboards	¼x9x96	7	2	325		7
ASPHALT INDIVIDUAL SHINGLES *Plain Back †Cork Back	(H) (I) (J)	(H) Asfaltslate	12 x16	5	6	325* 345†	Class "C"	12
			9 x12¾	4	4¾	253	Class "C"	12
		(I) Careylok (Standard)	12 x16	10	2	130* 140†	Class "C"	13
		(I) Careylok (Extra Heavy)	12 x16	10	2	162* 172†	Class "C"	13
		(J) Careylok (Hexagonal)	16 x16		2½	130* 140†	Class "C"	13
ASPHALT STRIP SHINGLES *Plain Back †Cork Back	(K) (L) (M)	(K) 2 Tab, Hexagonal	11⅓x36	4⅔	2	167* 177†	Class "C"	15
			12⅓x36	4⅔	3	186* 200†	Class "C"	15
			14½x36	4⅔	5⅙	225* 240†	Class "C"	15
		(L) 3 Tab, Square Butt	12 x36	5	2	210* 215†	Class "C"	16
			15 x36	5	5	270†	Class "C"	16
		(M) 4 Tab, Square Butt	10 x36 12½x36	4 4	2 4½	210* 266*	Class "C" Class "C"	16 16

PREPARED ROLL ROOFING.....PAGES 17, 18

BUILDING PAPERS, FELTS AND CAP SHEETS .....PAGE 19

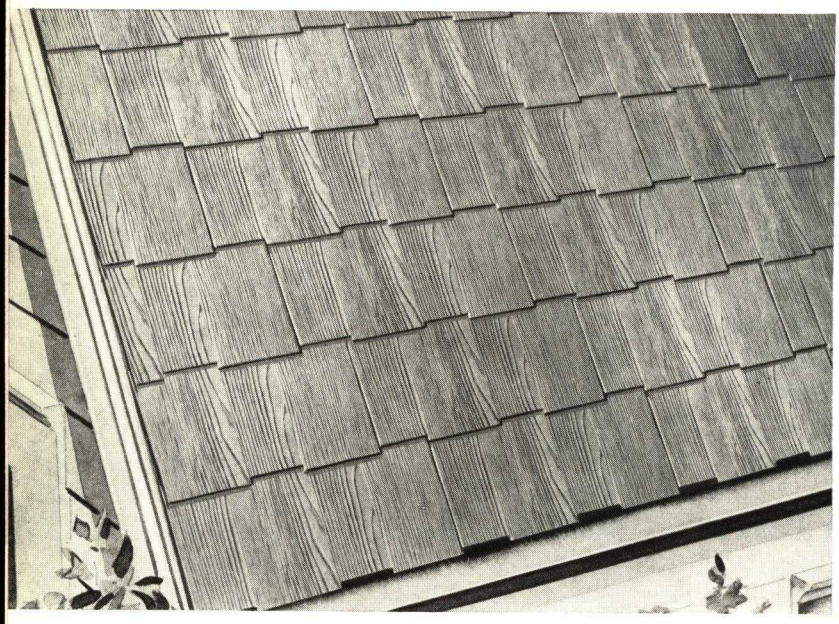
CAREYSTONE SHINGLES, with the exception of the French method, have the appearance of attractive wood shingles. The texture is an effective reproduction of wood grain set in everlasting Portland Cement and asbestos fibre. By a scientific process, selected Portland Cement is reinforced with everlasting asbestos fibres and combined under great pressure into a permanent shingle possessing natural properties that enable it to resist the destructive influence of time, and in addition, possess that peculiar property of increasing in toughness and strength upon exposure to the elements. They never require painting or other upkeep expense, and will last as long as the home upon which they are applied. Careystone Asbestos-Cement Shingles are made in both roofing and siding units. Popular colors meet every demand of architecture or personal taste.

Careystone

ASBESTOS CEMENT SHINGLES and SIDING

SCOTCH AMERICAN No. 20

Careystone SHINGLES



Showing Thatch Butt Exposed

Showing Wave Line Exposed

Most recent of the Careystone Asbestos Shingles is the new Scotch-American. The applied cost of this shingle is approximately that of the French Method — hitherto the lowest priced asbestos shingle — yet, it gives the effect of a high priced individual shingle laid in the most expensive manner — random widths and staggered butts.

Attractive appearance combined with the low cost of the Scotch-American Shingle extends the use of this fire-proof, maintenance-free Careystone roof to all buildings.

With one-third less exposure than the old style Scotch or Dutch Lap unit, this shingle is even more weatherproof, and has many more appealing shadow lines.

Size: 12 x 24 in. Exposure 9 x 20 in., 80 pieces (4 bundles) per square.

Colors: Manchester Gray, Black, Bristol Green.

Required: 160 Needle Point Nails, 80 copper anchors per square.

Weight: Approximately 260 lbs. per square.

Reversible: Careystone Scotch-American Shingles are reversible, and can be applied with the curved edge exposed to secure a most unique thatched effect.

The two illustrations show the two interesting treatments possible with Careystone Scotch-American Shingles. With either the Staggered Butt or the Wave Thatched Exposure a most attractive roof, with the appearance of authentic wood shingles but with the long life of asbestos shingles, is the result.

Packaged in special carton — completely protected to insure shingles arriving on job in perfect condition.

Apply Careystone Shingles over Carey 15 or 30-lb. Feltex or Carey Roll Roofing.

Careystone SHINGLES

THE POPULAR "BIG 3"

CAREYSTONE SHAKES (Duplex) No. 37

This unique development embodies two Tapered American Method Shingles in one piece, thus reducing the labor of application by at least half. At the same time showing broad shadow lines both at the butt and on the sides, bringing into bold relief the individual shingle. The accompanying illustration shows a random width and staggered butt design of utmost architectural appeal which is achieved without the usual application difficulties. They are self-spacing and self-aligning. Conventional design also available.

Size: 16 x 16 in. overall — tapered to approx. ¼-in. butt. **130 pieces** (10 bdls.) per square. Exposure approx. 7 in. Require: 260 Needle Point Nails per square.

Colors: Windsor Gray, Spring Blend (variegated cool greens and gray), Autumn Blend (warm tones of red, brown and gray) and Black.

Weight: Approximately 460 lbs. per square.

Underwriters' Label Class A.

SCOTCH METHOD No. 30

Careystone Scotch Method Shingles make a desirable and artistic roof for homes where the element of cost is an important factor. They have the texture and appearance of American Method Shingles, though the cost is but slightly more than for the French Method.

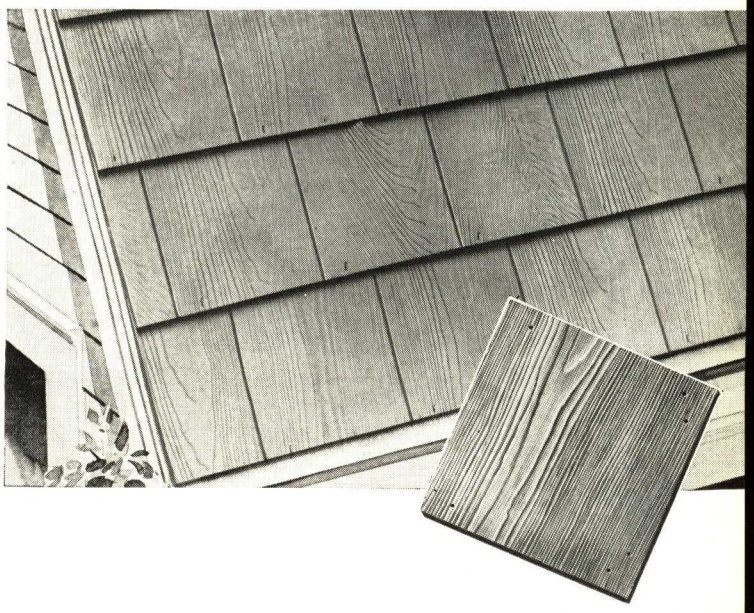
Size: 16 x 16 x 3/16 ins. *92 shingles (6 2/15 bdls.) per square. Exposure: 12 x 13 ins. Required: 184 Needle Point Nails and 92 Copper Storm Nails per square. *Actual coverage 99 2/3 square feet.

Note: Also applied with 5 1/3 in. side lap requiring 104 shingles per square.

Colors: Windsor Gray, Georgian Red, Solid Black, Mottled, Bristol Green.

Weight: Approximately 290 lbs. per square.

Underwriters' Label Class B.



FRENCH METHOD No. 70

French Method Shingles are made of Careystone Asbestos and Cement. Their smooth stone-like surface combines beauty, protection and permanent service at low cost.

Size: 16 x 16 x 5/32 in. Smooth Finish. 3 in. Headlap. 86 shingles (5 6/16 bundles) per square.

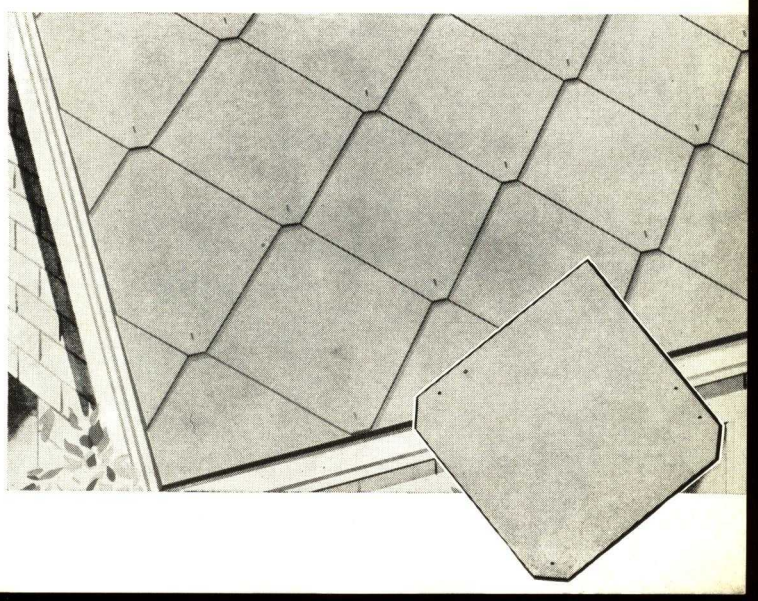
Required: 172 Needle Point Nails and 86 Copper Storm Nails per square.

Colors: Gray, Red, Solid Black, Mottled, Green.

Weight: Approximately 260 lbs. per square.

Underwriters' Label Class B.

Apply Careystone Shingles over Carey 15 or 30-lb. Feltex or Carey Roll Roofing.



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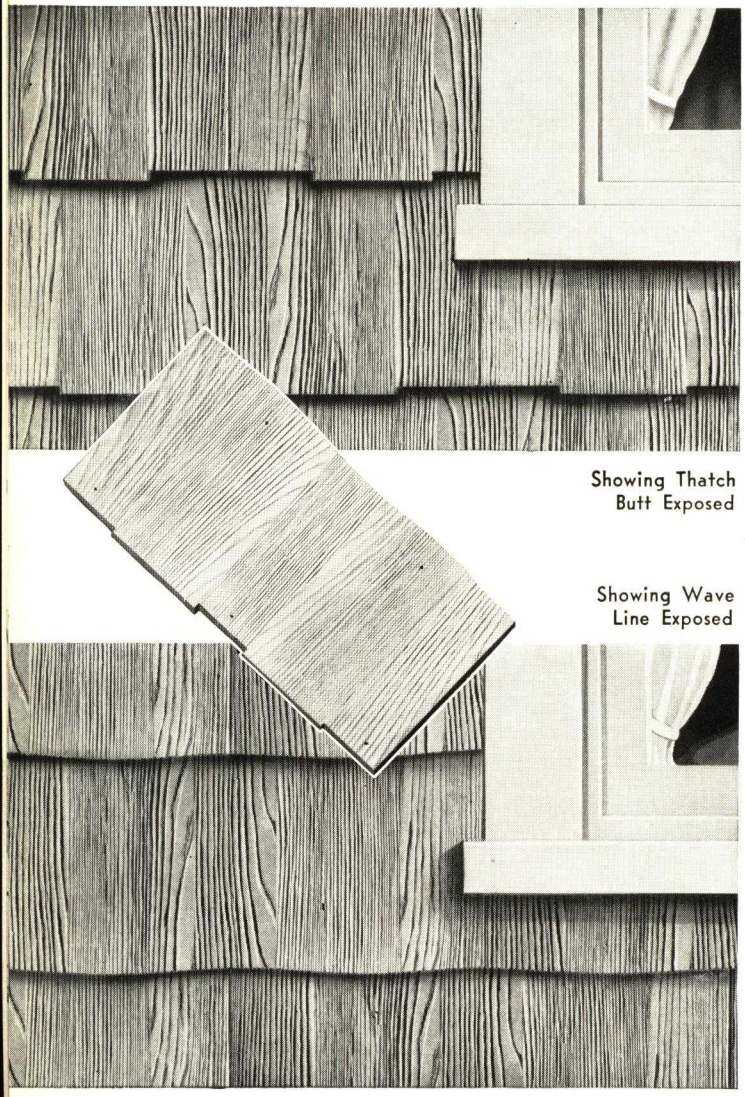
Careystone ASBESTOS — CEMENT SIDING FOR ANY STYLE HOME

AN AUTHENTIC REPRODUCTION of wood grain texture, a wide variety of patterns, choice of outstanding colors, adaptability to all types of architecture through various widths of exposure, plus complete freedom from maintenance expense are just a few of the many desirable features found in the new line of Careystone Siding that makes it worthy of your consideration as a sidewall material in the construction of new homes.

THE 15 IMPORTANT FEATURES

1. Low First Cost
2. Distinctive and Beautiful Appearance
3. No Up-Keep Expense
4. No Painting Required
5. Fire-proof
6. Adaptability of Design
7. "Wood Grain Texture"
8. Variety of Patterns
9. Warmer in Winter
10. Cooler in Summer
11. Will Not Rot
12. Will Not Deteriorate
13. Will Not Curl
14. Termite Proof
15. Enhanced Value



Showing Thatch Butt Exposed

Showing Wave Line Exposed

OLD COLONY DUO-EDGE No. 210

Old Colony Siding meets the demand for a side wall material that combines the charm of individual wood shingles with the fire-proof maintenance-free qualities of Asbestos and Portland Cement. This new Careystone Siding Unit is so designed that when laid with one edge exposed it gives the attractive broken lines of thatch butt shingles laid in random widths.

The effect of individual shingles laid with staggered butts and random widths is secured through careful selection and arrangement of adjacent panels of contrasting wood grain texture on each unit.

By exposing the other edge a very pleasing wave line appearance is secured.

A unique treatment can be obtained by using both the wave line and thatch butt exposures on the same building. This multiple design feature offers a wide freedom of choice in securing individual effects.

Size: 12 x 24 ins. Exposure: 10½ x 24 ins. 57 pieces (three bundles) per square. Either edge — wave line or thatch butt — can be exposed.

Weight: Approximately 180 lbs. per square.

Colors: Manchester Gray, Weathered Brown and Bristol Green.

All nail holes one-eighth in. diameter Maximum of 171 Headlap nails required. Should be same or similar to face nails furnished with units. Extras included: 57 pieces 4 x 12 in. smooth black backer strips and 11 oz. of special alloy face nails.

Application and insulation is considerably improved when Careystone is laid over Carey Utilizit Board.

DUO "8" • No. 220

With Careystone Duo "8" No. 220 the architect is offered almost unlimited opportunity to plan exterior wall treatments. This is another double edge unit made with thatch butt on one edge and a straight line on the other, which can be laid with either edge continually exposed or alternated. Ten or more separate and distinctive patterns can be achieved by combining this unit with the wider Old Colony Siding.

In the manufacture of Duo "8" siding, special attention has been given to the arrangement of the grain to bring out the effect of random width individual shingles in the finished job. There is hardly a home or building that cannot be enhanced by one or more of the desirable effects possible through such flexibility in application.

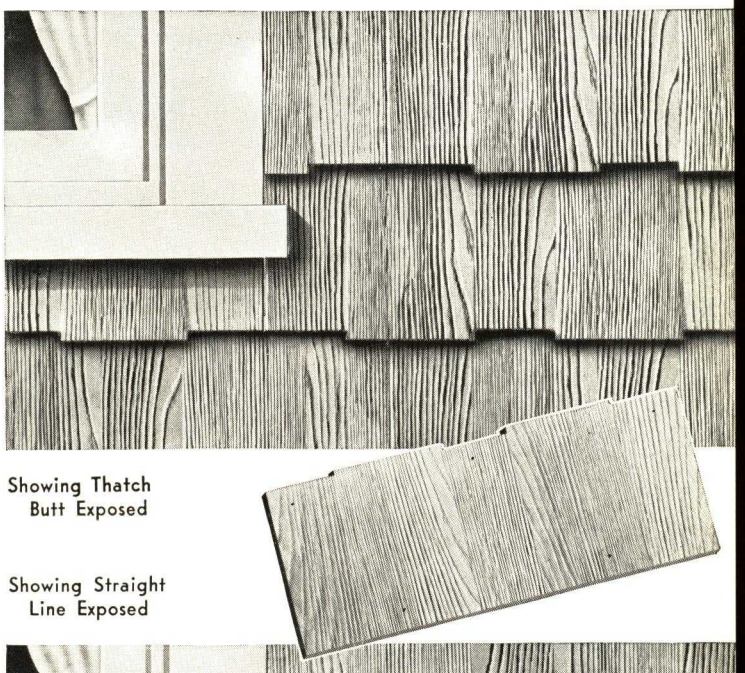
Size: 9½ x 24 ins. Exposure 8 x 24 ins. 75 pcs. (3 bdls.) per square.

Weight: Approximately 190 lbs. per square.

Color: Manchester Gray.

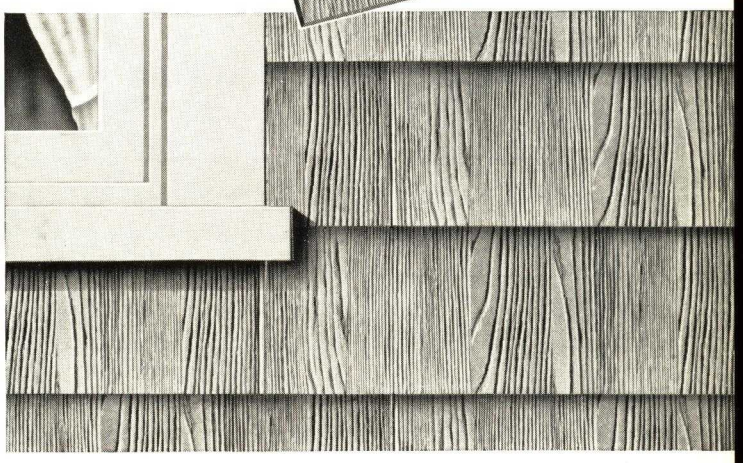
All nail holes ⅛-in. diameter. Maximum of 171 Headlap Nails required. Should be same or similar to face nails furnished with units.

Extras included: (75) 4 x 9 in. smooth black backer strips and 14 oz. special alloy face nails.



Showing Thatch Butt Exposed

Showing Straight Line Exposed



COLONIAL CLAPBOARD SIDING

Careystone Colonial Clapboard Siding is readily adaptable to almost every type of frame design. Its merit is substantiated by repeat orders for a new housing project which, upon completion, will use approximately one-half million square feet.

A pleasing contrast is achieved when Colonial Clapboard Siding is used in conjunction with other types of Careystone Siding Units whether for upper story or gable end treatments.

Size: ¼ in. x 9 in. x 8 ft. Headlap 2 ins. Exposure 7 in.

Weight: Approximately 325 lbs. per square.

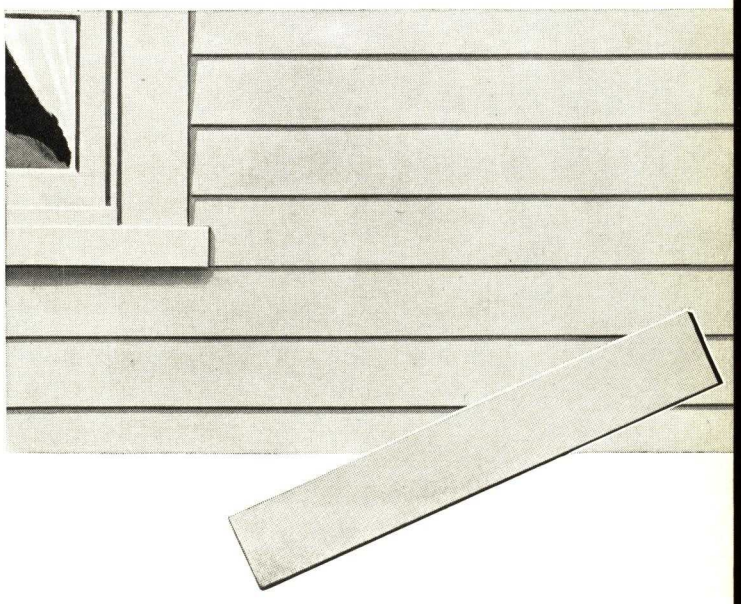
Color: French Gray.

22 pcs. (1 crate) per square. (Actual coverage 102.3 sq. ft. of surface.)

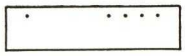
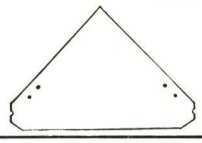
Furnished: (22) 3-in. by 7¼-in. black backer strips and 44 special alloy face nails.

Drilled for nailing on 8-in. centers. A countersunk hole in each lower corner provides for inconspicuous and effective face nailing.

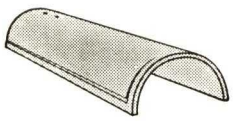
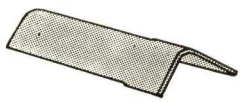
Application is considerably improved when Careystone is laid over Carey Utilizit Board.



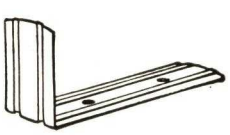
STARTERS FOR **Careystone** SHINGLES

SHAPE	STYLE	SIZES, In.	COLORS	COVERAGES (Per 100 lineal ft.)	WEIGHTS, Lbs. (Per 100 lineal ft.)
	American	8 x 16	Mixed	75 pcs. (3-15/20 bdls.)	130
	Scotch	4 x 16	Mixed	100 pcs. (5 bdls.)	90
	Scotch-American	4 x 24	Manchester Gray, Black, Bristol Green	60 pcs. (3 bdls.)	75
	French Method Eave Starter	4 x 16	Mixed	75 pcs. (3 bdls.)	60
	French Method Second Starter	20½ (wide)	Gray, Red, Mottled, Black, Green	60 pcs. (3 bdls.)	120

RIDGE SHINGLES AND ROLLS

	Hip and Ridge Shingles No. 57	5½ to 6 wide 16 long	Windsor Gray, Georgian Red, Weathered Brown, Solid Black, Bristol Green	336 Shingles (11-6/30 bdls.)	400
	Curved Ridge Roll	16-in. lengths	Windsor Gray, Georgian Red, Solid Black, Bristol Green	93 Sections	316
	Angle Ridge Roll	16-in. lengths	Windsor Gray, Georgian Red, Solid Black, Bristol Green	88 Sections	290

RIDGE ROLL FASTENERS AND NAILS



Copper Ridge Roll Fasteners
55 per lb., per 100 pieces.

Copper Storm Nails
1⅛ in. long, 195 per lb., per 100 pieces.

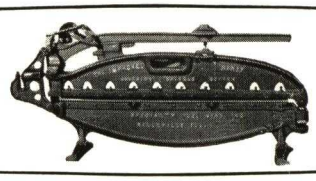
Galvanized Needlepoint Nails
1¼ in., 210 per lb.
1½ in., 195 per lb.
2 in., 175 per lb.

Copper Needle Point Nails
1¼ in., 250 per lb.
1½ in., 200 per lb.
2 in., 165 per lb.

Special Alloy Face Nails
1¼ in. long, 328 per lb.

Special Alloy Head Lap Nails
1¼ in. long, 425 per lb.

ASBESTOS SHINGLE CUTTER



27 in. Blade Asbestos Shingle Cutter — with notching attachment and punch, assembled complete. Crated weight, 50 lbs.

UTILIZIT BOARD

The ideal underlayment for Careystone Siding or Shingles, offering more than twice the protection and insulation of ordinary asphalt felts and providing a smooth, flat nailing surface, which assure the best workmanship and finished appearance to the job. Furnished in sheets, 48″ x 60″, weight 60 lbs. per 100 square feet or in cartons containing 200 square feet each.

SLATERS CEMENT

Slaters Cement — Knife or Gun Grade Consistency. Furnished in all colors to accurately match Careystone. Packed conveniently in 5-lb. cans to 300-lb. bbls.

Carey ASPHALT SHINGLES INDIVIDUAL and STRIP

CAREY ASFALTSLATE SHINGLES are noted for their long wearing qualities, their natural beauty and for their freedom from any need of painting or other servicing. They are proof against all ordinary fire risks. Asphalt Shingles, whether individual or strip are manufactured by the same process. Over a base of tough rag felt thoroughly saturated and coated with asphalt is applied a layer of colored mineral granules, providing a durable wearing surface of natural beauty in colors to appeal to individual tastes. In the final operation, individual shingles are cut singly, and strip shingles are cut in multi-units—2, 3, or 4 in one strip. The chief economy in the strip shingles is in the application cost.

CORK INSULATED SHINGLES FOR ADDED PROTECTION

Carey Cork Insulated Shingles provide a durable roof, insulated against heat or cold at a cost very little higher than that of ordinary asphalt shingles. They afford considerable economy in jobs where insulation is desired, since no extra material is necessary and there is no additional labor required. The finished roof is very pleasing in appearance with heavy shadow lines produced by the extra thickness of the shingles.

THE SEAL OF QUALITY
Carey
EST. 1873
DEPENDABLE PRODUCTS SINCE 1873

HARMONIOUS COLORS THA

The Red Blend—one of the four attractive blends now available in the Asphalt Shingle line. The others are Harvest, Russet and Green Blend.

Empire Green
Asfaltslate

Indian Red
Asfaltslate

Dependable, waterproof protection will always be the *first* requirement of a good roof, but the permanence of a good roof and the visible roof area in proportion to the rest of the home demands unusual care in the selection of color.

Carey Shingle colors have been developed after years of careful study and experience in satisfying individual preferences of home owners and the rigid requirements of architects. They are designed for permanent appeal

Blue-Black
Asfaltslate

Dixie Green
Asfaltslate

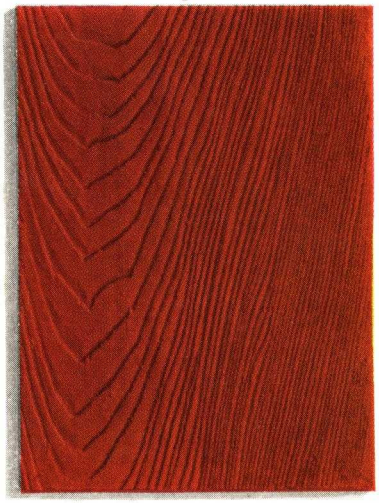
Slate Green
Asfaltslate

Tile Red
Asfaltslate

T ENDURE WITHOUT CARE!

Bristol Green
Careystone

Windsor Gray
Careystone


Georgian Red
Careystone

and while adequately wide in variety, they are confined to colors that will remain in harmony with the architecturally correct exterior.

Carey Shingles are available in nature's own colors—warm reds, cool greens and blended tones as reproduced on these pages—samples will be gladly furnished so that you may try them in various combinations and, in that way, be entirely confident that your final color selection is right.

Mottled
Careystone

THE PHILIP CAREY COMPANY
LOCKLAND, CINCINNATI, OHIO

Below—The new Careystone Scotch American Shingle. Note the natural looking wood grain and the effect of individual shingles laid in random widths with staggered butts.

Tudor Black
Careystone

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Carey ASFALTSLATE SHINGLES

Large Size:
12 x 16 in.

Standard Size:
9 x 12¾ in.

LARGE SIZE • 12 x 16 IN.

Carey Asfaltslate Shingles, because of their sturdy construction, are heavier and stronger than ordinary composition shingles. Their chipped slate wearing surface is applied over an exceptionally heavy felt base, saturated with a special asphalt, insuring endurance and freedom from repairs.

Carey Large Size Asfaltslate Shingles are 12 x 16 ins. in size. Extra Heavy Weight. Exposure, 5 ins. 224 shingles (4 bundles) per square.

Colors: Empire Green, Dixie Green, Slate Green,* Tile Red, Blue Black.

Weights: With Plain Back, approximately 325 lbs. per square. With Cork Insulation, 345 lbs. per square.

Underwriters' Label Class C.

*Not made with Cork Insulation.

STANDARD SIZE • 9 x 12¾ IN.

The Standard Size of Carey Asfaltslate Shingles is manufactured under the same process as the Large Size, the only difference being that the Standard Size Shingles are smaller in size and lighter in weight.

Standard Size Asfaltslate Shingles are 9 x 12¾ ins. in size. Exposure, 4 ins. 372 shingles (4 bundles) per square.

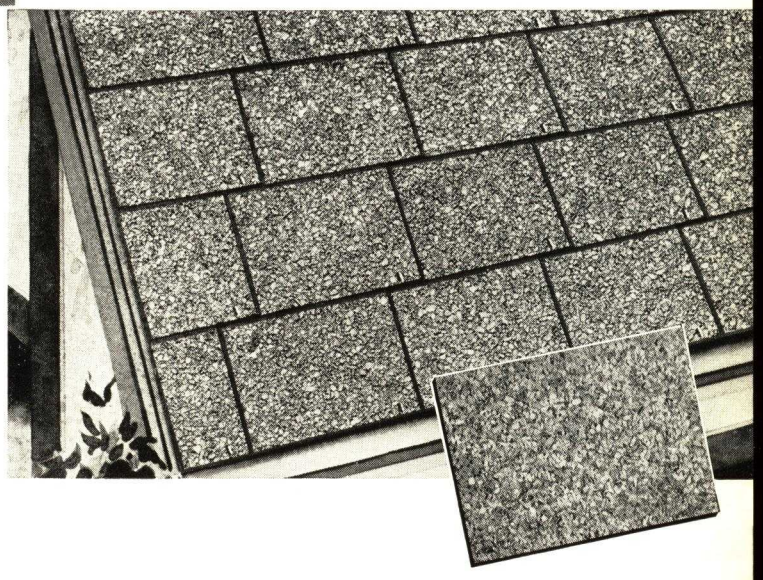
Colors: Empire Green, Dixie Green, Slate Green, Indian Red, Blue Black.

Weight: Approximately 253 lbs. per square, Plain Back.

Underwriters' Label Class C.

Carey Asphalt Saturated and Coated Sheathing Felt applied under the shingles assures longer service.

Careylok ASPHALT — SHINGLES



STANDARD WEIGHT

Careylok Shingles are especially designed for application over old roofs. Exposed corners are anchored with everlasting copper anchors which are furnished without extra charge. Though packed and priced for application with the headlap and sidelap indicated below, the headlap can be increased as desired.

Standard Weight Shingles are 12 x 16 ins. in size.

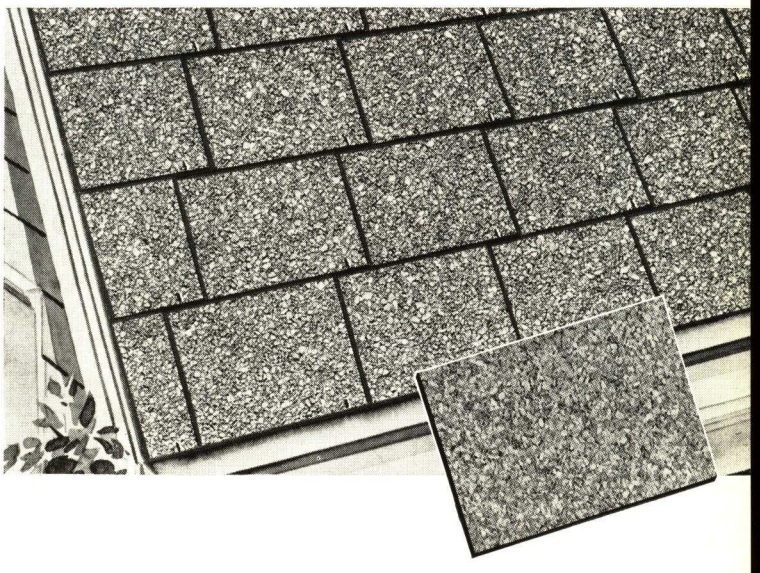
Exposure, 10 ins. Packed 112 (2 bundles) per square for single thickness application. Suggested sidelap 3 in.; headlap 2 in.

Colors: Empire Green, Dixie Green,* Slate Green, Tile Red, Indian Red, Blue Black.

Weights: With Plain Back, approximately 130 lbs. per square. With Cork Insulation, 140 lbs. per square.

Underwriters' Label Class C.

*Can be furnished with cork insulation.



EXTRA HEAVY WEIGHT

Extra Heavy Weight Shingles are similar in application to Standard Weight Shingles.

Size: 12 x 16 ins. Copper anchors furnished. 112 shingles (2 bundles) per square for single thickness application.

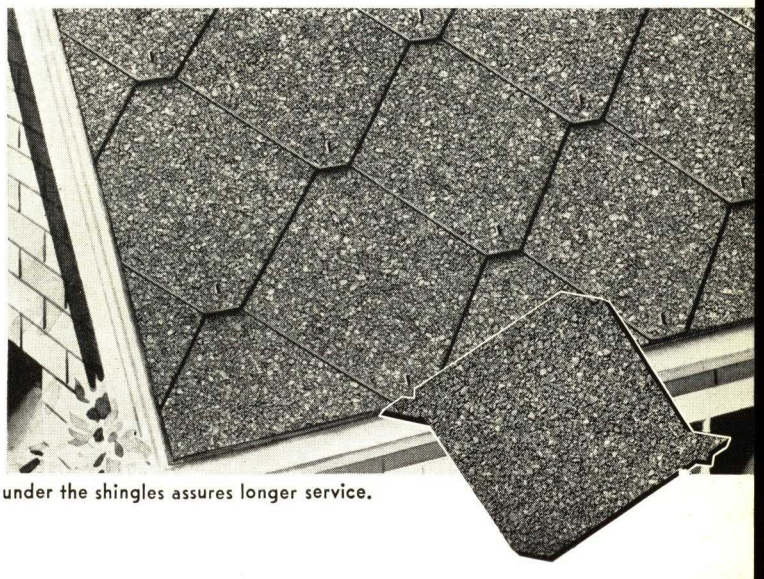
Colors: Dixie Green*, Slate Green, Blue Black.

Weights: With Plain Back, approximately 162 lbs. per square. With Cork Insulation, 172 lbs. per square.

Underwriters' Label Class C.

Note: If double coverage on either weight of Careylok Shingles is desired, order 188 shingles (1.67 squares) for each square of roof area and apply with 6-in. headlap.

*Can be furnished with cork insulation.



HEXAGONAL

Careylok Hexagonal Shingles are especially designed for application over old roofs.

Size, main body: 16 x 16 in. Copper Anchors furnished. 82 Shingles (2 cartons) per square.

Colors: Empire Green, Dixie Green, Slate Green*, Tile Red, Indian Red*, Blue Black.

Weights: With Plain Back, Approximately 130 lbs. per square. With Cork Insulation, 140 lbs. per square.

Underwriters' Label Class C.

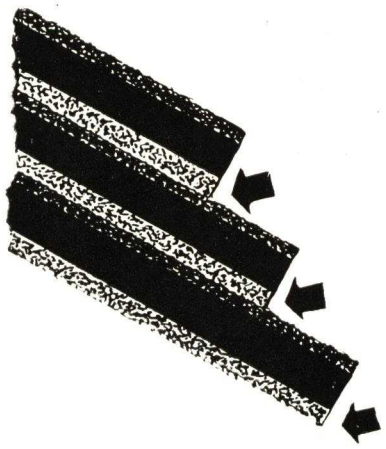
*Not made with cork insulation.

Carey Asphalt Saturated and Coated Sheathing Felt applied under the shingles assures longer service.

6/14

Carey CORK INSULATED SHINGLES

THE ADDED ADVANTAGES OF CAREY CORK INSULATED SHINGLES



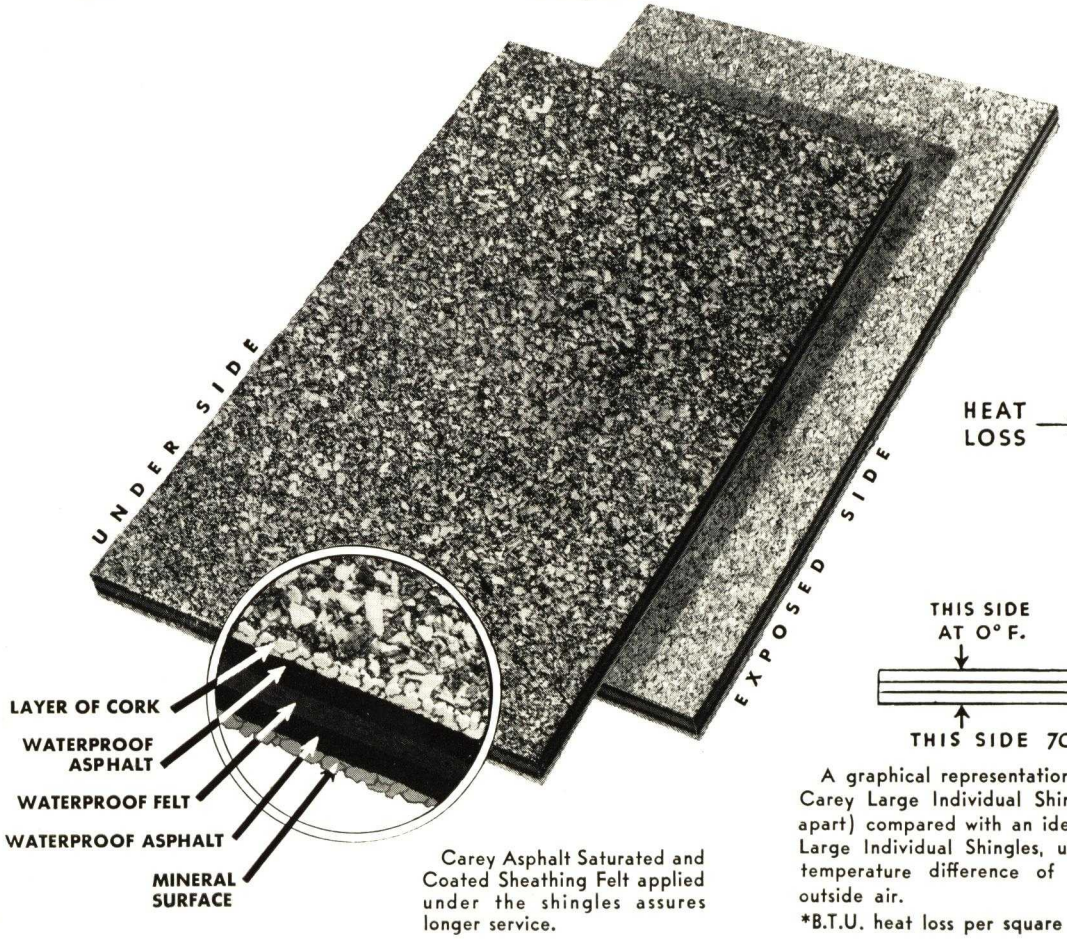
Three thicknesses of cork provide insulation, and this added thickness makes a more attractive roof with deep shadow lines.

BEAUTY—Carey Cork Insulated Shingles give crowning beauty to your building. They are made in shapes and colors to harmonize with any architectural and color treatment. The added thickness creates a deep shadow line which produces a rich finish.

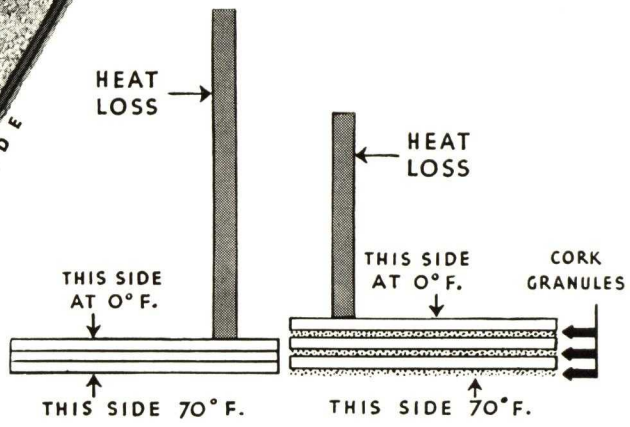
PERMANENCE—Carey Selected Materials, plus more complete saturation, non-fading Ceramic Granule Surface, and rigid inspection—guarded manufacturing process, give added permanence and complete weather resistance.

ECONOMY—A roof of Carey Cork Insulated Shingles gives economy through two lasting qualities — (1) roof insulation — with resulting comfort and fuel savings sufficiently large, in those localities where winter temperatures are low or fuel costs are high, to reimburse the home owner for the entire cost of the roof in a few years. (2) Complete freedom from roof maintenance expense.

FIRE RETARDANCE—Carey Cork Insulated Shingles bear the Class C Underwriters' label of approval — which means that they meet the strict requirements of the Underwriters' Laboratories — maintained by the National Board of Fire Underwriters — based on their burning brand and flame tests. In many localities, worthwhile savings can be made on fire insurance rates by applying a roof of Carey Cork Insulated Shingles.



Carey Asphalt Saturated and Coated Sheathing Felt applied under the shingles assures longer service.



A graphical representation of the heat loss* through three layers of Carey Large Individual Shingles (5 ins. exposure and spaced ¾ in. apart) compared with an identical application of Carey Cork Insulated Large Individual Shingles, under the same test conditions, namely, a temperature difference of 70° F. between the inner surface and outside air.

*B.T.U. heat loss per square foot, per hour.

Carey ASPHALT STRIP SHINGLES

2 TAB HEXAGONAL

11⅓ x 36 IN.

2-in. headlap. 86 shingles — packed 2 bundles per square.

Colors: Empire Green, Dixie Green*, Slate Green, Tile Red, Indian Red, Blue Black, Tapestry, Colorblend, Tropical Blend.

Weights: Approximately 167 lbs. per square. With Cork Insulation, 177 lbs. per square.

Underwriters' Label Class C.

*Can be furnished with cork insulation.

12⅓ x 36 IN.

3-in. headlap. 86 strips — packed 2 bundles per square.

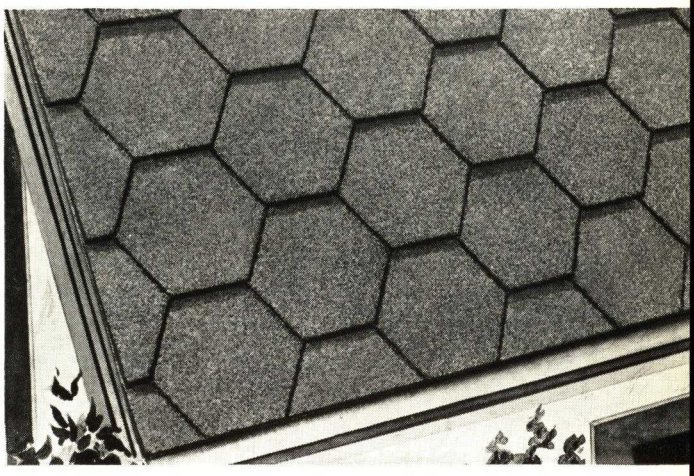
Colors: Empire Green*, Dixie Green, Slate Green*, Indian Red*, Blue Black*, Tile Red*.

Weights: Approximately 186 lbs. per square. With Cork Insulation: 200 lbs. per square.

Underwriters' Label Class C.

*Not made with cork insulation.

14½ x 36 IN.



This has the advantage of being a double coverage shingle. 5 1/6-in. headlap. 86 shingles—packed 2 bundles per square.

Colors: Empire Green*, Dixie Green, Slate Green*, Tile Red*, Blue Black*.

Weights: Approximately 225 lbs. per square. With Cork Insulation: 240 lbs. per square.

Underwriters' Label Class C.

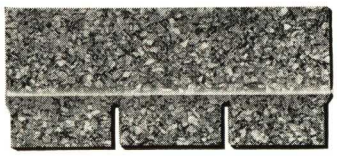
*Not made with cork insulation.

Carey Asphalt Saturated and Coated Sheathing Felt applied under the shingles assures longer service.

6/14 CORK INSULATED STRIP SHINGLES

The addition of ground cork to the underside of this shingle gives the advantage of extra heat insulation value at no extra cost for material or labor.

3 TAB SQUARE BUTT
12 x 36 IN.



(Thick Butt — Plain Back or Cork Insulated.)

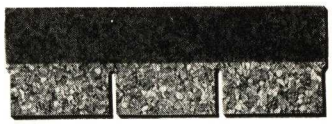
2-in. Headlap. 80 strips — packed 2 bundles per square. Laid 5 ins. to the weather. Self spacing.

Colors: Empire Green, Dixie Green, Slate Green, Tile Red, Blue Black, Green Blend, Red Blend, Harvest Blend, Russet Blend.

Weights: Plain Back, approximately 210 lbs. per square. Cork Insulated, 215 lbs. per square.

Underwriters' Label Class C.

3 TAB SQUARE BUTT
15 x 36 IN.



(Thick Butt—Cork Insulated.)

5-in. Headlap. 80 strips — packed 3 bundles per square. Laid 5 ins. to the weather. Self spacing.

Colors: Empire Green, Dixie Green, Slate Green, Tile Red, Blue Black, Green Blend, Red Blend, Harvest Blend, Russet Blend.

Weight: Approximately 270 lbs. per square.

Underwriters' Label Class C.

4 TAB SQUARE BUTT
10 x 36 IN.

(Standard Weight — Plain Back.)

Size: 10 x 36 in. 2-in. headlap. 100 strips — packed 2 bundles per square. Laid 4 ins. to weather. Self spacing.

Colors: Empire Green, Dixie Green, Slate Green, Indian Red, Blue Black.

Weight: Approximately 210 lbs. per square.

Underwriters' Label Class C.

4 TAB SQUARE BUTT
12½ x 36 IN.

(Standard Weight — Plain Back.)

4½-in. Headlap. 100 strips — packed 3 bundles per square. Laid 4 ins. to the weather. Self spacing.

Colors: Empire Green, Dixie Green, Indian Red, Blue Black.

Weight: Approximately 266 lbs. per square.

Underwriters' Label Class C.

Carey Asphalt Saturated and Coated Sheathing Felt applied under the shingles assures longer service.

Carey PREPARED ROLL ROOFING

LASTILE ROOFING • Mineral Surfaced

Colored granules are embedded into the top coating of asphalt, forming a hard, weather-resisting surface. A smooth selvage is provided along one edge to insure weather tight laps.

Standard Weight: 75 lbs., 2-in. selvage edge. Colors: Dixie Green, Tile Red, Indian Red, Slate Green, Blue Black.

Extra Heavy Weight: 90 lbs., 2-in. selvage edge. Colors: Dixie Green, Empire Green, Slate Green, Indian Red, Tile Red, Blue Black.

SUPER LASTILE

Extra Heavy Weight: 90 lbs., 4-in. selvage edge. Each roll (114 sq. ft.) complete with 2 pints Quick Drying Lap Cement and 1 lb. galvanized spiral nails. Covers 100 sq. ft. of roof surface.

Colors: Empire Green, Tile Red, Slate Green, Indiana Red, Blue Black.

BULLSEYE ROOFING • Fine Talc Surfaced

Bullseye Roofing is built on a felt of good quality but lighter in weight than used in our better grade roofings. Talc finished.

Light .....Approx. weight 35 lbs. per square
Medium .....Approx. weight 45 lbs. per square
Heavy .....Approx. weight 55 lbs. per square

SIMPLEX ROOFING • Talc Surfaced

Made to meet the demands for a low priced talc surface prepared roofing.

Light .....35 lbs. per roll
Medium .....45 lbs. per roll
Heavy .....55 lbs. per roll

CAREYPOINT ROOFING • Mineral Surfaced

For re-roofing over old roofs. No nails or lap cement furnished. Rolls contain 2 sheets providing enough material to cover 100 sq. ft. of roof area allowing for a 2-in. lap.

Colors: Empire Green, Dixie Green, Slate Green, Indian Red, Blue-Black, Colorblend.

Finish: Slate.

*Weight: Approx. 100 lbs. per square.

COLOR-AGE ROOFING

Surfaced with red or green ceramic fine granules, Color-Age Roofing provides a low priced colorful roofing for structures where price is an important consideration.

Extra Heavy .....60 lbs. per roll

Colors: Tile Red and Dixie Green.

Finish: Ceramic, Fine Granules.

FLEXIBLE CEMENT ROOFING

A roofing built on a Burlap base, with all nail heads completely covered and protected by a clever lap joint.

Completing materials furnished.

3 pints Quick Drying Lap Cement, 1 lb. Galv. Spiral Nails and Sealing Strips for End Lap.

*Weight: Approx. 100 lbs. per roll.

Rolls: 33 in. wide (including the 1¼-in. packing strip which is torn off before application).

Sheet: 31¾ in. wide, 40 ft. 9 in. long.

Finish: Superfine granules.

Color: Blue Black.

MICA-KOTE ROOFING • Mica Surfaced, Both Sides

An extra quality roofing of heavy felt base saturated and coated with carefully selected asphalt and finished with Mica Flakes.

Medium .....Approx. weight 45 lbs. per square
*Heavy .....Approx. weight 55 lbs. per square
*Extra Heavy..Approx. weight 65 lbs. per square
*Super Grade (Solka Base)..Approx. weight 75 lbs. per square

*Underwriters' Class C Label.

Unless otherwise specified all rolls contain 108 square feet (36 ins. wide by 36 ft. long) enough to cover 100 square feet of roof surface, sufficient quantity of lap cement and nails furnished.

PREPARED ROLL ROOFING (Continued)

SURETY ROOFING • Mica Surfaced, One Side—Talc Surfaced, One Side

Surety Roofing is an economical, smooth surface roofing recommended for any type of building where a low cost, durable roof is desired.

Light .....Approx. weight 35 lbs. per square
Medium .....Approx. weight 45 lbs. per square
*Heavy .....Approx. weight 55 lbs. per square
*Extra Heavy .Approx. weight 65 lbs. per square

STAGGERED EDGE ROOFING

An attractive low priced slate surfaced roofing designed to produce a novelty effect, for re-roofing over old roofs.

No nails or Lap Cement furnished.

Rolls contain 2 sheets, each 60 ft. 6 in. long, 17½ in. wide at outside points, sufficient to cover 125 sq. ft.

*Weight: 130 lbs. per roll.

Colors: Dixie Green with Blue Black edge, Tile Red with Blue Black edge.

Finish: Slate.

CAREY WHITE TOP ROOFING

Reinforced Asbestos Saturated Felt plied together with a top sheet of white asbestos which is adapted for use in built-up roof construction or as a ready roofing.

CAREY WHITE TOP ROOFING Cont.

Rolls 36 in. wide, containing 108 sq. ft. with 2-in. selvage edge.

§3 Ply, approx. 55 lbs. per roll.

Furnished with Pyramid Kaps and Nails. We do not recommend that White Top Roofing be applied with nails and lap cement.

FIBEROCK ROOFING • Black Top

High grade Reinforced Asbestos Felt, thoroughly impregnated with an exceptionally high melting point asphalt, having the felts cemented together with asphalt, making this material both fire retarding and waterproofing.

Rolls 36 in. wide containing 108 sq. ft.
§3 Ply, 52 lbs. per roll.
§3 Ply, 6 sheets 3 x 6 ft. per square.
§30 sheets (540 sq. ft.) per case, 65 lbs. per square.

ASBESTOS ROOFING • Grapevine Finish

A strong, compact, reinforced Asbestos Felt, thoroughly impregnated and coated on both sides. Talc surfaced.

* 53 lbs. per roll.

Rolls 36 ins. wide, 108 sq. ft.

Complete with galvanized nails and lap cement.

ASBESTOS ROOFING • Slate Surfaced

An unusually strong and compact reinforced Asbestos Felt, thoroughly saturated and coated on top side with tempered asphalt in which slate is embedded. 2-in. selvage edge.

Colors: Slate Green only carried in stock. Other standard colors made on special orders of 200 rolls or more. Complete with galvanized nails and lap cement.

†Weight: 85 lbs.

ASBESTOS ROOFING • Double Sanded

A high grade saturated and coated reinforced Asbestos Felt finished with a good, clean sand. Rolls 36 in. wide, 36 ft. 6 ins. long, containing 110 sq. ft., ½ in. selvage edge. Complete with Pyramid Kaps and Nails.

§Approximate Weight: 68 lbs.

*Underwriters' Class C Label.
†Underwriters' Class B Label.
§Underwriters' Special B.V. Label.

Unless otherwise specified all rolls contain 103 square feet (36 ins. wide by 36 ft. long) enough to cover 100 square feet of roof surface, sufficient quantity of lap cement and nails furnished.

Carey BUILDING PAPERS FELTS and CAP SHEETS

BUILDING PAPERS AND FELTS

Carey waterproofed building papers keep out dampness, dust, grit, and wind; thus insuring a comfortable home.

BLUE PLASTER BOARD

Furnished in 250 sq. ft. rolls (36 ins. wide).
Weight: Approximately 30 lbs. per roll.

RED ROSIN SIZED SHEATHING

Furnished in 500 sq. ft. rolls (36 ins. wide).
Weights: Approximately 20, 25, 30 and 40 lbs. per roll.

BLUE ROSIN SIZED SHEATHING

Furnished in 500 sq. ft. rolls (36 ins. wide).
Weight: Approximately 20 lbs. per roll.

SLATERS FELT

Furnished in 500 sq. ft. rolls (36 ins. wide).
Weight: Approximately 32 lbs. per roll.

SHEATHING FELT • Saturated Only

Polar Brand—a light weight but tough sheet of saturated rag felt. Furnished in 500 sq. ft. rolls (36 ins. wide).
Weight: Approximately 35 lbs. per roll.

SHEATHING FELT • Saturated and Coated

Furnished in 200 sq. ft. rolls (36 ins. wide).
Weight: Approximately 50 lbs. per roll.

CAREY-KRAFT INSULATING PAPER

A very light, but surprisingly strong sheet of Saturated Kraft. Furnished in 250 sq. ft. rolls, 38" wide. Weight 10 lbs. per roll.

BUILDING AND DEADENING FELTS

Furnished in 50 sq. yd. rolls (36 ins. wide).

¾ lb. to sq. yd...Approximate weight 37 lbs. per sq.

1 lb. to sq. yd...Approximate weight 50 lbs. per sq.

1½ lbs. to sq. yd...Approximate weight 75 lbs. per sq.

2 lbs. to sq. yd...Approximate weight 100 lbs. per sq.

FIBREWOVE INSULATING PAPER

A strong, dense, jute paper, waterproofed with asphalt. Furnished in 500 sq. ft. rolls (36 ins. wide).

No. 1—Saturated only. 11 lbs. per sq. Approximate weight 55 lbs. per roll.

No. 2—Saturated only. 9 lbs. per sq. Approximate weight 45 lbs. per roll.

No. 3—Saturated only. 8 lbs. per sq. Approximate weight 40 lbs. per roll.

No. 4—Saturated only. 6 lbs. per sq. Approximate weight 30 lbs. per roll.

No. 5—Saturated only. 5 lbs. per sq. Approximate weight 25 lbs. per roll.

No. 6—Saturated and coated. 7 lbs. per sq. Approximate weight 35 lbs. per roll.

No. 7—Saturated and coated. 10 lbs. per sq. Approximate weight 50 lbs. per roll.

ROOFING ASPHALT AND FELT

ASPHALT SATURATED RAG FELT • Underwriters' Label

ASPHALT SATURATED ASBESTOS FELT Underwriters' Label

15 lbs. (432 sq. ft. per roll). Approximate weight 65 lbs.

30 lbs. (216 sq. ft. per roll). Approximate weight 65 lbs.

ASPHALT SATURATED ASBESTOS FELT • Underwriters' Label

ASPHALT SATURATED RAG FELT Underwriters' Label

Rolls 36 in. wide.

15 lb. Fiberock (324 sq. ft. per roll). Weight 45 lbs. per roll.

20 lb. Fiberock (coated one side) (324 sq. ft. per roll). Weight 60 lbs. per roll.

45 lb. Fiberock Base Sheet (coated and sanded two sides) (108 sq. ft. per roll). Weight 45 lbs.

65 lb. Asbestos Base Sheet (coated and sanded two sides) (108 sq. ft. per roll). Weight 65 lbs.

TAR SATURATED RAG FELT

No. 2 (216 sq. ft. per roll). Weight 50 lbs. per roll.

No. 3 (432 sq. ft. per roll). Weight 50 lbs. per roll.

15 lb. Carey-Seal (432 sq. ft. per roll). Weight 65 lbs. per roll 32 ins. wide.

MANCO ASPHALTS

Manco Asphalt (400-lb. drums).

Manco Asphalt (50-lb. drums).

Flat Manco (for flat roofs) will be furnished unless Steep Manco is specified.

NABOSAR ASPHALT

Steep (drums approximately 400 lbs. each).
Flat (drums approximately 400 lbs. each).
Slag (drums approximately 400 lbs. each).

MINERAL SURFACED CAP SHEETS

19-IN. SELVAGE EDGE

Rolls 36 ins. wide, 36 ft. long. Two rolls required to cover 100 sq. ft. roof area, giving 2-ply construction.

Colors: Indian Red, Slate Green, Blue Black.

Weight: Approximately 110 lbs. per square.

Underwriters' Special B. U. Label.

DUR-A-SEAL CAP SHEET • White Ceramic Surface

Rolls 36 ins. wide, 40 ft. long, containing 120 sq. ft., with 4-in. longitudinal selvage edge on one side and 6-in. transverse selvage edge for endlap for each 8-ft. section. Bottom of sheet is not coated with asphalt. No completing materials.

Mineral Surfaced—Approximate weight 75 lbs. per roll. Underwriters' Special B. U. Label.

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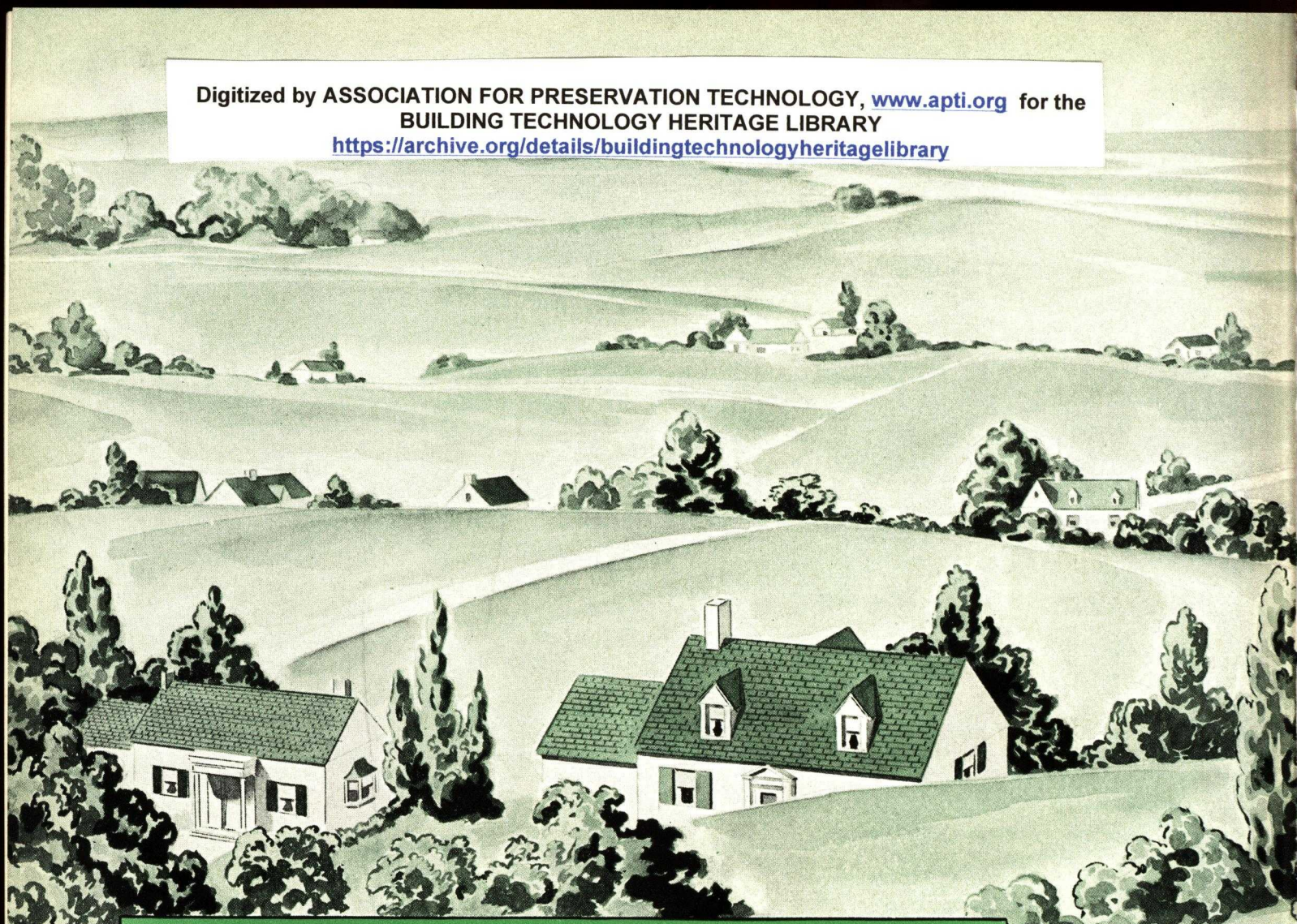

THE PHILIP CAREY COMPANY

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Atlanta, Ga.	The Philip Carey Company	666 Greenwood Avenue, N.E.
Baltimore, Md.	The Philip Carey Company	1400 Moreland Avenue
Birmingham, Ala.	The Philip Carey Company	1601-04 Empire Building
Boston, Mass.	The Philip Carey Company	267 Medford St., Charlestown Dist.
Buffalo, N. Y.	The Philip Carey Company, Inc.	1174 Niagara Street
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Chattanooga, Tenn.	The Philip Carey Company	212 Volunteer State Life Builing
Chicago, Ill.	Illinois Philip Carey Company	2100 Fullerton Avenue
Cincinnati, Ohio	The Philip Carey Company (Cincinnati Sales Office)	Eighth and Broadway
Cleveland, Ohio	The Carey Company	5906-5916 Euclid Avenue
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Detroit, Mich.	The Carey Company	6197 Hamilton Avenue
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Kansas City, Mo.	The Philip Carey Company	2008-2010 McGee Street
Los Angeles, Calif.	The Philip Carey Company	4536 District Boulevard
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Norfolk, Va.	The Philip Carey Company	23rd and Granby Streets
Philadelphia, Pa.	The Philip Carey Company	24th and Sedgley Avenue
Pittsburgh, Pa.	The Philip Carey Company	Corliss Station
St. Louis, Mo.	The Philip Carey Company	4485-87 Duncan Avenue
Seattle, Wash.	The Philip Carey Company	820 Fairview Place
Wheeling, W. Va.	The Philip Carey Company	Chapline at 18th Street

JOHNS-MANVILLE

EXECUTIVE OFFICES

22 East 40th Street, NEW YORK, N. Y.

Member of the Producers' Council, Inc.

Products

JOHNS-MANVILLE RIGID ASBESTOS and ASPHALT ROOFING and SIDING SHINGLES.

For the following Johns-Manville products, see File Index: Acoustical Treatment and Sound Isolation; Built-up Roofs; Roof Insulation; Home Insulation; Insulating Board and Insulating Lath; Pipe Coverings and Insulations; Tile Flooring; Transite, Flat and Corrugated; Asbestos Wainscoting and Asbestos Flexboard; Steeltex for Plaster, Stucco and Brick or Stone Veneer; Steeltex Floor Lath and Welded Wire Reinforcement; Transite Walls for office partitions.

JOHNS-MANVILLE RIGID ASBESTOS ROOFING SHINGLES

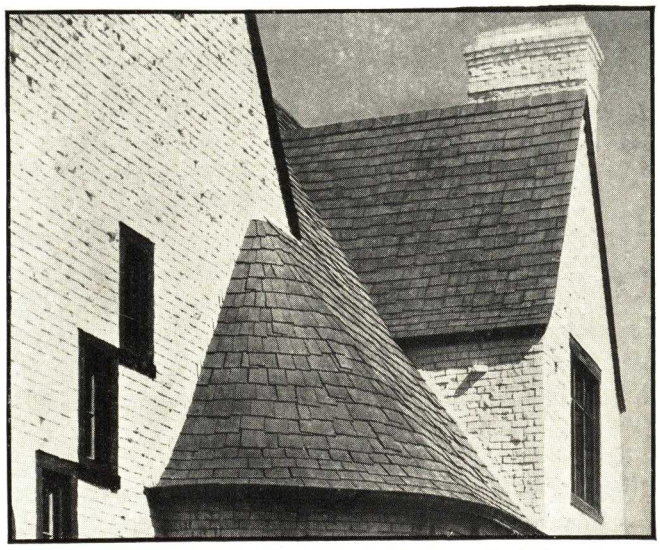
J-M Rigid Asbestos Roofing and Siding Shingles are made of asbestos fibre and portland cement united under great hydraulic pressure. They are fireproof and highly resistant to weather and wear.

Roofing Shingles are manufactured in various sizes for application in three styles broadly known as the American, Dutch Lap and Hexagonal Methods. Included are shingles of uniform or tapered thickness, smooth or rough texture, applicable in one uniform color or in two or more colors blended.

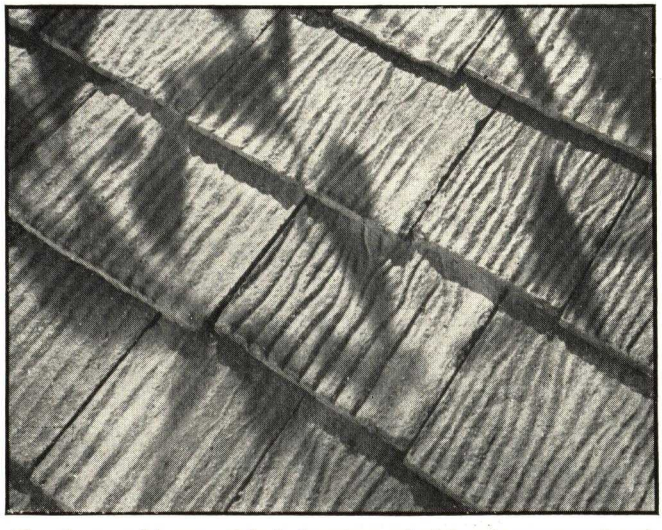
The application of the American Method Shingles, like other roofing materials of shingle form, may be varied to obtain effects ranging from those in which the line of the butts appear straight and entirely regular, to those in which the units appear to have been placed entirely at random, with no definite scheme of regularity having been followed. Eaves starters, eaves shingles, ridge and hip shingles, and ridge roll are provided as required by the various styles and varieties.

Tables containing colors, dimensions, weights and other data on each style, as well as on various types of siding shingles, will be found on pages 2 and 4.

It is recommended that roof surfaces which are to receive asbestos shingles be pitched not less than 4 in. to the foot where American Method Shingles are to be used and not less than 5 in. to the foot for the Hexagonal or Dutch Lap Methods. Siding shingles should be applied only to vertical walls.



J-M Rigid Asbestos Shingles, American Method



The charm and beauty of Early American colonial roofs recaptured, and made permanent and fireproof in Salem Shingles

Underwriters' Rating

American Method Roofing Shingles carry Underwriters' Class "A" label for all varieties.

Dutch Lap and Hexagonal Method Roofing Shingles carry Underwriters' Class "B" label.

Salem Roofs

The Salem Shingles have been developed to provide when applied, a literal counterpart in appearance of the aged hand-hewn wood shingle roofs of early new England, and have, in addition, the advantage of being fireproof and superior in all points of durability.

These shingles are available in warm weathered gray, brown and black and in varying shades of greens and reds, all of which may be used singly or in combination.

They may be applied over solid wood sheathing in new construction or over existing wood shingles, this latter adaptability being valuable in eliminating the possibility of damage to the interior while the old roof was off, and

the muss and possible damage to shrubbery incident to removing the old roof.

Data on the Salem Shingles will be found in the table at the bottom of this page.

No. 70 Hexagonal Shingles
Because of its pleasing design and great economy, this is one of the most popular asbestos shingle styles

Dutch Lap and Hexagonal Methods

In addition to the Salem Shingles, which are laid American Method, other styles have been developed to provide, at a cost within the budget limitations of even the most modest house, a fire and weather resisting roofing material which, through a proper combination of colors, or colors and texture, makes the roof partake of the spirit of the house and its surroundings.

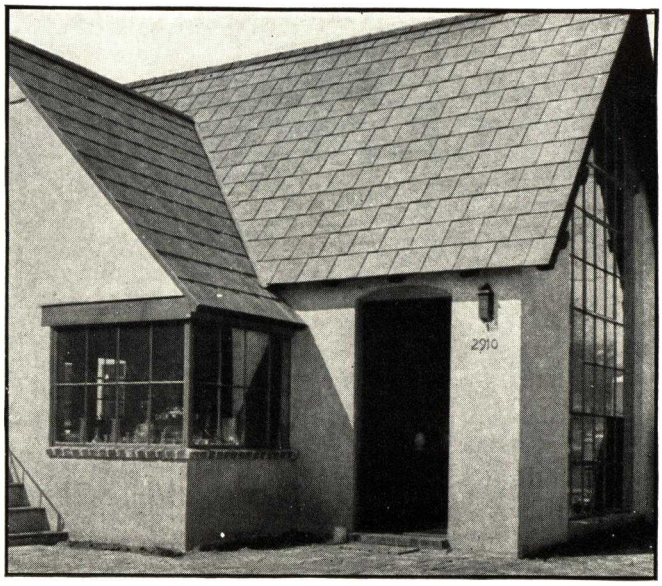
No. 70 Hexagonal Shingle—Applicable by the familiar Hexagonal Method, this shape provides a saving in labor and material through the relatively few number of pieces per square involved.

No. 30 Dutch Lap Shingle—This shingle, with the economy of the Dutch Lap Method, provides the familiar horizontal butt line characteristic, at about the cost of asphalt shingles or other low priced roofing materials of far less permanence.

Both of these styles make procurable, at low cost, a fireproof and weatherproof roof in colors which are in keeping with the character of the building.

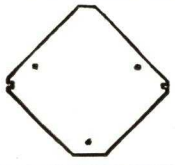
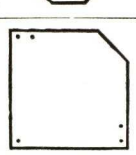
Re-roofing

For many years, Johns-Manville has advocated, in connection with re-roofing projects, the application of rigid asbestos shingles directly over existing wood shingles. This practice has been followed so successfully that we do not hesitate to recommend it to the architect.



No. 30 Dutch Lap Shingles
This beautiful Dutch Lap Roof demonstrates how closely the lines of this shingle resemble the American Method

DATA ON JOHNS-MANVILLE RIGID ASBESTOS ROOFING SINGLES

Shape	Catalog No. and type	Size	Thickness	Colors marked with (*) have a textured surface; others are smooth surfaced	Approx. weight per square applied	Weather exposure, inches	No. of shingles required per square	Galvanized shingle nails required per square	Copper storm anchors req'd per square	Catalog No. of eaves starter or hip and ridge shingle to be used.
	No. 35 Salem American method	Standard 8"x16" Random 6", 8" and 10"x16"	Tapered ¼" butt	*1. Weathered gray *2. Weathered black *3. Olive green *4. Sea green *5. Apple green *6. Forest brown *7. Granada red *8. Touraine red	540	7	260	2½ lb. 1¼" nail	None	No. 36 Salem starter No. 37 Salem hip and ridge
	No. 70 Hexagonal method	16"x16"	Uniform 3/16" approx.	Mottled gray Mottled blue-black Mottled red *Mottled green Mottled copper	275	13x13	86	1 lb. 1¼" nail	86	No. 17 and No. 71 starters
	No. 30 Dutch Lap method	16"x16"	Uniform 3/16" approx.	Mottled gray *Mottled blue-black *Mottled red *Mottled green Mottled copper	290	¼ side lap 13x12 ⅓ side lap 13x10⅔	92 per 99⅔ sq. ft. 104	1 lb. 1¼" nail	92 per 99⅔ sq. ft. 104	No. 31 starter

JOHNS-MANVILLE ASBESTOS SIDING SHINGLES

J-M Tapered Shake Texture Asbestos Siding Shingles

In these fireproof shingles, Johns-Manville has captured all the beauty of texture found in weathered hand-hewn wood shingles, mellowed by time, and has made this charm available in a permanent, fireproof material.

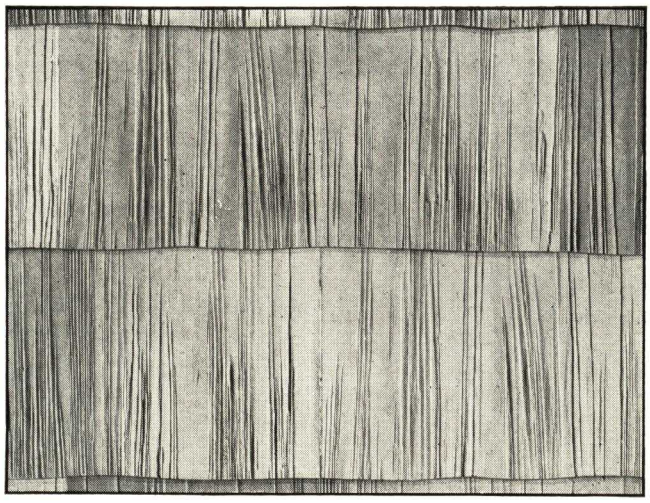
Siding of J-M Shake Texture Asbestos Siding Shingles is permanent and fireproof, for these shingles will not rot, corrode, split or burn. They do not need periodic painting to preserve them. Their colors—gray and oyster white—produce the attractive appearance of the old originals. The tapered butts carry out the effect of ruggedness and give a heavy shadow line.

Shake Texture Shingles are the heaviest and strongest asbestos siding shingles made, and exclusive with the Johns-Manville line.

Colonial charm with fireproof, maintenance-free Asbestos Siding Shingles with Cedargrain texture

Yet, despite all their advantages of beauty, fire protection and permanence, these new Shake Texture Shingles cost less applied than most other types of permanent siding. Although the wide units, when applied, have the appearance of individual shingles in random widths, they are actually large sheets which cover large areas quickly and economically.

When used for re-siding work, they can easily be applied right over the old wood siding, thereby saving the expense of tearing off the old material. Combined with a roof of J-M Asbestos Roofing Shingles they complete the protection of the building from fire, weather and deterioration through age.



Close view of the No. 105-T Shake Texture Siding Shingles

J-M Cedargrain Texture Asbestos Siding Shingles

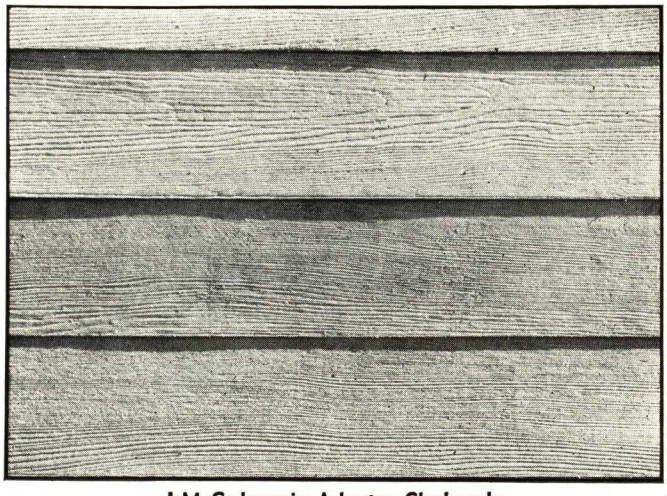
These shingles possess all the qualities of permanence and fire-resistance of the Shake Texture Shingles but differ in that they are of uniform thickness and have the graining of the ordinary weathered wood shingle. Available in blended gray, green, oyster white, mottled gray or special mottled gray, they offer a range of color suitable for the majority of moderate-priced houses. They are adaptable for use on new work or for re-siding over old materials.

Sizes, weights and other detail data on all types of J-M Asbestos Siding Shingles will be found on the following page.

J-M Cedargrain Asbestos Clapboards

The desirable features of lapped wood siding, plus permanence and freedom from maintenance, are incorporated in J-M Cedargrain Asbestos Clapboards. Made of asbestos and white portland cement, they are fireproof, rot-proof and require no protective painting or other periodic maintenance.

The use of white portland cement in manufacture



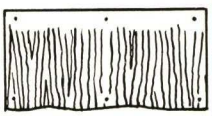
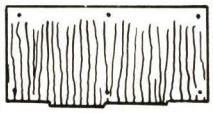
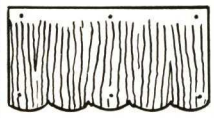
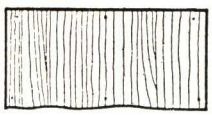
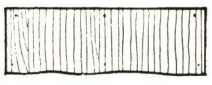
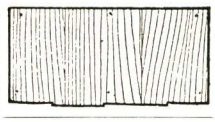
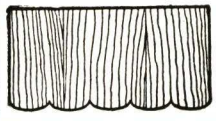
J-M Cedargrain Asbestos Clapboards

produces a finished white sidewall. The face of each clapboard is attractively surfaced for its entire length to give the effect of the grain in natural wood. The clapboards are sufficiently large to permit rapid and economical application.

J-M Cedargrain Asbestos Clapboards are $\frac{3}{16}$ in. thick, 9½ in. wide, and 8 ft. long. They are designed to be applied with 1½-in. lap, giving 8-in. exposure to the weather. Sufficient material to cover one square consists of the equivalent of nineteen 8-ft. lengths, which are packed in two bundles. With each square there are shipped 25 backer strips and ½ lb. of 1¾-in. bronze face-nails. In addition, ¾ lb. of 1¼-in. galvanized needlepoint nails (1¼ lb. 2-in. nails for re-siding) are required for the concealed nailing.

The clapboards are factory-punched on approximately 16-in. centers, 1½ in. from butt edge to receive face-nails and 1 in. from head to receive galvanized iron shingle nails.

DATA ON JOHNS-MANVILLE RIGID ASBESTOS SIDING SHINGLES

Shape	Catalog No. and type	Size	Thickness	Texture	Colors	Approx. weight per square applied, lb.	Weather exposure, inches	No. of shingles required per square	Galvanized shingle nails required per square
	105-T	24″x12″	Tapered $\frac{5}{16}$″ butt (approx.)	Shake Shake	Oyster white Blended gray	260	10½	57	1¼ lb. 2″ nail
	107-T	24″x12″	Tapered $\frac{5}{16}$″ butt (approx.)	Shake Shake	Oyster white Blended gray	270	10	60	1¼ lb. 2″ nail
	108-T	24″x12″	Tapered $\frac{5}{16}$″ butt (approx.)	Shake Shake	Oyster white Blended gray	285	9½	63	1¼ lb. 2″ nail
	No. 105-U	24″x12″	Uniform $\frac{3}{16}$″ approx.	Cedargrain Cedargrain Cedargrain Cedargrain Cedargrain Cedargrain	Blended gray Blended copper Green Oyster white Mottled gray Special mottled gray	195	10½	57	1¼ lb. 2″ nail
	No. 106	24″x8″	Uniform $\frac{3}{16}$″ approx.	Cedargrain Cedargrain Cedargrain Cedargrain	Blended gray Blended copper Green Oyster white	212	6½	93	2 lb. 2″ nail
	No. 107-U	24″x12″	Uniform $\frac{3}{16}$″ approx.	Cedargrain Cedargrain Cedargrain Cedargrain Cedargrain	Blended gray Green Oyster white Mottled gray Special mottled gray	205	10	60	1½ lb. 2″ nail
	No. 108-U	24″x12″	Uniform $\frac{3}{16}$″ approx.	Cedargrain Cedargrain Cedargrain	Blended gray Green Oyster white	215	9½	63	1¼ lb. 2″ nail

JOHNS-MANVILLE ASPHALT SHINGLES

Johns-Manville Asphalt Shingles are made of heavy felts impregnated with the finest asphalt and surfaced with crushed mineral. They are made as strip shingles, both Hexagonal and American styles, and as individual shingles, American, Dutch Lap and Hexagonal styles. All J-M Asphalt Roofing Shingles carry the Underwriters' Class C label.

These shingles are made in a variety of colors chosen by a committee of architects and building authorities. Included are monotones and blends. Among the latter are the "Duo-Blend" effects in which the base color is overlaid intermittently with another color.

The Double Coated Thick Butt strip shingles have an extra coating of asphalt and slate on the exposed side. The Sealed Edge Thick Butt strip shingles are redipped, which gives a thick butt and sealed edges.

Four color reproductions of J-M Asphalt Shingles, and complete data on sizes, weights, exposure, etc., are included in the J-M Building Material Catalog, which may be had on request at any Johns-Manville office.

KEASBEY & MATTISON COMPANY

AMBLER, PA.

DISTRICT OFFICES IN PRINCIPAL CITIES

For K&M Decorative Wallboards, Mineral Wool and Pipe, Sheet and Block Insulations, Sidewall and Ceiling Erection System, Asbestos Corrugated and Trafford Tile, see File Index.

The first asbestos-cement shingles made in this country were produced by Keasbey & Mattison Company in 1905. Since that time, this company, which is one of the oldest and largest manufacturers of asbestos products, has continued to play a leading part in the development of asbestos shingles.

K&M "Century" Asbestos shingles are manufactured from selected asbestos fibre scientifically combined with Portland cement. Formed under tremendous hydraulic pressure, they are fire-resisting, weather-resisting, and termite-proof.

Textures have been developed that give the architect a full range of effects that portray effectively the architectural periods of the past, as well as the more modern styles.

On this and the following pages will be found illustrations and data covering K&M "Century" Asbestos Roofing and Siding Shingles.

K&M No. 92 AMERICAN METHOD ASBESTOS ROOFING SHINGLES

Thick, tapered butts, irregular edges, heavy shadow lines, and deep, rich vertical texture characterize this aristocrat American Method Shingle. On the roof, it has the mellowness of costly thick butt cypress shingles after they have had many years exposure to weather. The texture of these shingles is varied and interesting. This distinctive shingle is appropriate for many types of homes. It is non-combustible and permanent. Available in a wide range of colors, to meet varying architectural requirements.

Description—The No. 92 Weathered Effect Asbestos Shingle is tapered, with a ¼ in. butt. It is 18 in. long, 9 in. wide, with ¼ in. butt standard. Random widths are available in any combination of widths that will cut without waste from a blank 18 in. wide. Standard colors as shown below are Royal Red, Lindenwold, Dell Green, Olive Green, Oxford Black.

Rustic Blend, which is illustrated in full color on the next page, is also available in this style shingle.

Exposure to the weather is 8 in. Head Lap is 2 in. Weight per square is (approximately) 525 lbs. 200 shingles per square.

Method of application furnished upon request to Headquarters, at Ambler, Penna.

Application of No. 92 Roofing Shingles

K&M No. 99 AMERICAN METHOD ASBESTOS ROOFING SHINGLES

The popular Lindenwold design is a modern counterpart of the old Colonial type, hand-hewn shingle. Recommended for both new construction and restoration work. Irregularity of surface may be enhanced by random widths, staggered joints, and graduated exposures when desired. It is fire-resisting and weather-resisting.

Description—The No. 99 Asbestos Shingle is tapered to a $\frac{7}{16}$ in. butt. It is 18½ in. long and 9¼ in. wide or may be obtained in random widths of 6, 12, and 18 in. Exposure to the weather is 8¼ in. Weight per square is (approximately) 900 lbs. 190 shingles per square. It may be secured on special order in the five colors illustrated on preceding page or in the Rustic Blend shown below.

K&M No. 100 AMERICAN METHOD ASBESTOS ROOFING SHINGLES

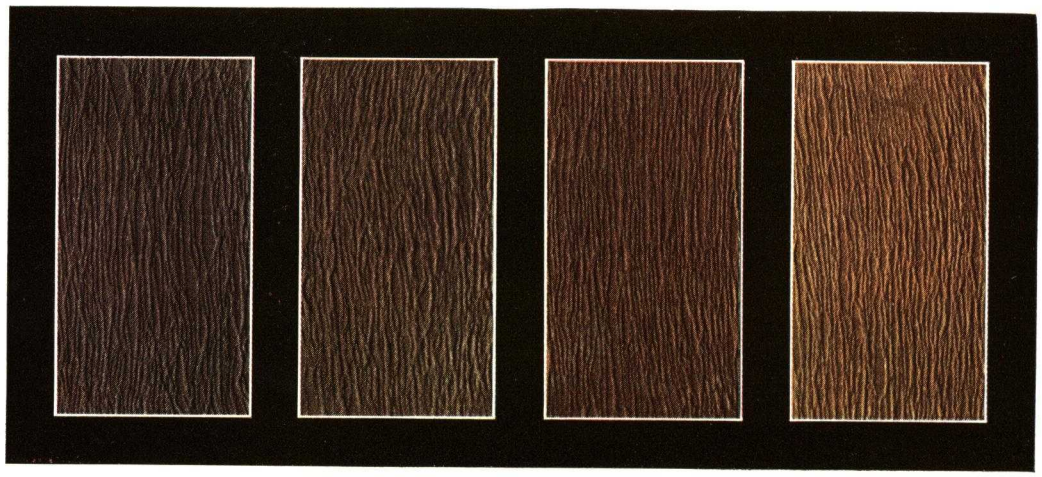
This asbestos shingle gives the effect of old, weathered wood shingles. The "Lindenwold" is textured individually with no two shingles exactly alike. Leading architects have found that this shingle meets their requirements particularly well.

Random widths are offered in any combination of widths that will cut without waste. The Rustic Blend Combination is available as well as the five colors illustrated on the preceding page: Royal Red, Lindenwold, Dell Green, Olive Green and Oxford Black. This shingle is not stocked but is manufactured to order only.

Description—The shingle is 18½ in. long and 9¼ in. wide, tapered to a $\frac{5}{16}$ in. butt. Exposure to the weather is 8¼ in. Head lap is 2 in. Weight per square is (approximately) 625 lbs. 190 shingles per square. For method of application, write Headquarters at Ambler, Penna.

Rustic Blend . . .

Rustic Blend is a four color combination consisting of 30% each of three shades of purplish brown and 10% of contrasting buff. These colors when blended give a soft autumnal effect. Variations of Rustic Blend are possible by changing the percentages of each shade. Rustic Blend as illustrated below is designated as Nos. 3, 2, 1, 4, reading from left to right.



K&M No. 16 AMERICAN METHOD ASBESTOS ROOFING SHINGLES

A popular American Method Shingle for roofing, either in renovizing work or new construction. Made by the laminated process of a light though sturdy construction.

Pleasing colors are obtained by the use of pure mineral pigments which have proved their lasting quality by more than twenty-five years of satisfactory service.

Description—The No. 16 American Method Asbestos Shingle is 16 in. long, 8 in. wide and 5/32 in. thick. Standard colors are Surf Green, Spanish Red, Autumn Brown, Pearl Gray, Newport Gray and Black, the same as No. 30 shingle described and illustrated in full color on the next page. Exposure to the weather is 7 in. Head lap is 2 in. Weight per square is (approximately) 416 lbs. 260 shingles per square.

K&M No. 30 SIDE LAP ASBESTOS SHINGLES

This type of shingle, often called "Dutch Lap", resembles the more expensive American Method application due to the presence of both horizontal and vertical lines. An exceedingly desirable, low cost shingle, with its texture giving a weathered wood effect. Large unit size reduces the cost of application.

Two edges of each shingle are completely covered by adjoining shingles, leaving only one exposed corner which is rigidly fastened with a storm anchor of solid copper. This side lap shingle is rigid and strong and offers effective protection for the surface it covers, being especially efficient in areas subject to wind storms of high velocity. It is fire-resisting and permanent, and well adapted to most types of architecture.

Description—The No. 30 Side Lap Asbestos Shingle is 16 in. long, 16 in. wide, and 5/32 in. thick. Standard colors, illustrated below, are Autumn Brown, Spanish Red, Surf Green, Black and Pearl Gray. This shingle is also furnished standard in Newport Gray. Exposure to the weather is 12 in. by 13 in. Head lap is 3 in. and side lap 4 in. Weight per square is (approximately) 280 lbs. 92 shingles per square (¼" lap).

K&M No. 57 BROADSIDING ASBESTOS SHINGLES

A low cost siding shingle of genuine beauty. It is uniform in thickness, and its deep, cypress graining and wavy butt line present a pleasing weathered effect. These shingles are fire-resisting, termite-proof and never need protective painting. The mineral pigment coloring is a part of the shingle itself. This shingle and the three which follow, Nos. 60, 75, and 80 are all available in Shell White, Sage Green, and Newport Gray. These three colors are shown at the bottom of the next page.

Description—The No. 57 Broadsiding Asbestos Shingle is 12 in. long, 24 in. wide and 5/32 in. thick. Surface texture is vertical. It is applied with 1½ in. overlap. Weight per square is (approximately) 192 lbs. 57 shingles per square.

For method of application, write Headquarters at Ambler, Penna.

Application of No. 57 Broadsiding . . . Shell White

KEASBEY & MATTISON COMPANY

K&M No. 60 BROADSIDING ASBESTOS SHINGLES

The staggered butt effect obtained by using No. 60 Broadsiding makes available a low cost shingle giving the appearance of the most expensive random exposure wood unit. It is a weathered effect shingle of uniform thickness, with vertical surface texture.

Description—The K&M No. 60 Broadsiding Asbestos Shingle is 12 in. long, 24 in. wide, and 5/32 in. thick, with staggered butt. It is applied with a maximum 2 in. overlap. Weight per square is (approximately) 190 lbs. 60 shingles per square. The three colors—Shell White, Sage Green and Newport Gray—are shown at bottom of this page.

K&M No. 60 Broadsiding

K&M No. 80 BROADSIDING ASBESTOS SHINGLES

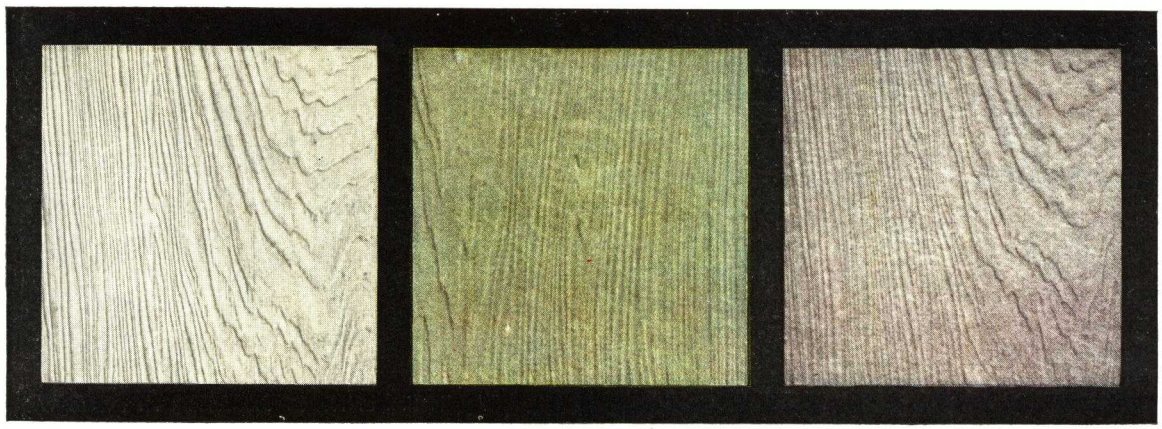
The appearance of this shingle is much the same as that of the No. 60 Broadsiding with staggered butt, except that it is smaller. Furnished in same colors as No. 60 Broadsiding.

Description—9½ in. long, and 24 in. wide, with staggered butt line. Maximum overlap is 2 in. Exposure to the weather is 7½ in. by 24 in. Weight per square is (approximately) 200 lbs. 80 shingles per square.

K&M No. 75 BROADSIDING ASBESTOS SHINGLES

K&M No. 75 is a Broadsiding shingle especially adaptable to small buildings. It is a wavy butt shingle, with exposure approximating that of high grade wood siding shingles. It is also recommended for use with the larger No. 57 shingle where it is desired to use one or two courses of narrower shingles to break sameness of effect. This shingle is fire-resisting, termite-proof and never needs protective painting.

Description—The K&M No. 75 Broadsiding shingle is of uniform thickness and has a weathered effect with vertical surface texture. It is 9½ in. long, 24 in. wide, and 5/32 in. thick, with wavy butt. It is applied with 1½ in. overlap. Standard colors are left to right, Shell White, Sage Green and Newport Gray, as illustrated below. Weight per square is (approximately) 200 lbs. 75 shingles per square.



Asbestos-Cement

• SHINGLES •

Asphalt

RU-BER-OID

The Pioneer

The RUBEROID Co. (originally named, "The Standard Paint Co."), was founded in the year 1886. The first product, manufactured over fifty years ago, was Ruberoid Asphalt Paint (formerly called "P&B Paint"), an insulating and protective coating still widely used in the electrical and industrial fields.

From one small factory with a limited number of products, The RUBEROID Co. has grown until today it is one of the largest manufacturers of roofing and allied building products in the world. Outside of its plants in foreign countries, it now operates ten great factories in the United States.

Today, The RUBEROID Co. manufactures a wide variety of quality building and maintenance products, which are giving service in all parts of the world. A complete listing and description of some of these products is contained in this catalog.

Ruberoid plants are strategically located throughout the Country. Its divisional sales offices are manned by executives who have full and complete authority over their divisions. Only the most fundamental questions of general policy are dictated from the head office. A factory produces the goods shipped in a limited area under the supervision of a capable staff at an office in each division.

THE RUBEROID CO.

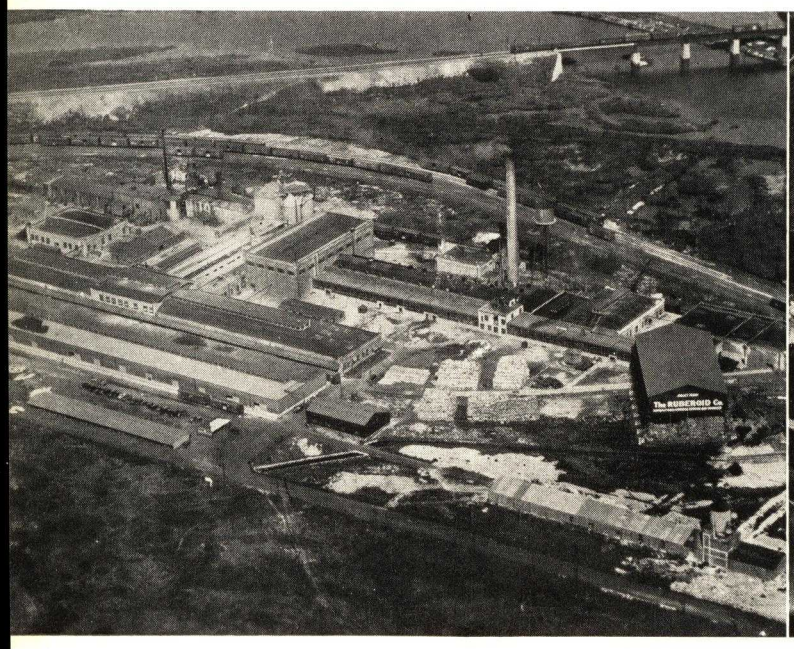
DIVISIONS

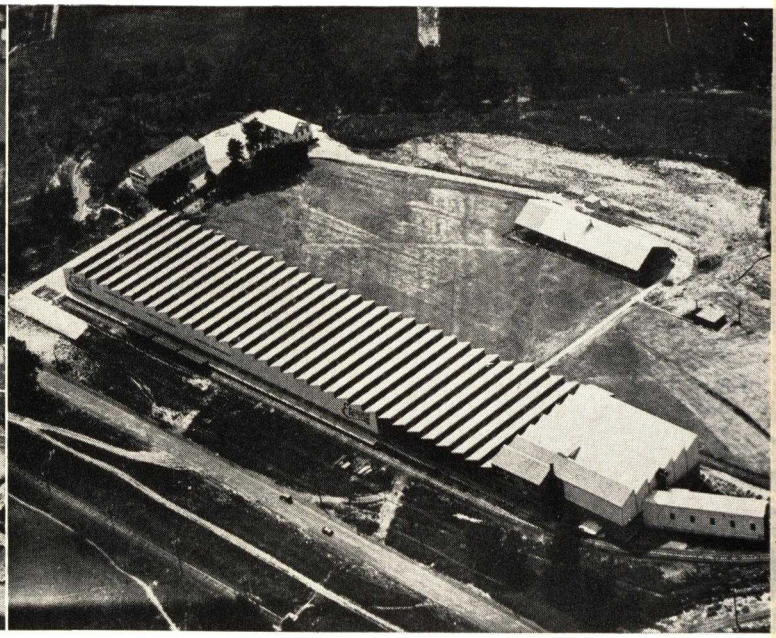
CONTINENTAL ETERNIT SAFEPACK
H. F. WATSON

OFFICES

NEW YORK CHICAGO BOSTON (MILLIS) ERIE
BALTIMORE MOBILE

Samples and descriptive literature of any product made by The Ruberoid Co. will be gladly sent on request.





TWO OF TEN MODERN PLANTS WHERE RUBEROID PRODUCTS ARE MADE

ETERNIT ASBESTOS CEMENT PRODUCTS . . .

ETERNIT Asbestos-cement Shingles are made of Portland Cement and Asbestos Fibres, carefully combined by an ingenious building up process which insures an even distribution of the reinforcing fibres throughout the finished shingle, and results in remarkable strength and resiliency. When finally subjected to tremendous hydraulic pressure, they acquire great density, becoming waterproof, as well as fireproof. Eternits are as truly an ageless product as the name implies.

ETERNIT Asbestos-cement Shingles are made in a wide variety of shapes, textures and colors—each one adaptable to some particular architectural style, or the property owner's pocketbook. They are as well suited for re-roofing over old shingles and for residing over old clapboards, stucco or other material as for new work. Colors are pure mineral oxides and are an integral part of each shingle. All ETERNIT Shingles bear the Underwriter's Laboratories, Inc. Label.

ETERNIT GOTHIC SHINGLES No. 200

The Gothic has age-old architectural charm in its rugged rock-like texture and soft, mellow colors. The texture is like that of natural rock in which has been carved by years of exposure to the elements fascinating designs such as only nature itself can produce. The luxurious appearance is duplicated only in the most expensive types of natural slate or stone.

Tapered with a heavy butt, the Gothic shingle lays perfectly on the roof and has shadow lines which give the effect of massiveness without the burden of extra weight in the shingle itself which would necessitate an expensive supporting structure.

Furnished in random widths and designed so that it can be applied with staggered butts, the Gothic offers unusual opportunities for individuality in roof design both from the standpoint of roof lines and color blending.

The Gothic Shingle is equally suitable for old or new work.

COLORS

Dark Green	Quarry Blue	Purple
Jade Green	Colonial Gray	Buff
Tile Red	Slate Gray	Weathered Copper
	Dark Brown	

SPECIFICATIONS

Full size shingles—12 in. wide by 16 in. high.

Random widths—5, 6 and 7 in.

Tapered with approximately 5/16 in. butts.

Applied with 7 x 12 in. exposure; spaced ⅛ in. apart.

Shingles per Square: 171.

Approximate Weight per Square: 525 lbs.

Packaged 9 bundles containing 19 shingles each.

For finishing Hips and Ridges: 6 in. wide shingles in Boston Hip Method.

Completing Materials: 2 lbs. 1½ in. Galvanized Needle Point Nails.

(Use 2 in. nails for applying over old shingles.)

Underwriter's Label Class "A"

RANDOM WIDTH SHINGLES No. 201

Gothic Random Width Shingles are available in 5, 6 and 7 in. widths in the same colors as regular Gothics.

There are 342 random width shingles per square (18 bundles of 19 shingles each).

Weight approximately 525 lbs. per square.

Where 5 in. and 7 in. shingles are used, equal quantities of each must be ordered.

Completing materials: 3½ lbs. 1½ in. galvanized needle point nails.

HIP AND RIDGE SHINGLES No. 202

Hips and Ridges are finished with 6 in. wide Gothics specially designed for this purpose. They are applied by the Boston Hip Method with a 7 in. exposure.

342 shingles, weighing approximately 525 lbs. are required to cover 100 lineal feet of ridge in this manner.

Packed in 18 bundles of 19 shingles each.

Gothic Hip and Ridge Shingles are available in the same colors as Gothic Shingles No. 200.

TIMBERTEX ASBESTOS . . .

AMERICAN METHOD—No. 203

Eternit Timbertex American Method Shingles faithfully reproduce the texture of weather-aged cypress. For many years the charm and beauty of wood shingles have been beloved in American residential architecture. That these characteristics have been retained in a shingle that is fireproof and durable to the extent of being practically everlasting, is an outstanding achievement of architectural and mechanical skill.

Tapered in shape, Timbertex Shingles lay perfectly snug and tight to the roof, giving maximum protection against the weather. The heavy butts produce attractive shadows and, when laid with straight or slightly staggered alignment, the effect is that of mellowed wood with colors softened and made richer by the finely etched texture. The colors are an integral part of each shingle; painting or staining is not required.

Double sets of punched nail holes permit the laying of irregular shingle courses, providing interesting roof lines. Timbertex Shingles are ideal for new roofing, or they may be applied with 2 in. nails right over old shingles.

COLORS

Weathered Copper	Jade Green	Slate Gray
Dark Brown	Tile Red	Colonial Gray
Dark Green	Quarry Blue	Cypress Brown

SPECIFICATIONS

Size 8 in. x 16 in.—approx. ¼ in. thick butt... Exposure 8 in x 7 in.
Shingles per Square..... 260
Bundles per Square..... 10
Approximate weight per Square.....525 lbs.

Completing Materials: 2½ lbs. 1½ in. Galvanized Needlepoint nails. (Use 2 in. long nails for applying over old shingles.)

Underwriter's Label Class "A"

TIMBERTEX HIP AND RIDGE SHINGLES No. 211

These shingles are uniform standard thickness, and are for use with all shingles except Gothics.

SPECIFICATIONS

Size—16 in. long by 4⅝ in. to 5⅜ in. tapered width. Applied with 7 in. exposure.

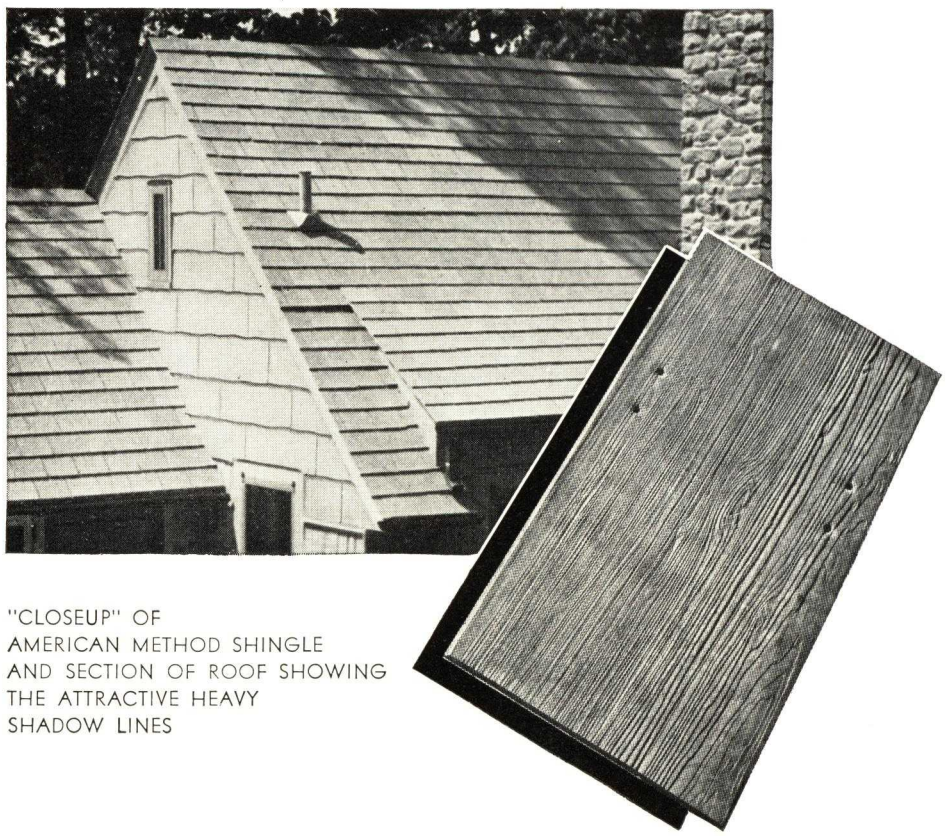
342 Pieces per 100 lineal ft., of 18 bundles of 19 pieces each.

Approximate Weight: 325 lbs. per 100 lineal ft.

COLORS

Colonial Gray	Cypress Brown	Polychrome
Quarry Blue	Slate Gray	Jade Green
	Tile Red	

Completing Materials: 3½ lbs. of 1½ in. Galvanized Needle Point Nails.



"CLOSEUP" OF AMERICAN METHOD SHINGLE AND SECTION OF ROOF SHOWING THE ATTRACTIVE HEAVY SHADOW LINES

. . . CEMENT SHINGLES

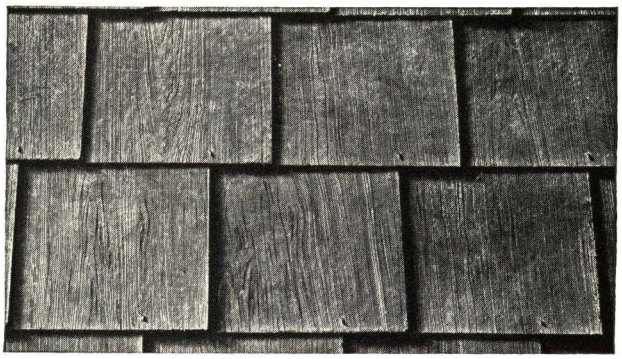
DUTCH LAP METHOD No. 210

Eternit Dutch Lap Shingles have the "weathered cypress" texture and roof lines of "American Method" shingles. This ingenious design, however, effects great economy in the cost of the finished roof.

The method of application follows the principle of having both a headlap and sidelap for protection. It has been employed for many years in the application of certain types of roofing material and has been proven entirely satisfactory.

For small homes, where massiveness is not paramount, or for re-roofing, this shingle lends itself admirably.

The Dutch Lap Timbertex is particularly recommended to those who would have the best in quality and appearance, and to whom economy in cost is an important consideration.



COLORS

Jade Green	Quarry Blue	Cypress Brown
Tile Red	Colonial Gray	Polychrome
	Slate Gray	

SPECIFICATIONS

Size.....16 in. x 16 in. x $\frac{5}{32}$ in. thick
Headlap..... 3 in. Sidelap..... 4 in.
Exposure.....13 in. x 12 in.
Shingles per Square..... 92*
Bundles per Square..... 4
Approximate Weight per Square.....280 lbs.

**Actual coverage 99 2/3 sq. ft. Prices quoted on this basis. Also applied with 5 1/3 in. sidelap requiring 104 shingles per square. Use 4 in. x 16 in. eave starters.*

Completing Materials: 92 Copper Storm Anchors, $\frac{4}{5}$ lb. 1¼ in. Galvanized Needle Point nails. (Use 1½ in. galvanized nails for applying over old shingles.)

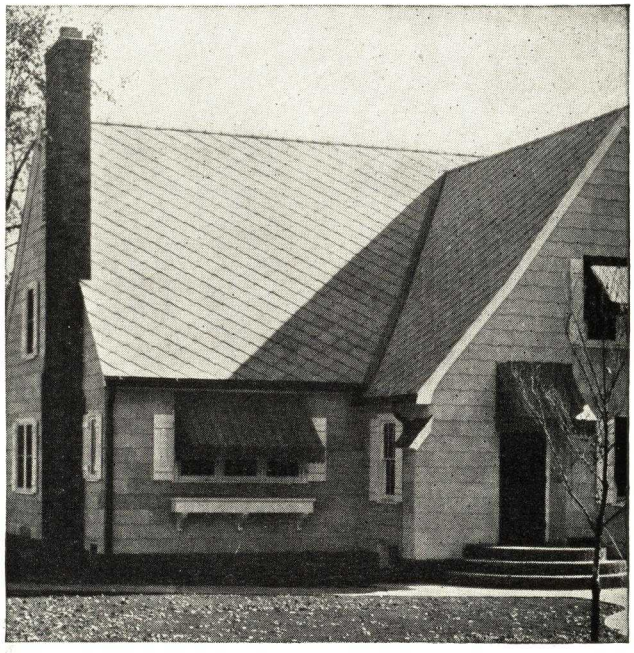
Underwriter's Label Class "B"

HEXAGONAL ASBESTOS—CEMENT SHINGLES

For many years the Hexagonal or honeycomb design has been associated with Asbestos Cement Shingles, for it was in this design that this particular type of roofing material first became popular. Although pleasing and unique in appearance, the Hexagonal Shingle owes its popularity chiefly to economy in price. It is designed so that only a minimum amount of material is required for overlapping, and while efficient from the standpoint of being absolutely weatherproof when used under proper conditions, it effects a maximum saving in labor and materials and consequently makes a finished, enduring, fireproof roof at low cost.

Eternit Hexagonals are smooth surfaced, but are produced in the same beautiful and lasting colors as the more expensive textured shingles.

They are adaptable for re-roofing and re-siding as well as new work.



COLORS

Tile Red	Jade Green	Polychrome
Quarry Blue	Colonial Gray	Pastel (Red and Blue)
	Mottled Gray	

SPECIFICATIONS

Size.....16 in. x 16 in. approx. $\frac{5}{32}$ in. thick
Headlap .....3 in.
Exposure.....13 in. x 13 in.
Shingles per Square..... 86
Bundles per Square.....4⅓
Approximate Weight per Square.....265 lbs.

Completing Materials: 86 Copper Storm Anchors, ¾ lb. 1¼ in. Galvanized Needle Point nails. (Use 1½ in. Galvanized nails for applying over old shingles.)

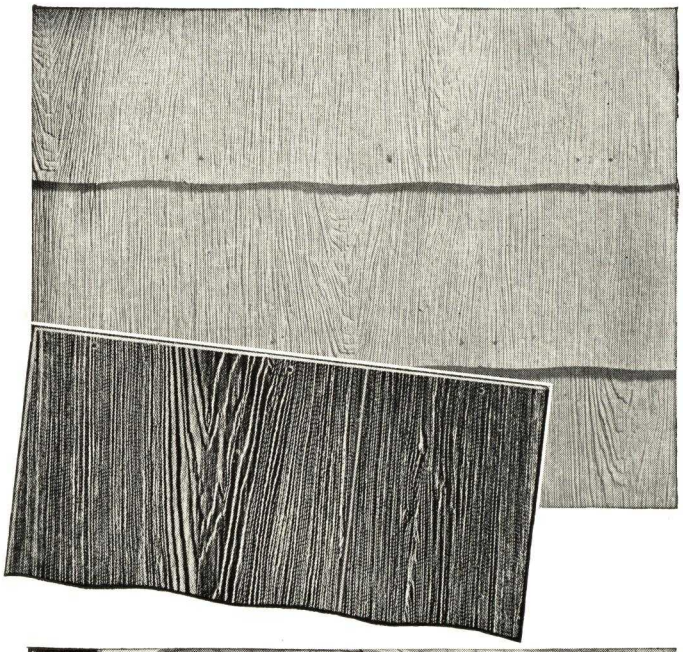
Use 16 in. Hexagonal Starters for eave course.

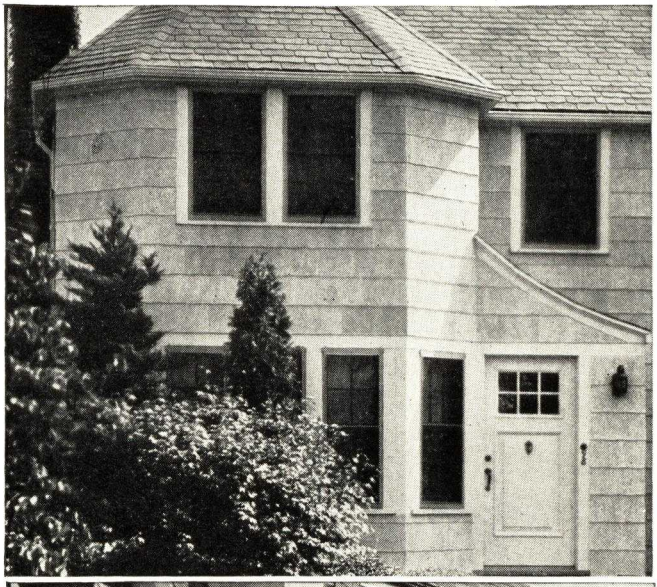
60 pieces per 100 ft.—3 bundles—wgt. 120 lbs. per 100 ft.

Underwriter's Label, Class "B"

ETERNIT ASBESTOS . . .

COLONIAL TIMBERTEX SIDING





Eternit Colonial Timbertex Asbestos-Cement Siding is furnished in three sizes: 12 in. x 24 in., 9½ in. x 24 in., and 7¾ in. x 24 in. All of these are equally efficient for new construction or re-siding old buildings. Its texture exactly reproduces the graining of natural weather-aged cypress. Each shingle is made of Portland cement and long asbestos fibres, providing a rot-proof, fireproof, time-defying siding.

The attractive "wood colors" are an integral part of each shingle so that its beauty endures without the necessity of periodic painting or staining.

On new construction, Colonial Timbertex Siding is applied right over the board sheathing or insulation. When applied over clapboard, stucco, or brick, Colonial Timbertex Siding affords increased insulation. This is made possible by the dead air space between the old siding and the new. Fuel savings upward of 20% have been reported.

The beauty of this siding, reproducing the charm of cypress, its economy of application, and the savings in upkeep, have made it one of the most popular sidewall products.

The shingles are so designed that perfect alignment and absolutely tight nailing are assured.

COLORS

Silver Gray	Cypress Brown	Sno-White
Silver White		Lawn Green

SPECIFICATIONS — No. 244

Size	12 in. x 24 in. x $\frac{5}{32}$ in. thick
Headlap	1½ in.
Exposure	10½ in. x 24 in.
Shingles per Square	57
Bundles per Square	3
Approximate Weight per Square	195 lbs.

Accessories Per Square: 60 Asphalt Roofing Joint Strips—3 in. x 12 in., to be used underneath shingles where they butt together and sufficient Special Facing Nails, furnished without extra charge.

Completing Materials: 1 lb. 1½ in. Galvanized nails for Concealed Nailing, 171 nails per square—3 per shingle.

SPECIFICATIONS — No. 248

Size	9½ in. x 24 in. x $\frac{5}{32}$ in. thick
Headlap	1½ in.
Exposure	8 in. x 24 in.
Shingles per Square	75
Bundles per Square	3
Approximate Weight per Square	210 lbs.

Accessories Per Square: 75 Asphalt Roofing Joint Strips—3 in. x 9½ in., to be used underneath shingles where they butt together and sufficient Special Facing Nails furnished without extra charge.

Completing Materials: 1½ lbs. 1½ in. Galvanized nails for Concealed Nailing, 225 nails per square—3 per shingle.

SPECIFICATIONS — No. 245

Size	7¾ in. x 24 in. x $\frac{5}{32}$ in. thick
Headlap	1½ in.
Exposure	6¼ in. x 24 in.
Shingles per Square	96
Bundles per Square	4
Approximate Weight per Square	218 lbs.

Accessories Per Square: 96 Asphalt Roofing Joint Strips—3 in. x 7¾ in., to be used underneath shingles where they butt together and sufficient Special Facing Nails furnished without extra charge.

Completing Materials: 1½ lbs. 1½ in. Galvanized Nails for Concealed Nailing, 288 nails per square—3 per shingle.

. . . CEMENT SIDINGS

THATCH TIMBERTEX SIDING

Eternit Timbertex Thatch Siding offers the architect an ideal method of permanently beautifying new or existing walls at low cost. Its advantages include elimination of up-keep expense, reduction in heating costs and permanent fire protection.

This Asbestos-cement Siding Shingle because of its "wood" textured surface and irregular butt line, perfectly reproduces the effect of weathered cypress shingles, applied in the "thatch" method.

Furnished in two sizes—12 in. x 24 in. and 9½ in. x 24 in., this shingle is unusually economical to apply.

COLORS

Silver Gray Silver White Sno-White Lawn Green

SPECIFICATIONS — No. 246

Size.....12 in. x 24 in. x $\frac{5}{32}$ in. thick

Minimum Headlap 1¼ in. Maximum Headlap 2 in.
Exposure.....10 in. x 24 in.
Shingles per Square.....60
Bundles per Square..... 3
Approximate Weight per Square.....205 lbs.

Accessories Per Square: 60 Asphalt Roofing Joint Strips—3 in. x 12 in., to be used underneath shingles where they butt together and sufficient Special Facing Nails furnished without extra charge.

Completing Materials: 1 lb. 1½ in. Galvanized nails for Concealed Nailing, 180 nails per square—3 per shingle.

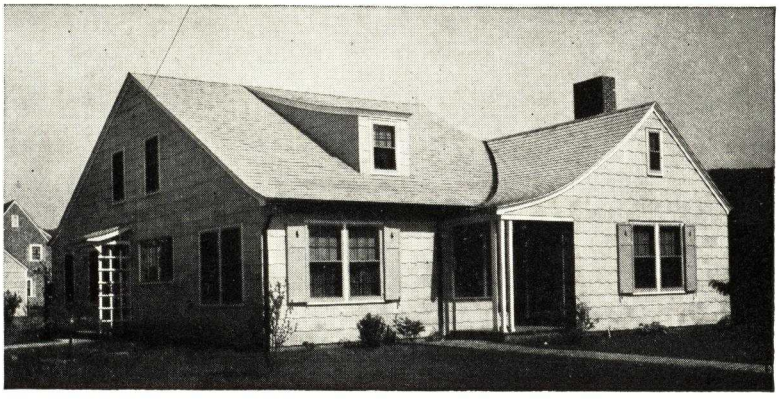
SPECIFICATIONS — No. 247

Size.....9½ in. x 24 in. x $\frac{5}{32}$ in. thick

Minimum Headlap 1¼ in. Maximum Headlap 2 in.
Exposure.....7½ in. x 24 in.
Shingles per Square.....80
Bundles per Square..... 4
Approximate Weight per Square.....216 lbs.

Accessories Per Square: 80 Asphalt Roofing Joint Strips—3 in. x 9½ in., to be used underneath shingles where they butt together and sufficient Special Facing Nails furnished without extra charge.

Completing Materials: 1½ lbs. 1½ in. Galvanized Nails for Concealed Nailing, 240 nails per square—3 per shingle.



WEATHERPAD SHEATHING

Ruberoid Weatherpad consists of an indented, heavy rag-felt coated with asphalt on one side to make it waterproof and surfaced on the under side with ground cork.

It has been tested and proven to be a highly efficient heat insulation and sound deadener when used as a companion product to Siding Shingles. Weatherpad materially increases the sound insulation of ordinary frame construction.

Though particularly designed for use under Asbestos Shingles, Weatherpad Siding is equally good under Asphalt Shingles, or for general sheathing and sound deadening purposes.

Weatherpad is easily applied and does not lengthen the time required to apply new siding. It is treated to resist the activities of vermin, termites and other insects. 30 lbs. per 100 sq. ft. roll, 36 inches wide.

ETERNIT ASBESTOS—CEMENT BRICK—TYPE SIDING

Asbestos-Cement Brick-type Siding is a rigid three-in-one strip designed for use on sidewalls. It gives the appearance, and many of the advantages, of brick veneer, at low cost. It is equally adaptable for new construction or for application over old sidewalls.

The "rough brick" texture with each individual "brick" set out from the recessed mortar joints gives a remarkable reproduction of a brick sidewall. Special corner pieces mitred to a perfect fit, and soldier courses for use at the base and over windows, plus the stony hardness of the material, enhance the perfect brick-like appearance.

Age-enduring cement and fireproof asbestos guarantee weather protection, reduce fire hazards, eliminate frequent paintings, increase comfort through insulation, and lower fuel costs.

Asbestos-Cement Brick-type Siding may be had in both Redtone and Bufftone, the most popular brick colors.

SPECIFICATIONS — No. 250

Size of Strips.....6¼ in. x 30 in. (3 bricks 2½ in. x 9½ in.)
Exposure.....3 in. x 30 in. with ½ in. mortar line
Strips per Square.....160
Bundles per Square..... 4
Approximate Weight per Square.....360 lbs.

Completing Materials: Completing materials required: 3¼ lbs. 1½ in. Nails.

CORNER PIECES No. 251

(Special Cut with Mitred Corner Edge.)

For use for finishing corners on Asbestos Brick-type Siding.

Right and Left Side Longs: 6¼ in. x 30 in. (3 bricks per strip), 81 lbs. per bundle or 9 lbs. per lineal ft.

Right and Left Side Shorts: 6¼ in. x 15 in. (1½ bricks per strip), 40 lbs. per bundle or 9 lbs. per lineal ft.

SOLDIER COURSE No. 252

For use as bottom course over windows, etc., with Asbestos Brick-type Siding.

Pieces: 6¼ in. x 10 in. (1 brick 2½ x 9½ in.), Exposure 3 in. x 9½ in. with vertical mortar lines, weight 2¾ lbs. per lineal ft. (4 pieces). 40 pieces or 10 lineal ft. per bundle. 4 lbs. of 1½ in. nails per 100 lineal feet.

STARTER FILLER STRIP No. 253

For use under first course of Asbestos Brick-type Siding to give the proper cant.

Pieces 3½ in. x 30 in., 40 pieces per bundle and per 100 lineal feet, 50 lbs. per 100 lineal feet. Exposure ½ in. by 30 ins. ¾ of 1½ in. nails per 100 lineal feet.

ASBESTOS—CEMENT WEATHERBOARD SIDING

One of The Ruberoid Co.'s newest products is Sno-White Asbestos-Cement Weatherboard Siding. This product, which is ideal for new construction work as well as for modernization, has a smooth surface and is rotproof, fireproof, termiteproof, and never requires paint.

Asbestos-Cement Weatherboard is made in 8-foot lengths 9½ in. wide, 5/32 in. uniform thickness. The headlap is 1½ in., exposure, 8 in. Nineteen strips are required per 100 square feet area. Packaged in 2 bundles, and the approximate weight is 195 to 200 pounds per square. Sufficient 3 in. x 9 in. felt joint strips and face nails are furnished without extra charge. Completing materials required: 1½ pounds—1½ in. Galv. N.P. Nails.

RUBEROID

ASPHALT PRODUCTS

THE RUBEROID CO. pioneered the development of Asphalt Roofing Products. In 1892, when the first roll of Ruberoid Roofing was made by hand, it marked the birth of a new industry. Ruberoid engineers, since that time, have been constantly alert to maintain and improve the high quality and long service of Ruberoid products.

RUBEROID ASPHALT SHINGLES, unit and strip, for roofing and siding, are made in several styles and many harmoniously blended colors. A few of these are described in the following pages. Complete, detailed information is available on request. Asphalt Shingles may be used on any roof with a pitch of six inches or more to the foot. They cannot be used on flat roofs. They are generally adaptable for new construction and for re-roofing and re-siding.

RUBEROID ROLL ROOFING is made with smooth or mineral surfaces in numerous grades and weights. There is a Ruberoid Roll Roofing to meet every building and economic need.

Ruberoid Roofs on homes, schools, churches, hotels, museums, offices, industrial and farm buildings have made good in every corner of the globe, regardless of climatic or weather conditions.

RUBEROID ASPHALT SHINGLES

MASSIVE UNIT No. 50
(*Jumbo Weight*)

This shingle is the aristocrat of asphalt shingles and has been applied on some of America's finest homes.

The extra size, extra weight, extra rigidity and extra large headlap of this shingle provide unusual protection against leakage and assure durability. Because of its wide over-lapping the massive unit gives two thicknesses over the entire roof area and three thicknesses at the butts where the wear is hardest.

They are adapted for new constructions, for applications over old shingles and for re-siding. Made in a variety of attractive colors.

SPECIFICATIONS

Shingles per Square	228
Size each Shingle	12 in. x 16 in.
Exposure	5 in.
Average Approximate Weight per Square	325 lbs.
Bundles per Square	4

Underwriter's Label Class "C"

THICK BUTT SQUARE-TABS
(*Standard Weight*) *Patented*

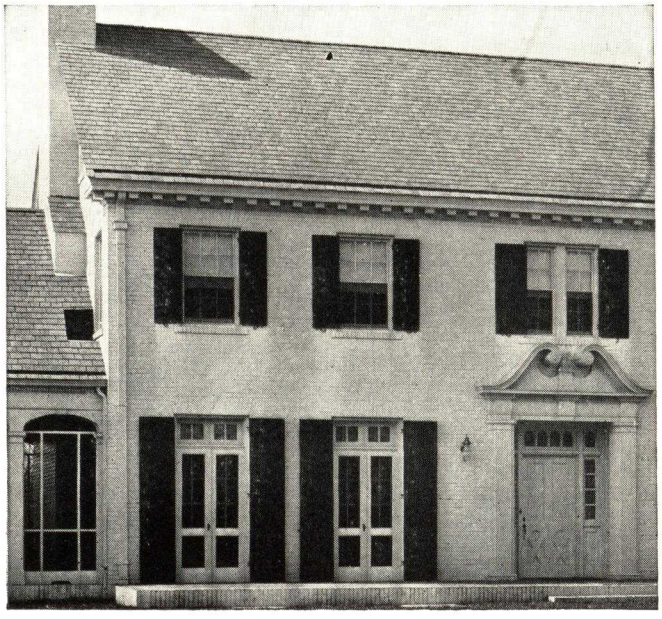
12 In.—No. 25 This shingle is distinguished by its massive appearance on the roof. There is an extra coating of asphalt and mineral surfacing on the butts, the area of the shingle which is exposed to the weather. Thick Butt Square-tabs can be obtained in several colors, and attractive color blends.

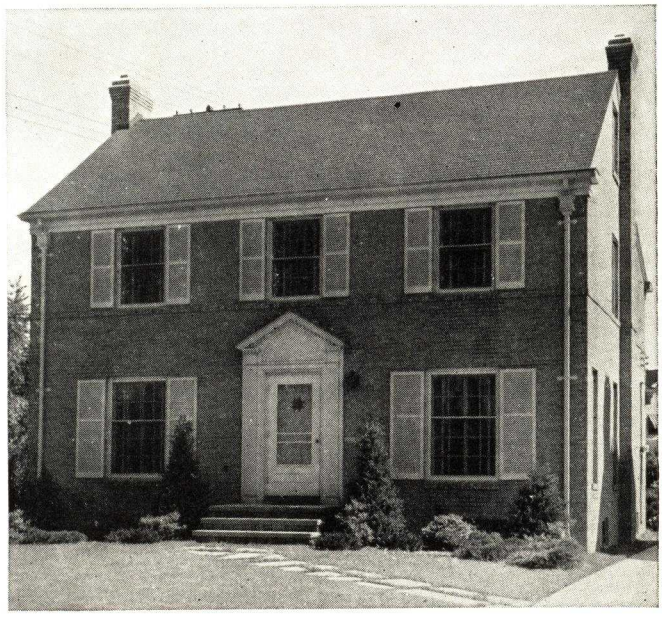
14 In.—No. 26 Similar to the 12-inch shingle, but with the added advantage of additional weight and greater headlap protection.

SPECIFICATIONS

	12 In.	14 In.
Strips per Square	80	86
Shingles per Strip	3	3
Size of each Strip	12 in. x 36 in.	14 in. x 36 in.
Average Approximate Weight per Square	210 lbs.	250 lbs.
Bundles per Square	3	3

Underwriter's Label Class "C"





RUBEROID ASPHALT SHINGLES

MASSIVE SQUARE-TABS No. 20

12 in. (Jumbo Weight) Patented

A true "heavy weight" among asphalt strip-shingles, these Square-tabs possess many excellent qualities. They are massive in appearance, 40% thicker than the ordinary asphalt strip-shingle, have tremendous strength and give complete weather protection.

They are especially adapted for use on new construction, for application over old roofs and for re-siding. You have a wide choice of colors and color blends.

Approved by the Board of Fire Underwriters, Inc. (Class C Label)

SPECIFICATIONS

Strips per Square.....80
Shingles per Strip..... 3
Size each Strip.....12 in. x 36 in.
Average Approximate Weight per Square.....257 lbs.
Bundles per Square..... 3

MASSIVE HEX-STRIPS No. 10

(Jumbo Weight—2⅝ in. Headlap)

Massive Hex-strip Shingles are truly giants in size, thickness and in their appearance on the roof. They are nearly twice as thick as ordinary shingles. This extra "massiveness" doubles their protective qualities and produces heavy shadow lines. Available in many beautiful colors and blends.

Approved by the Board of Fire Underwriters, Inc. (Class C Label)

SPECIFICATIONS

Strips per Square.....76
Shingles per Strip..... 2
Size each Strip.....13⅛ in. x 36 in.
Average Approximate Weight per Square.....217 lbs.
Bundles per Square..... 3

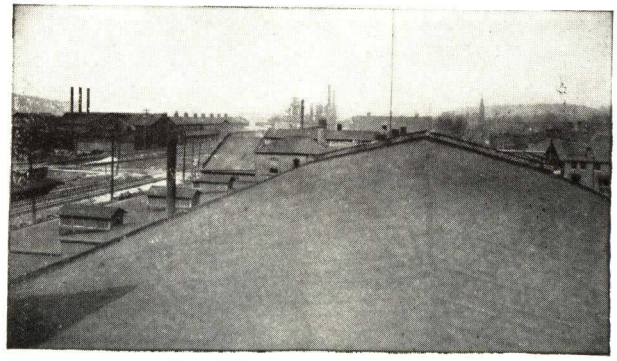
RUBEROID ROLL ROOFINGS

Ruberoid Roll Roofings are the result of many years of careful study and development. Their long life and economy have made *Genuine* Ruberoid Roll Roofings a standard of roofing quality all over the world.

The formula for Ruberoid Roll Roofing was pioneered in 1892. In the production process, strong felt fabric is filled with a powerful saturant and finally coated with heavy weather-resisting asphalt. There are many examples today, of Ruberoid Roll Roofing installations that were laid twenty and twenty-five years ago and are still giving dependable service.

Today, gigantic roofing machines in six great plants, turn out hundreds of rolls of *genuine* Ruberoid in a fraction of the time it took to make the first roll by a laborious hand process.

Ruberoid Roll Roofings are made in two styles: Smooth Surfaced and Mineralized. The Mineralized Roofing has an additional surfacing of colorful mineral granules on one side, which artistically blend with the scenic surroundings.



This Ruberoid Roof, Installed 41 Years Ago, Is Still in Service

RUBEROID ROLL ROOFINGS (Continued)

There is a Ruberoid Roofing to meet every building need and economic condition, and The Ruberoid Co. is glad at all times to recommend the type and grade of roll roofing best suited to individual requirements.

GENUINE RUBEROID SMOOTH ROLL ROOFING — No. 100

No effort has been spared to make this the finest smooth surface roll roofing possible. Installations made over 35 years ago are still in good condition.

Five Weights: Light, 35 lbs.; Medium, 45 lbs.; Heavy, 55 lbs.; Extra-Heavy, 65 lbs.; Super-Weight, 75 lbs. Each roll 36 in. wide, containing 108 sq. ft.

45, 55, 65 and 75 lb. weights have Underwriter's Label Class "C."

GENUINE RUBEROID MINERALIZED ROLL ROOFING — No. 110

(Heavy Weight.) Has 2-in. bare marginal edge and is coated on under side. Zinc-coated large headed nails and lap-cement included in each roll. Underwriter's Label, Class "C." Average approximate weight: 90 lbs. per 108 sq. ft. roll, 36 in. wide.

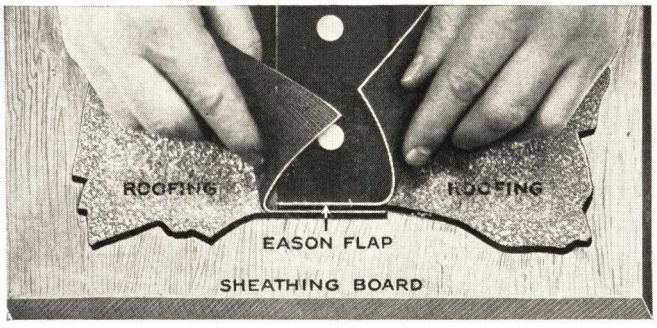
Available in many attractive colors and color blends.

RUBEROID MINERALIZED ROLL ROOFING — No. 112 (Extra Heavy Weight)

Same as No. 110, but with additional weight. Average approximate weight: 105 lbs. per 108 sq. ft. roll, 36 in. wide. Rolls shipped from Joliet, Ill., 32 in. wide. Underwriter's Label, Class "C." There are many attractive colors and blends to choose from.

There are numerous other Ruberoid Roll Roofings available with excellent serviceability at lower cost. Full particulars will be sent on request.

GENUINE RUBEROID ROLL ROOFING WITH EASON FLAPS



Eason Flaps permit the application of *Genuine* Ruberoid Roll Roofing with virtually a 7-layer seam. They are ideal for new construction or re-roofing work.

With Eason Flaps all nails are sealed with two layers of fabric and one of asphalt seam cement. Nails cannot rust or pop out because of heat. Virtually a 7-layer built-up seam with closed lap edge, there is no opportunity for wind or water to get under. This patented flap provides reinforced protection at the weakest part of a roll roofing roof—the seams. Successfully used on both steep pitches and almost true level decks, with both smooth and mineral surfaced roofing, Eason Flaps are supplied with *Genuine* Ruberoid Roll Roofing at only a small additional cost.

OTHER RUBEROID PRODUCTS

CEMENT WATERPROOFING COMPOUND

RUBEROID Cement Waterproofing Compound (patented), when mixed with Portland cement, makes leaky cellars or pits bone dry. Its use in stucco entirely eliminates "hair cracking." It differs from other waterproofing compounds in that it does not delay the set or reduce the strength of the mortar. It contains no calcium stearate or other soap compounds.

A ¾-in. mortar facing containing Cement Waterproofing on the inside of a structure will resist a 200-ft. head of water from without. This fact makes it especially adaptable for use in pump pits, cellars or other structures below ground. Cement waterproofing will resist action of brine, hot water, steam, oils, distillates and other chemicals.

Packed in barrels (450 lbs.), 100-lb. and 25-lb. cans.

BUILDING PAPERS

Ruberoid manufactures a complete line of building papers. Included are the well-known reinforced papers—"Safe-n-dry" and "7-Ply"—for use behind clapboards, stucco, shingles, brick veneer and under floors.

"Safe-n-dry," because of its two sheets of kraft paper, the strong woven jute fabric used and the extra reinforcing cords along each edge, has unusual strength. It is almost impossible to tear, and never becomes sticky or brittle. It is clean, odorless, waterproof and air-tight. Rolls 36 in. wide contain 250 or 500 sq. ft. weighing 15 and 30 lbs. respectively.

Where unusual insulating values are required, "7-Ply" should be used. Standard rolls contain 250 or 500 sq. ft., 36 in. wide weighing 17 and 34 lbs. respectively.

There are also less expensive building papers, saturated, or saturated and coated, in 500-ft. rolls, 36 in. wide. These are particularly adaptable for use under slate, tile, or other types of roofing where a waterproof protective covering is required.

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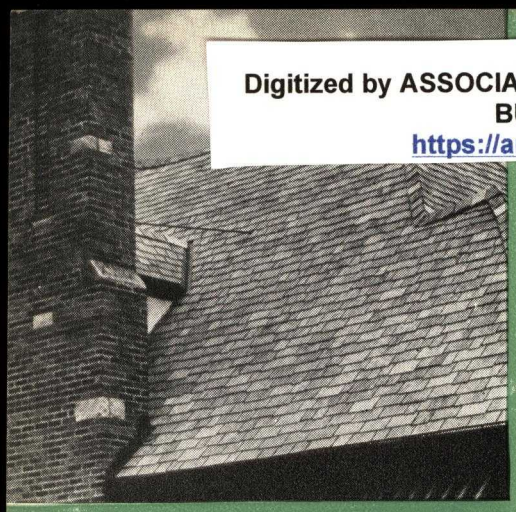


Close-up of an Eternit Gothic Asbestos-Cement Shingle Roof at Cincinnati, Ohio.
Note the random widths and staggered butts.

Apartment Residence in Jackson, Miss.
Roofed with Eternit Dutch-Lap Asbestos-Cement Shingles.
Eternit Colonial Asbestos-Cement Siding on sidewalls.

Residence at Afton, Minn.
Roofed with Eternit Timbertex Asbestos-Cement Shingles
Architects—Pesek & Shifflet, Minneapolis, Minn.

Home at Appleton, Wisc.
Roofed with 12" x 16" RU-BER-OID Massive Unit Asphalt Shingles.

Residence at Cincinnati, Ohio.
Roofed with Eternit Gothic Asbestos-Cement Shingles.

Colonial Cottage in Cleveland, Ohio.
Roofed with RU-BER-OID Evergreen Thick-Butt Asphalt Shingles.

Home at Meridian, Miss.
Sided with Eternit Colonial Timbertex Asbestos-Cement Siding.
Roofed with Eternit Dutch-Lap Asbestos-Cement Shingles.

Home at Bristol, Pa.
Sided with Eternit Asbestos-Cement Brick-type Siding.

SECTION 6

CONTINUED ⟶

MOHAWK ASBESTOS SHINGLES, INC.

TELEPHONE
AShland 4-5080

GENERAL AND SALES OFFICE
101 Park Avenue, NEW YORK, N. Y.

FACTORY AT ONEIDA, N. Y.
REPRESENTATIVES IN PRINCIPAL CITIES

MOHAWK ASBESTOS SHINGLES

Fireproof—Made of Cement and Asbestos

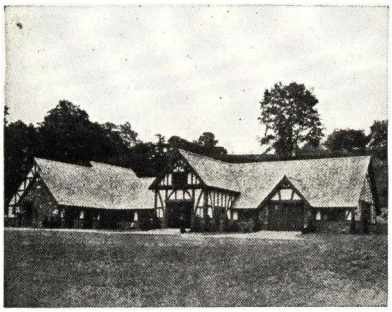
Mohawk Tapered Asbestos Shingles have won favor with architects for more than twenty years because of their individuality in texture and color. These shingles are fireproof (Underwriters' Class A Label) and are made of natural materials—portland cement, oxide colors and asbestos. They are tapered with thick butts. Because of the exclusive Mohawk method of manufacture, they are the only asbestos shingles that can be said to have real individuality in texture and color. They are practically custom-made shingles, with all the beauty of color and shadow lines previously found only in wood, or heavier materials such as stone, tile, or slate. Yet because they are lighter than stone or slate, they are much easier to lay and do not require so heavy an understructure.

First cost is the only cost—and is surprisingly low. The cost stops right there. We stand behind every Mohawk roof, and issue a written guarantee of absolute satisfaction.

Designs and Colors—Mohawk Shingles are made in seven different designs and many colors—allowing wide opportunity for individual roof treatments.

Specifications—Complete specifications for all types of Mohawk Shingles furnished on request. Full size samples and photographs of Mohawk houses are also available.

Prospect Presbyterian Church, Maplewood, N. J.
GRANT & DAHLER, Architects, New York, N. Y.



Stables, Edwin Burke, Jr. Estate, Chagrin Falls Valley, Ohio
MEADE AND HAMILTON, Architects, Cleveland, Ohio

Mohawkstonne

Square and Rough Butts

At the right is shown how the two simplest types of Mohawk Shingles—Square Butts and Rough Butts—may be combined to give the effect of rugged texture and heavy shadow lines. Either type may be used separately throughout the entire roof. Tapered, with thick butts.

Colors—Black, Brown, Purple, Acme Red, Buff, Dark Gray, Light Gray. Soft shades can be intermixed at random without sharp contrast. Special colors furnished on request.

Size and Weight—Square and Rough Butts, 8x16 in., 260 shingles per square, laid 7 in. to weather. Thickness at butt ⅜ to ½ in. Weight, loose, per square, 720 lbs.

Square and Rough Butts

Rustic Type

The Rustic Type of Mohawk Shingles, shown *at the right,* is another individual design. This design is textured differently from Mohawk Rough Butts and should not be used in mixture with any other type. Tapered, with thick butts.

Colors—Same as Square and Rough Butts.

Size and Weight—Same as Square and Rough Butts.

Adaptability—Mohawk Square Butts, Rough Butts and Rustic Type may be used with Colonial, Georgian, English, French, modern English, early American architecture, etc.

Rustic Type

Mohawkstonne and Stonnetexture

Mohawkstonne *(left)* is specially textured and colored in soft tints to duplicate the effect of Cotswold, Eyford and Yorkshire split-stone roofs. Thickness and color-tints are intermixed at random. Stonnetexture is produced in the same hand-moulded texture, but in deeper colors. Tapered with thick butts.

Colors—Mohawkstonne is produced in a special mixture of Graystonne, Bluestonne, Brownstonne, Buffstonne, and Redstonne, blended throughout the roof. Stonnetexture: choice of Dark Gray, Purple, Buff, Brown, Black, Acme Red.

Size and Weight—Mohawkstonne: Sold only in mixture ⅜, ½, ⅝, ¾, ⅞ and 1 in. Weight, 900 lbs. per square.

Stonnetexture: 16 in. long, random widths of 6, 8, 10 and 16 in. Thickness at butt, ⅜ to 1 in. Weight, 760 to 1440 lbs. per square.

Williamsburg Type

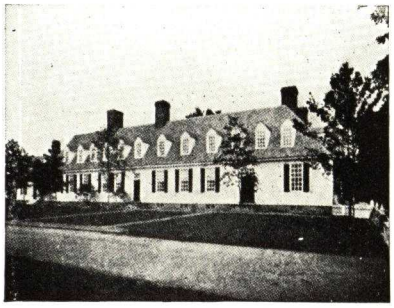
The Williamsburg Type of Mohawk Shingle *(right)* is a perfect fireproof reproduction of weathered Colonial hand-hewn shingles. It was designed at the request of architects Perry, Shaw & Hepburn for John D. Rockefeller, Jr.'s restoration of Williamsburg, Virginia. It has also been used on Henry Ford's Edison Museum at Dearborn, Michigan, designed by Robert O. Derrick, architect, of Detroit; on the home, recently restored at Fredericksburg, Virginia, of Mary Washington, the mother of George Washington; and on other restoration projects including the York Hall at Yorktown, Pa., and the famous Pohick Church in which George Washington worshipped.

Williamsburg Shingles are hand-textured to represent both vertical and cross-grained types. They are tapered with thick butts.

Colors—Made in a special brown-black. Special colors on demand only.

Size and Weight—16 in. long, random widths 5, 6 and 8 in. Thickness at butt, ⅜ to ½ in. Special widths and thicknesses furnished on request. Weight, loose, approximately 720 lbs. per square.

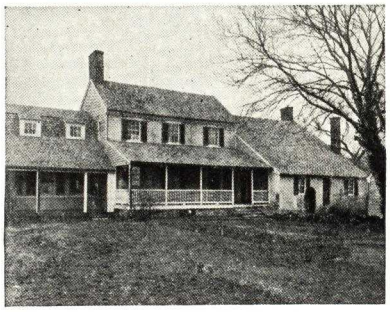
Williamsburg Type



Raleigh Tavern, Williamsburg, Va.

Below:

Stettinius Residence



Home of Mary Washington, Mother of George, Fredricksburg, Va.

Plymouth Type

Plymouth Type

The Plymouth Type of Mohawk Shingle *(left)* is a less expensive development in the reproduction of weathered wood shingles. Plymouth Type Shingles are hand-textured and tapered, but are more uniform in texture than the Williamsburg Type. Furnished in vertical grain only. Yet each Plymouth Type Shingle is individually textured so that no two shingles are exactly alike.

Colors—Plymouth Type Shingles are made in special brown-gray color only.

Size and Weight—16 in. long, random widths of 6, 8 and 10 in. Thickness at butt, ⅜ in. only. Weight loose, 680 lbs. per square.

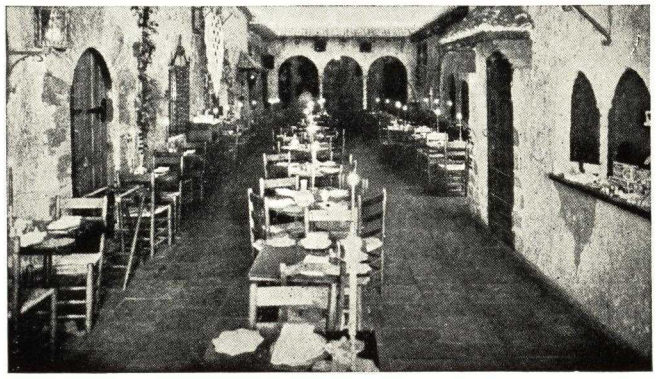
Adaptability—Both Williamsburg and Plymouth Type Shingles are especially adapted to Colonial, Georgian, and modern types of architecture for roofs and sidewalls.

MOHAWK FLOORING AND FLAGGING

Produced in the same colors as Mohawk Shingles for interior and exterior floors, entrances, terraces and walks, in solid colors tones heretofore available only in natural stone. The stone-like texture prevents slipping and, if desired, the completed floor can be rubbed to a smooth, marble-like surface, thereby increasing the depth of color. Furnished in squares and rectangles making it possible to work out definite schemes and designs.

The material can be nailed directly to a wood floor, the joints filled with cement and the nail heads covered. Exterior floors are laid on a concrete or a well-tamped soil or cinder base.

Furnished with square edges, in ½, ¾ and 1-in. thicknesses, and in the following sizes: 16x16 in., 8x16 in., and 8x8 in.



Huyler's Candy Store, Chicago, Ill.
Mohawk Flooring in Varied Colors

WILLIAM L. BARRELL COMPANY, INC.

Cotton Duck—Converted Fabrics
40 Worth Street, NEW YORK, N. Y.

BRANCHES

ATLANTA, GA., Trust Co. of Ga. Building
BOSTON, MASS., 52 Chauncy Street
CHICAGO, ILL., 300 West Adams Street
KANSAS CITY, MO., 219 West 8th Street
LOS ANGELES, CALIF., 1206 Maple Avenue
SAN FRANCISCO, CALIF., 360 Pine Street

CON-SER-TEX—A CANVAS COVERING FOR ROOFS AND FLOORS

Characteristics of Con-Ser-Tex

CON-SER-TEX CANVAS ROOFING
TRADE-MARK

Con-Ser-Tex is a specially woven cotton fabric scientifically treated by a chemical process which makes it not only waterproof but preserves it against the ravages of dry rot, mildew, vermin and the elements—the arch enemies of ordinary cotton duck.

The development of the chemical process had its origin in an investigation of the properties of Egyptian mummy cloths which have been known through the ages as possessing extraordinary features of durability. Modern research disclosed the fact that the cotton fibres had been physically altered to prevent capillary attraction and revealed the basic chemical treatment which was used in the process. In the manufacture of Con-Ser-Tex these same properties have been secured along with others which make the material particularly adaptable for its special uses. The chemical processes provide a protective coating to each cotton fibre which prevents the oils in paint from being absorbed by the fibres. In ordinary fabrics, these oils form one of the most destructive elements because of their oxidizing action. No oils or paraffin enter into the manufacture of Con-Ser-Tex.

While paint is necessary to provide a wearing surface on canvas decks, it is the inherent checking tendency of oil paints which not only breaks the surface fibres but exposes the body of the fabric to rotting and mildew. In Con-Ser-Tex these difficulties are reduced to a negligible minimum.

Adaptability and Advantages of Con-Ser-Tex

Con-Ser-Tex has many miscellaneous industrial uses, but in building construction as a roof covering and a floor covering in exposed locations subject to footwear it offers many advantages not obtainable by any other type of covering. Even where footwear is not a consideration it offers many advantages as a roofing material.

Under foot and heavy rain impact it is obviously less noisy than any metal covering.

There is no other type of roofing at once so light and so durable under foot traffic.

It offers advantages in its low heat transmission.

Con-Ser-Tex is an ideal covering for floors and roofs of porches for residences, hospitals, sanitariums, clubs, etc.

It is a most serviceable covering for roofs of frame or fireproof construction used for roof gardens and for recreational purposes in general.

In the heavy grades it is recommended for roofs where water is collected or retained, such as for spray ponds used in connection with air conditioning on refrigerating plants.

Corrosion will destroy tin and galvanized roofing materials sooner than Con-Ser-Tex will lose its strength and weather-resisting properties.

Practical Utility and Economy

Con-Ser-Tex is so woven and treated that there is no tendency to curl or blister. It lies flat. This is unusual in a material of its type.

As a covering for warped roof surfaces and geometrical forms, such as conical, domical and barrel roof surfaces, Con-Ser-Tex offers evident advantages. Its wide use by railroads for passenger car roofing bears testimony to this effect.

Facility in working makes Con-Ser-Tex useful for flashings, gutter and valley linings and at edges where more rigid materials would present difficulties. Ease of installing results in time saving with consequent economy.

Preparation of Surfaces

Where the construction is of wood frame the surface may be of the common grades of pine, fir, spruce, etc., available in the locality and equal to No. 2 common flooring.

Where foot traffic is intended the surface and framing should be rigid. Material ⅞ in. thick and 3 ins. or not over 4 ins. wide will be found to give a satisfactory result and it must be tongued and grooved. It should be smooth, with joints planed if necessary. Any knots or pitch streaks must be shellacked. Shiplap should not be used.

Where there is likelihood of dampness from underneath, the wood should be painted on the underside before laying and the joints made up in white lead. White pine in narrow widths is particularly useful in such cases.

When used over masonry surfaces, portland cement topping should be laid and troweled to a smooth surface without projections which might perforate the Con-Ser-Tex, and dressed nailing strips dipped in creosote should be set as shown on accompanying detail.

How to Apply Con-Ser-Tex

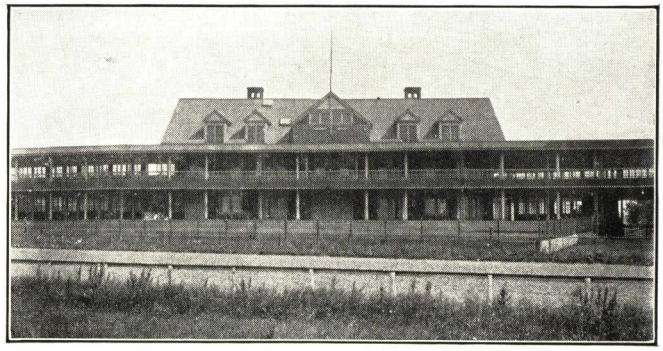
Dress the surface by eliminating rough places and sharp edges, then apply a heavy coating of Barrell Special Bedding Paint as a bedding (see Note). Over this bedding (while still wet) lay the Con-Ser-Tex, dark side down, slightly stretching it so as to insure a close adhesion to the surface, taking care to arrange laps so as to permit free drainage.

If Con-Ser-Tex is to be laid in parallel courses with the building, the strips start from the outer or lower edge of the surface to be covered. Con-Ser-Tex should be turned up or flashed 4 to 6 ins. at walls to insure a watertight result.

While Con-Ser-Tex is stretched, fasten with ⅞-in. copper or galvanized tacks 4 ins. apart on edge to be lapped. Coat the upper, exposed surface of the edge to be lapped 1½ ins. with the bedding paint, then apply the next strip, allowing a lap of not less than 1½ ins. Fasten with tacks ¾ in. apart.

After Con-Ser-Tex is laid and set, apply a coat of good quality lead and oil paint, and a heavy second coat of

The Pier Casino, Daytona Beach, Florida
Con-Ser-Tex covers the largest dancing pavilion south of Atlantic City



Club House, Empire City Race Track, Mt. Vernon, N. Y.
Con-Ser-Tex is giving service on the porch floor and roof

best grade Yacht Deck paint after the first is thoroughly dry.

Note: If desired, white lead thinned with linseed oil to a pasty consistency may be used as a bedding, but we recommend our Special Bedding Paint as it has greater adhesive quality.

Grades of Con-Ser-Tex

Grade E—The lightest grade of Con-Ser-Tex, suitable for roofing small areas where traffic is very limited.

Grade G—A medium weight, suitable for medium sized porch floors and roofs where traffic is not excessive.

Grade I—A heavy weight, suitable for roofing and flooring in residences and semipublic buildings where heavy traffic exists.

Grade K—The heaviest grade, designed for use in public buildings and all places where severe conditions exist.

Grade XXX—A *special* extra heavy grade to meet extreme conditions. Prepared only to order. Price upon application.

Economy in Cost and Maintenance

The first cost of Con-Ser-Tex is reasonable and its upkeep practically nil, requiring painting only as often as the rest of the building.

LIST PRICES* OF CON-SER-TEX PER LINEAR YARD

Width, in.	Grade E	Grade G	Grade I	Grade K
30	$1.10	$1.22	$1.35	$1.44
36	1.30	1.42	1.55	1.66

Note: The above widths carried in stock. Other widths and special heavier weights processed to order. *Discounts furnished on request.

Advisory Service

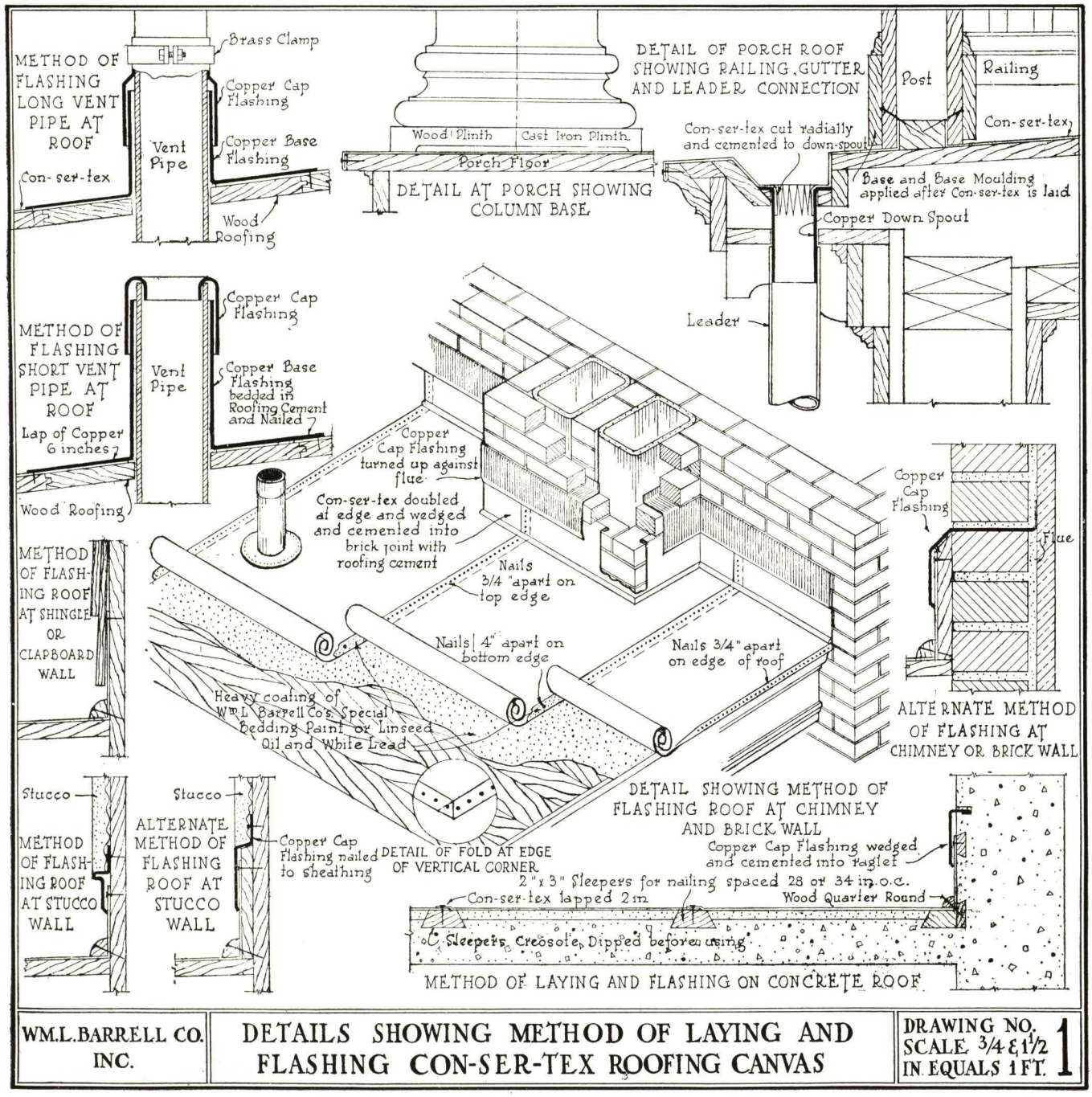
On receipt of dimensions of the surface to be covered, we will submit an estimate of cost, also a diagram showing the most economical method of laying Con-Ser-Tex, eliminating to the greatest possible extent all waste in cutting.

There is no charge for this service.

Guarantee of Material

Our company stands back of its products. We guarantee Con-Ser-Tex to be waterproof and to remain so for a period of ten years when laid and maintained in accordance with our instructions given on request with submission of drawings.

We do not, of course, guarantee Con-Ser-Tex against extraordinary conditions of traffic wear.



WM. L. BARRELL CO. INC.	DETAILS SHOWING METHOD OF LAYING AND FLASHING CON-SER-TEX ROOFING CANVAS	DRAWING NO. 1 SCALE 3/4 & 1 1/2 IN. EQUALS 1 FT.

BARNETT CANVAS GOODS & BAG CO., INC.

Roofing and Porch Canvas, Awnings, Tarpaulins and Canopies

TELEPHONES
Market 2160-2161
Keystone Main 7564

128 Arch Street
PHILADELPHIA, PA.

REPRESENTATIVES: BALTIMORE, MD.; PITTSBURGH, PA.; CINCINNATI, OHIO; YORK, PA.
ALSO IN OTHER PRINCIPAL CITIES

Barco-Dex Roofing and Porch Canvas

Barco-Dex is a canvas especially designed and woven for covering flat roofs, floors and decks in any type of building. *No chemicals are used* in the manufacture of Barco-Dex and it is unaffected by sun, wind, rain, snow and frost even after years of service.

Where Barco-Dex Should Be Used

From the viewpoint of the architect, contractor and owner Barco-Dex furnishes an ideal covering for porch roofs, piazza floors, sleeping balconies and similar locations where an attractive, economical and durable material is required. Barco-Dex is sound-proof, non-heat radiating and non-conductive to heat and cold. It is easily and quickly laid and its upkeep is practically nothing. It withstands footwear to a remarkable degree and for this reason provides an excellent material for covering areas subject to pedestrian traffic.

Barco-Dex has been much used for lining wood box gutters, as a covering for hips and valleys under other types of roof coverings, and for certain forms of construction it makes an excellent flashing.

Application of Barco-Dex

Before applying Barco-Dex the base surface should be cleaned thoroughly and dressed down to eliminate rough places and sharp edges. Over this surface the canvas may be laid direct without bedding or a bed may be prepared of white lead thinned with linseed oil to a paste consistency. This should be spread in a heavy coat and while the bedding material is still wet, the canvas should be drawn and stretched slightly to insure a good bond to the base surface.

When the canvas is laid parallel to the building, the outer or lower strip should be laid first and the laps of the following strips should be toward the first strip. Lap should be not less than 1½ ins. Against walls and other vertical surfaces the canvas should be turned up from 4 to 6 ins. and fastened securely. Cover with cap flashing where necessary.

When Barco-Dex is stretched, fasten the exposed edge with ¾-in. copper or galvanized tacks spaced 4 ins. apart. After tacking, spread the edge with a coat of bedding paint 1½ ins. wide and apply the next strip, lapping over 1½ ins. in the same way, and tack through the lapped edges with ¾-in. tacks spaced ¾ in. apart.

When entire surface has been covered and flashing completed, give the canvas a light coat of lead and oil paint. After this coat is thoroughly dry apply second and heavier coat.

SPECIFICATIONS AND PRICES (PER YARD) OF BARCO-DEX

Width, in.	White No. 300	Khaki No. 314	White No. 128	White No. 126	Khaki No. 1108
36	$0.80	$1.05	$1.10	$1.30	$1.50
54	.....	.....	1.60	1.85	2.25
60	.....	.....	1.90	2.10	2.50
72	.....	.....	2.25	2.40	2.80

All prices are based on a lineal yard. *The 36-in. width is the most popular.* All the above widths and weights carried in stock.

Bartex Cement

Bartex Cement, used for waterproofing and cementing the seams together during the process of tacking Barco-Dex, gives an especially water-tight installation. Cannot be used as a bedding.

SIZES AND PRICES OF BARTEX CEMENT

¼-pt. can	$0.50	1-qt. can	$2.50
½-pt. can	.80	½-gal. can	4.50
1-pt. can	1.40	1-gal. can	8.00

Prices subject to discount.

A Few Users of Barco-Dex

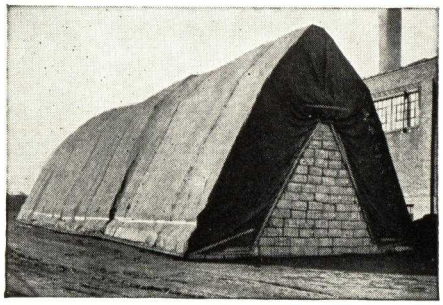
State Sanatorium at White Haven, Pa.—Stewardson & Page, Architect, Philadelphia; Chew-Bittel Co., Roofer, Germantown, Pa.

St. Vincent's Hospital, Philadelphia, Pa.—Philip Johnson, Architect.

Lancaster Municipal Airport, Lancaster, Pa.—J. B. Harman, Architect.

Awnings and Canopies

More and more architects are appreciating the fact that awnings and canopies should be selected and installed to harmonize with the building on which they will be used. The Barnett Canvas Goods & Bag Co., Inc., has unusual facilities for manufacturing any type of awning and canopy and we are pleased to offer the architect, contractor and owner, the results of our extensive experience in this work.

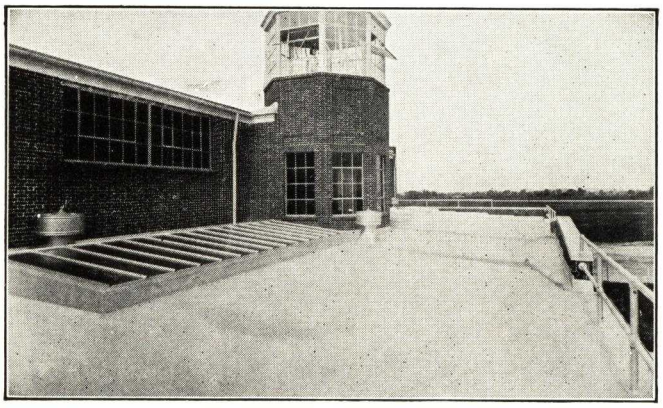


Barco Tarpaulins

This New Jersey box manufacturer selected Barco No. 30 for covering the piles of pulp in his yard—over 79,000 sq. ft. of Barco Guaranteed Protection

Barco tarpaulins and truck covers are strongly and carefully constructed to give the greatest wear. Built in 7 different grades and 12 stock sizes, here is a wide range of covers to meet every requirement. Light weights for enclosures, medium grades for perishables, heavy, closely woven cloth for truck covers, where guaranteed protection is essential.

Over one million square feet of covers ready for shipment.



Tower and Hangar, Lancaster Municipal Airport—Barco-Dex Was Specified for This Installation
J. B. Harman, Lancaster, Pa., Architect

MARINE CANVAS SUPPLY CORPORATION

Waterproof Canvas and Waterproof Canvas Paint

TELEPHONE
CUmberland 6-0100-0101

700-706 Court Street, BROOKLYN, N. Y.

NEW ORLEANS, Brooks Tarpaulin Co., 429 Celeste Street
BOSTON, MASS., Marine Canvas & Supply Co., 330 Atlantic Avenue

JATON CLOTH—WATERPROOF CANVAS
"A Product of the Sea"

READY TO USE

JATON CLOTH
REGISTERED TRADE MARK

NO PAINTING REQUIRED

Features of Jaton Cloth

Jaton Cloth is watertight to the point of pressure and *does not require painting after it is laid.* This feature is possible, due to the exclusive process by which Jaton Cloth is made with special machinery; both of which are patented. The impregnation of Jaton Cloth is so thorough that it is virtually a part of the fabric, hence it does not flake off; yet it remains fully flexible under all climatic conditions. Furthermore, Jaton Cloth is colorfast, clean to handle, oil and gasoline proof, will not blister and, when specified, can be made fire-resisting.

Easily Laid—No Special Equipment Needed

The cost of laying Jaton Cloth is very low. It can be unrolled and laid without special equipment; because it requires no stretching. Jaton Cloth does not crack or stiffen from extreme cold, nor does it become "gummy" in hot weather.

Retains Its Waterproofing

As Jaton Cloth is unaffected by extreme of cold or hot weather, it retains its waterproof quality and flexibility at all times.

Increased Strength

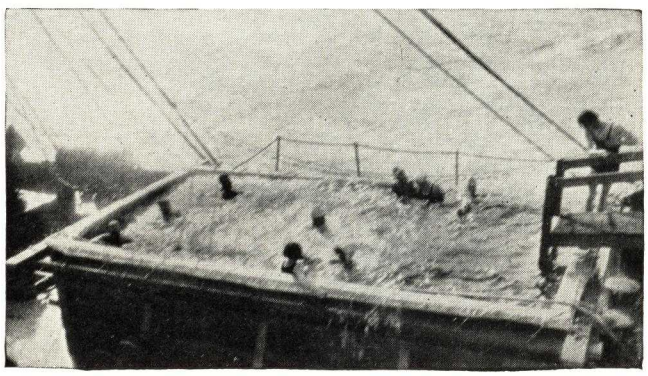
When any of the ordinary treatments are applied to cotton duck, the action of the chemical is such that the duck rapidly deteriorates and the initial strength of the canvas is seriously impaired. Jaton Cloth is treated solely with a *vegetable compound,* which increases the ordinary strength of the cloth fully 20%.

Oil and Gasoline Proof

Jaton Cloth is oilproof. It is not soluble in crude oil, gasoline, or any of the ordinary solvents used for waterproofing, also acid-resistant.

Suggested Applications

Canvas Roofing (no painting—watertight).
Awnings (sparkproof—will not ignite—waterproof).
Tarpaulins (soft—watertight—crackproof).
Swimming Tanks (clean—watertight).



"Jaton" Swimming Pool
This Jaton Portable Swimming Pool holds 50 tons of water and aptly demonstrates the waterproofing qualities of this material

Thorough Impregnation

Jaton Cloth is thoroughly impregnated. Proof of the thoroughness of this impregnation is evidenced by the unsurpassed service it is rendering as a flooring for steamship decks, and as a covering for roofs.

The Cloth is scientifically prepared and thoroughly dried before it is Jaton-treated, this eliminates danger of mildew.

Colors — Weights — Sizes

Weights and Sizes—Jaton Cloth is made in all standard cotton duck weights and widths.

Colors—Green, Brown, Khaki, White and Battleship Grey. All colors are absolutely fast.

JATON CANVAS PAINT

"Jaton" Canvas Paint is manufactured especially for use on all grades and weights of canvas, where a waterproof, hard-wearing, non-cracking, non-blistering flexible paint is required.

The result of several years of experimental work, "Jaton" Canvas Paint is ideal for canvas decks and roofing, bridge dodgers, screens, boat covers, life rings, car roofs, saddle pads, and all canvas products.

"Jaton" Canvas Paint is especially prepared to withstand mildew, will not rot canvas, therefore prolonging its life. "Jaton" treated canvas does not crack and will not blister, remains always flexible; and may be rolled or folded, a feature found only in "Jaton" paint. It is rapid drying, easy to apply and always ready for use.

Colors—White, Grey, Khaki and Green.

BUCKINGHAM-VIRGINIA SLATE CORPORATION

1103 East Main Street,
RICHMOND, VA.
TELEPHONE: 32947
QUARRIES AND SHIPPING POINT: ARVONIA, VA.

BUCKINGHAM ROOFING SLATE

QUARRIED SINCE 1787

AWARDS OF MERIT

First Award .....London 1857
Gold Medal ..Philadelphia 1876
Gold Medal .....Chicago 1893
Gold Medal.....St. Louis 1904

GUARANTEED UNFADING

Characteristics of Buckingham Slate

This exclusive roofing slate, which defies time, has been quarried since the latter part of the eighteenth century, and covers many of the outstanding buildings in America. There is no substitute for Buckingham Slate where beauty, permanence, economy, and satisfaction are considered.

Texture and Color

Buckingham Slate is famous for its wide range in natural rock texture. The everchanging play of light and shadow over its rustic surfaces creates most interesting effects that never become tiresome. Its pleasing, deep gray color is greatly enriched by a soft silvery lustre, which causes the color values to change from lightest to deepest gray tones as the light strikes the surfaces from different angles.

Superior Quality

Buckingham Slate is a *mica,* not a *clay* Slate.

Buckingham Slate has received highest awards for quality in the United States and England. The outstanding quality characteristics of Buckingham Slate cannot be over-emphasized. It has the lowest water absorption of any slate in America, the greatest strength with and across the grain, the highest resistance to acids, and is absolutely guaranteed to be unfading. Fading in slate is a positive indication of deterioration.

Service and Production

Samples of standard sizes and thicknesses, literature, roof lay-outs, and estimates will be promptly furnished upon request.

Architects in specifying Buckingham Slate, may require their contractors to furnish a Buckingham Certificate as evidence of complete fulfilment of their specifications.

The Buckingham quarries have ample production to take care of all demands. Also, we wish to impress upon architects desiring to specify Buckingham Slate that we carry in stock more than thirty thousand squares in all sizes and thicknesses. This is definite assurance that prompt shipment can be made to conform to the architect's specifications.

Specification Designation

For Roofing—Buckingham-Virginia Unfading Blue Grey—Blue Black Rustic or Smooth Texture Slate as desired. Length ..... x Random Widths, or ..... (one width as desired). Certificate of shipments from Buckingham-Virginia Slate Corporation, Richmond, Va., to be furnished architect by roofing contractor.

COMBINATION SUGGESTIONS

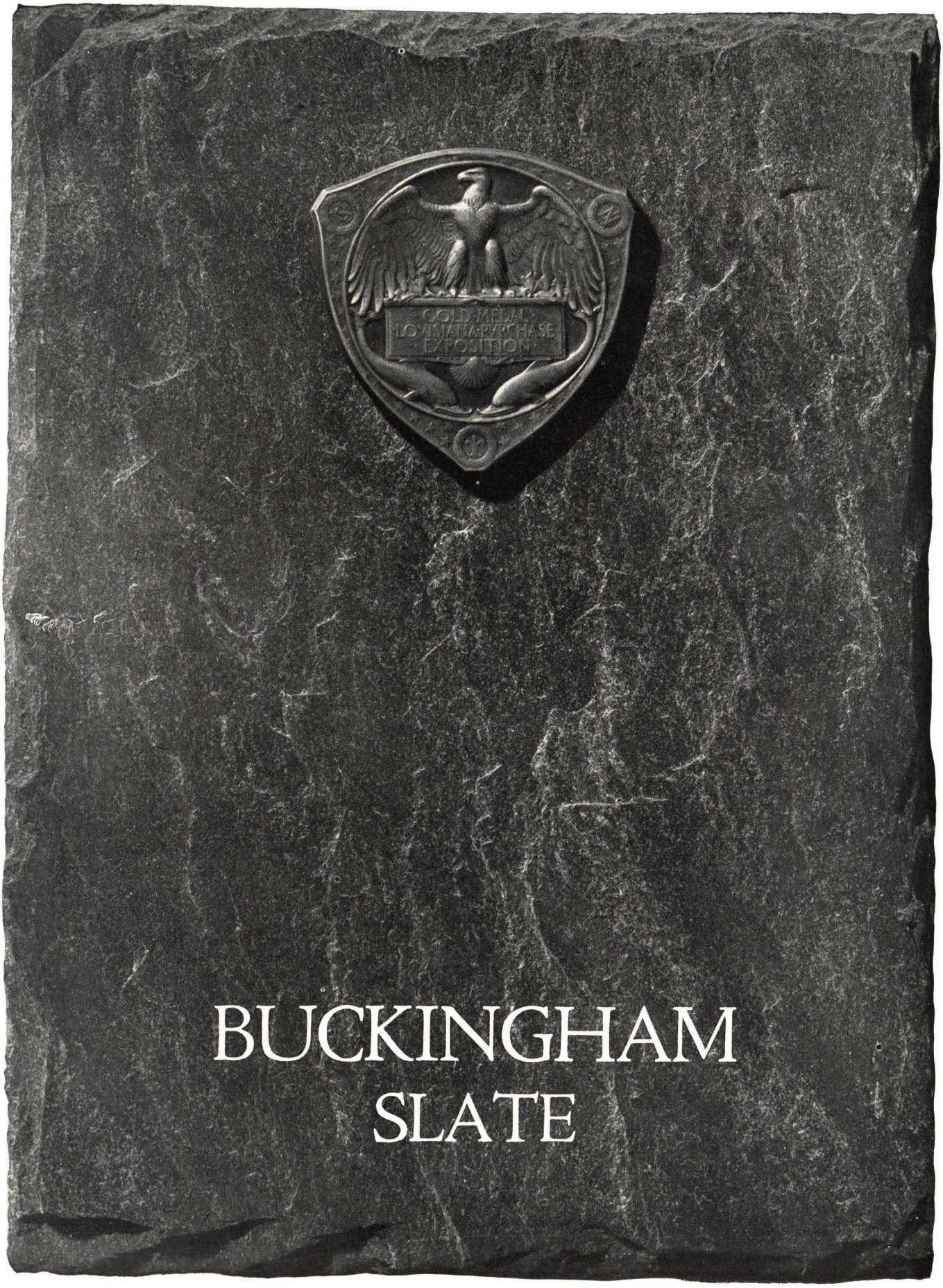
			Weight per Sq.
No. 1	33⅓%	⅜ in.	
	33⅓%	½ in.	
	33⅓%	¾ in.	1934 lbs.
No. 2	25%	¼ in.	
	25%	⅜ in.	
	25%	½ in.	
	25%	¾ in.	1675 lbs.
No. 3	50%	⅜ in.	
	50%	½ in.	1550 lbs.
No. 4	33⅓%	¼ in.	
	33⅓%	⅜ in.	
	33⅓%	½ in.	1334 lbs.
No. 5	50%	¼ in.	
	50%	⅜ in.	1100 lbs.
No. 6	33⅓%	3/16 in.	
	33⅓%	¼ in.	
	33⅓%	⅜ in.	985 lbs.
No. 7	50%	3/16 in.	
	50%	¼ in.	825 lbs.

RUSTIC TEXTURE

Finest quality rock selected for texture furnished in all standard dimensions.

Thickness	Weight per square
3/16-in.	750 lbs.
¼-in.	900 lbs.
⅜-in.	1,300 lbs.
½-in.	1,800 lbs.
¾-in.	2,700 lbs.
1-in.	3,600 lbs.

Furnished in All Standard Sizes and Thicknesses from 3/16 to 1 in.
Random Rectangular Flagging with Trimmed Edges for Floors and Terraces.
Flagging (Irregular shapes only) For Garden Walks, Stepping Stones, and Driveways.



BUCKINGHAM SLATE

Office
Telephone:
Bangor 39
After Office Hours
Call:
Bangor 308L
Bangor 288W

NORTH BANGOR SLATE COMPANY

BANGOR, PENNSYLVANIA

REPRESENTATIVES

NEW YORK, N. Y., D. Bernard Myers, 536 Fort Washington Avenue—Telephone, WAdsworth 3-4030
QUEENS VILLAGE, L. I., N. Y., J. E. Yerks, 217 Hempstead Turnpike—Telephone, HOllis 5-9270
PHILADELPHIA, PA., E. C. Strong, 305 Fairfield Avenue—Telephone, Boulevard 997

The Company

North Bangor Quarry was opened about 1863 by the late John Brown, was leased in 1882 by the North Bangor Slate Company and has been continuously operated by this company for the past half century.

Today the North Bangor Slate Company, through its recent purchases of the Bangor Union Quarry and the Bangor Excelsior Quarry, has a normal output of from 75,000 to 100,000 squares of slate per year and is the largest producer of Genuine Bangor Slate.

This Label is Attached to About 5% of the Slates In Each Shipment

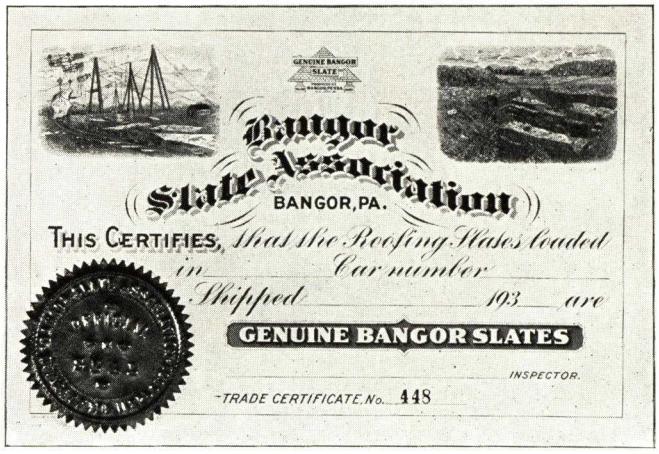
Grades of Genuine Bangor Slate

No. 1 Clear Smooth Texture—The finest grade of dark blue-gray slate. *Uniform throughout* as to color and texture, and free from knots and knurls that in any way interfere with the safe conveyance or the laying of the slate on the roof. Corners are full, cleavage is straight, maximum bend does not exceed ¼ in. in lengths up to 16 in. nor ⅜ in. in lengths from 16 in. up to 24 in. Thickness approximately 3/16 in.

Clear Rough Texture — Similar in color to the No. 1 Clear Smooth Texture, this grade admits only such knots and knurls which do not interfere with the close laying of the slate. Corners are full and cleavage is similar to the No. 1 Clear Smooth Texture. Thickness varies from 3/16 to ¼ in.

No. 1 Ribbon—Similar in all respects to the No. 1 Clear Smooth Texture, except that one or more ribbons of darker material may cross the slate in such a manner that when laid with the regulation 3-in. lap, the ribbons shall not be exposed to the weather.

No. 2 Ribbon—Similar in all respects to the No. 1 Clear Smooth Texture, except ribbons may cross the slate in such a manner as to be exposed to the weather.



Small Size of Facsimile Certificate Issued with Every Shipment of Genuine Bangor Slate

Relative Life of Slate

No. 1 Clear Smooth Texture has a useful life of seventy-five to one hundred years. Clear Rough Texture has a useful life of the same length. No. 1 Ribbon has a useful life of fifty years and No. 2 Ribbon has a useful life of thirty-five years.

Stock Sizes Available at All Times

Due to the large production of the North Bangor Slate Company's Quarries, a complete stock of the sizes given in the table and in standard thickness of approximately 3/16 in. is available at all times. All shipments are made from quarries at Bangor, Pa. Heavier slate in ¼ in., ⅜ in., ½ in., ¾ in. and 1 in. are manufactured promptly to order.

Standard Lay

Thatch Lay

Random Lay

STOCK SIZES AVAILABLE

Type	Sizes are in inches—length by width in the order given						
No. 1 Clear.....						14x12	
	24x14	22x12	20x12	18x12	16x12	14x10	12x10
	24x12	22x11	20x10	18x10	16x10	14x 8	12x 8
	.....	.....	.....	18x 9	16x 9	14x 7	12x 7
	.....	.....	.....	.....	16x 8	.....	12x 6
No. 1 Ribbon...						14x12	
and	24x12	22x12	20x12	18x12	16x12	14x10	12x 8
No. 2 Ribbon...	.....	22x11	20x10	18x10	16x10	14x 8	.....
	.....	.....	.....	18x 9	16x 8	14x 7	.....

Architects' Specifications

Due to the fact that Genuine Bangor Slate is a high quality slate, well known to the architectural profession, and the building trades of the country, it is widely specified, probably more so than any other blue gray slate. Producers of slates similar in color but of inferior quality frequently endeavor to market their slates as Bangor Slate, under various names hyphenated with the word "Bangor". Architects are cautioned in writing specifications to make their specifications specific, thereby enabling them to avoid distressing complications. Specifications for Genuine Bangor Slate should be written so far as the material is concerned, as follows:

Slate shall be Genuine Bangor Certificate Slate (state grade desired), identified by the copyrighted label of the Bangor Slate Association on a percentage of the slates. A Certificate of the Bangor Slate Association specifying the car number, date of shipment, number of squares, grade and size, shall be furnished by the roofing contractor to the architect.

Slate shall be of commercial standard quality and thickness (or such thickness as may be desired). Size of slate shall be ( ) or random widths of ( ) lengths. Lap shall be 3 in. of the third course over the first course, the fourth course over the second course, etc. Nails shall be copper 1½ in. long for standard slate.

QUANTITIES REQUIRED, WEIGHTS AND PRICES PER SQUARE

Sizes, in.	Number of pieces per sq.	Shipping weights, lbs.	Exposed when laid.	Nails to square 3d galvanized	
			in.	Lbs.	Ozs.
24 x 14	98	700	10½	1	0
24 x 12	115	700	10½	1	2
22 x 14	108	710	9½	1	1
22 x 12	127	710	9½	1	4
22 x 11	138	710	9½	1	6
20 x 14	121	725	8½	1	4
20 x 12	142	725	8½	1	6
20 x 11	154	725	8½	1	8
20 x 10	170	725	8½	1	11
18 x 12	160	735	7½	1	9
18 x 11	175	735	7½	1	12
18 x 10	192	735	7½	1	14
18 x 9	214	735	7½	2	1
16 x 12	185	750	6½	1	13
16 x 10	222	750	6½	2	3
16 x 9	247	750	6½	2	7
16 x 8	277	750	6½	2	12
14 x 12	218	780	5½	2	2
14 x 10	262	780	5½	2	9
14 x 9	290	780	5½	3	1
14 x 8	328	780	5½	3	3
14 x 7	374	780	5½	3	11
12 x 12	267	800	4½	2	9
12 x 10	320	800	4½	3	2
12 x 8	400	800	4½	3	15
12 x 7	457	800	4½	4	8
12 x 6	534	800	4½	5	4
10 x 8	514	825	3½	5	3
10 x 7	587	825	3½	5	6

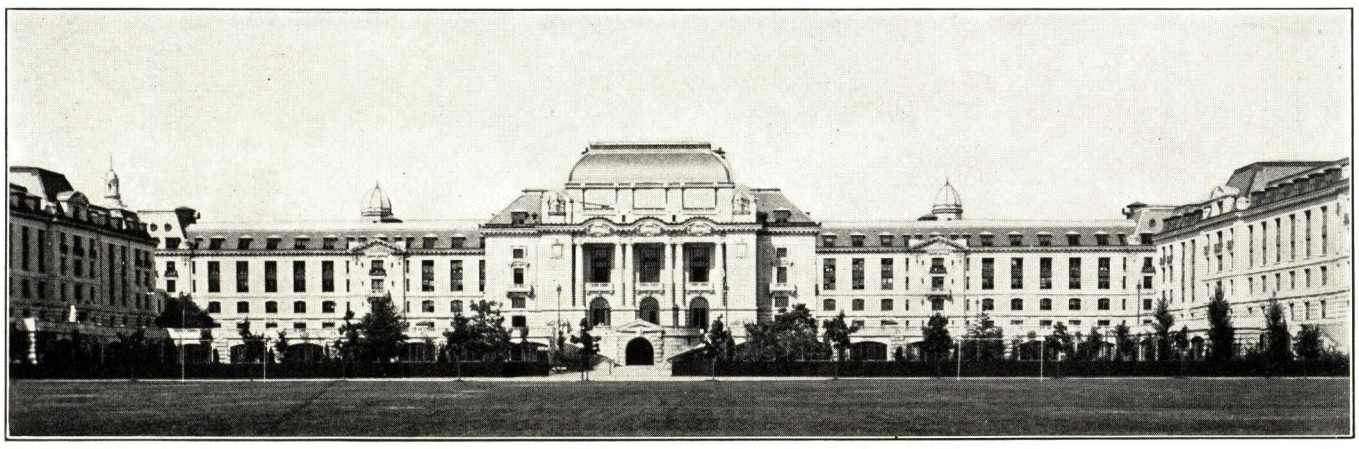
List Prices range from $11.25 per square for the more popular sizes of No. 1 Clear grade, to $7.75 per square for the No. 2 Ribbon. Prices are subject to the usual trade discounts.

Bangor Slate Association

This is an organization formed more than forty years ago by the producers of Genuine Bangor Slate. Every quarry producing this slate is entitled to membership in this Association. The purpose of the Association is statistical, advertising and protection. The Association furnishes to its members its copyrighted label which is attached to about 5% of the slates in each shipment. It also furnishes to each shipper a certificate of the Association for transmission to the buyer. Facsimile of the label and certificate are shown herewith. These are your protection against substitution. The slates should be inspected for the label and the certificate should be demanded from the roofing contractor.

OTHER NORTH BANGOR SLATE PRODUCTS

The North Bangor Slate Company also produces Structural Slate for blackboards, stair treads and risers, toilet partitions, wainscots, thresholds, sills, sinks, tubs, etc., as well as Slate for floor and walks. Complete information gladly sent on request.



Bancroft Hall, United States Naval Academy, Annapolis, Maryland
Slate furnished in 1915 by North Bangor Slate Company

6
24

ESTABLISHED 1901

O'BRIEN BROTHERS SLATE COMPANY, INC.

Quarriers and Manufacturers of Roofing Slate and Slate Flagging

MAIN OFFICE

GRANVILLE, N. Y.

QUARRIES—PAWLET, VERMONT

UNFADING GREEN—UNFADING MOTTLED GREEN AND PURPLE—GRAY—WEATHERING GREEN—VERMONT BLACK—RUSTICS

Unfading Green—Considered one of the best products manufactured in Vermont Roofing Slate, absolutely unfading and a certificate is furnished by the Unfading Slate Association to the effect that our slate is *unfading*.

Unfading Mottled Green and Purple—The green and purple color appears in each individual slate. A certificate is furnished by the Unfading Slate Association with every shipment which guarantees that slate is *unfading* and of the best possible slate rock obtainable.

Gray—This slate is furnished in two shades, a light and dark, and is of a somewhat rougher texture than our other slate.

Weathering Green—A commercial slate that gives the owner the best possible roof protection at the least possible price. This material fades out but this fading does not affect the watertightness of a roof of this color.

Vermont Black—A rough texture slate produced only in ¼ in. and thicker thicknesses. Some are a shiny black while others are sort of gray-black.

Rustics—The quarry people call them Freaks, they are a top rock of very poor qualities for durability. The bronze and yellow colors disappear after being exposed to the weather. This type of slate is recommended only in ⅜ in. and thicker thickness.

SPECIFICATIONS

(1) General and Guarantee—

(a) The General Conditions of the contract are hereby made a part of the contract and this contractor shall examine these General Conditions and thoroughly acquaint himself with all the requirements therein contained.

(b) This contractor shall furnish all materials and labor in accordance with the drawings and these specifications.

(c) This contractor shall inspect all surfaces prepared for slating by other trades, point out to the proper authority all defects, and shall not proceed with the laying of felt, flashings or slate until the necessary corrections have been made.

(d) Roofing shall be applied by workmen experienced in the applying of slate.

(e) The roofing contractor shall furnish his own scaffold or rigging, or arrange with the general contractor for the use of scaffolds furnished by others.

(f) A written guarantee shall be furnished that the materials used are in strict accordance with these specifications, and that any and all repairs required on the roof due to defective materials or workmanship furnished under this contract shall be made without cost to the owner for a period of one year.

(2) Roofing Felt—

(a) On all boarding to be covered with slate, furnish and lay asphalt saturated rag felt, not less in weight than that commercially known as "14-lb." felt. In this weight, per 100 sq. ft., a tolerance of 1 lb. plus or minus will be allowed.

(b) Felt shall be laid in horizontal layers with joints lapped toward eaves and at ends at least 2 in. and well secured along laps and at ends as necessary to properly hold the felt in place and proect the structure until covered by the slate. All felt shall be preserved unbroken, tight and whole.

(c) The felt shall lap over all hips and ridges.

(d) Felt shall be lapped 2 in. over the metal of any valleys or built-in gutters.

(3) Slate—

Slate shall be of commercial standard No. 1 quality and thickness, size 14 x random widths, Unfading Green Slate as mined and manufactured by O'Brien Brothers Slate Company, Inc., Granville, N. Y. A certificate of the Unfading Slate Association of Vermont shall be furnished by the contractor.

All slate shall be hard, dense, sound rock, machine punched for two nails each. All exposed corners shall be practically full. No broken corners on covered ends which sacrifice nailing strength or the laying of a watertight roof will be allowed. No broken or cracked slates shall be used.

(4) Hips—

(a) All hips shall be laid to form "saddle" hips without metal underneath.

(5) Ridges—

(a) All ridges shall be laid to form "saddle" ridges. The nails of the combing slate shall pass through the joints of the slates below.

(6) Valleys—

(a) All valleys shall be laid to form "open" valleys.

(7) Elastic Cement—

(a) Cement shall be an approved brand of waterproof elastic slaters' cement colored to match as nearly as possible the general color of the slate.

(8) Nails—

(a) All slate shall be fastened with two large-head slaters' solid copper nails. Use 3d (1¼-in. nails for slates 18 in. or less in length, 4d (½-in.) for 20-in. or longer, and 6d (2-in.) for slates on hips and ridges.

(9) Slating—The entire surface of all main and porch roofs, the roofs and sides of any dormer windows, if shown, and all other surfaces so indicated on the drawings, shall be covered with slate in a proper and watertight manner.

(b) The slate shall protect 2 in. at the eaves and 1 in. at all gable ends, and shall be laid in horizontal courses with the standard 3-in. headlap, and each course shall break joints with the preceding one. Slates at the eaves or cornice line shall be doubled and canted ¼ in. by a wooden cant strip.

(c) Slates overlapping sheet metal work shall have the nails so placed as to avoid puncturing the sheet metal. Exposed nails shall be permissible only in top courses where unavoidable.

(d) Neatly fit slate around any pipes, ventilators, etc.

(e) Nails shall not be driven in so far as to produce a strain on the slate.

(f) Cover all exposed nailheads with elastic cement. Hip slates and ridge slates shall be laid in elastic cement spread thickly over unexposed surface of undercourses of slate, nailed securely in place and pointed with elastic cement.

(g) Build in and place all flashing pieces furnished by the sheet metal contractor and co-operate with him in doing the work of flashing.

(h) On completion all slate must be sound, whole and clean, and the roof shall be left in every respect tight and a neat example of workmanship.

ESTABLISHED 1869

RISING & NELSON SLATE CO.

Miners, Makers and Shippers of High Grade Slate

MAIN OFFICE

WEST PAWLET, VERMONT

NEW YORK OFFICE, 101 Park Avenue
DETROIT OFFICE, 2539 Woodward Avenue
CHICAGO OFFICE, 2554 West Harrison Street
PHILADELPHIA OFFICE, 3121 Jefferson Street
WASHINGTON OFFICE, 1427 Eye Street, N. W.
ARCHITECTS' SERVICE DEPARTMENT, 101 Park Avenue, NEW YORK, N. Y.

Products

ARCHITECTURAL and COMMERCIAL ROOFING SLATE.
SLATE for FLOORS and WALKS.
GARDEN FLAGGING.

Tudor Stone Roofs and Flagging
TRADE-MARK

Designing Service

The production of our quarries is endowed by nature with an exceptionally interesting surface texture and soft blending of color tones which can be worked into any desired sizes and thicknesses, thus providing a material admirably suited to the designing of roofs adaptable to different types of architecture such as Tudor, Georgian, Cotswold, Colonial, English, French, Dutch and Normandy, smooth, medium or rough texture as desired.

In order that the roof may harmonize with the rest of the building it is necessary that all of these elements—texture, colors, sizes and thicknesses—should be worked into a design, to accord with the type of architecture chosen. This does not necessarily mean just certain percentages of colors, sizes and thicknesses but a carefully worked out design for each individual building. To be of assistance in the designing of such roofs we maintain an efficient Service Department and architects are invited to make use of this specialized service.

Samples of the various types and colorings of slate, literature and estimates will be gladly sent upon request.

Architectural and Commercial Slate

Verde Unique—This is a beautiful dark unfading deep green. Darker in shade than that from any other quarry and therefore exclusive. It is particularly adaptable for the Colonial and Georgian type of architecture but may be used with satisfactory results on other types where a dark green roof is desired. It may also be used to great advantage in color combinations. Any thickness or graduation from ¼ in. up.

Velenheli Purple Blend—A distinctive unfading rich purple with tints of green, blending to a more even mixture of the two shades. It is also an exclusive production, and is adaptable to the Colonial and Georgian periods of architecture. Also used advantageously in a number of color combinations. Any thickness or graduation from ¼ in. up.

Vermont Black and Gray Black—This slate varies from dark gray to black, having a very interesting texture and is adaptable to English, French and Colonial types of architecture. Also as a background in a mixture with other colors. Any thickness or graduation from ¼ in. up.

Imperial Unfading Green—A standard of perfection, permanent color, medium dark shade suitable for the Colonial and other types of architecture. Any thicknesses or graduation from $\frac{3}{16}$ in. up.

Unfading Mottled Green and Purple—Makes a roof with rich, beautiful mottling of the green and purple shades. These slate blend nicely together and they are also used in numerous combinations. In any thickness or graduation from $\frac{3}{16}$ in. up.

Variegated Purple—In this slate the purple color predominates, part being clear purple, but some with green spots and shadings. Makes a handsome roof at a moderate price. Any thickness or graduation from $\frac{3}{16}$ in. up.

Unfading Mottled Gray—This slate varies in coloring from medium light to dark, and from nearly clear to a nicely clouded effect. It is an exceptionally good fast color slate and moderately priced. Any thickness or graduation from $\frac{3}{16}$ in. up.

Sea Green—Weathering Green—Gray—There is no better quality slate and it is used more frequently than any other type. It weathers beautifully to varying shades of greens, grays, buffs, soft browns and other tints. Sold at a comparatively low price, it is not only used by itself but in practically all combinations that contain weathering slate. Any thickness or graduation from $\frac{3}{16}$ in. up.

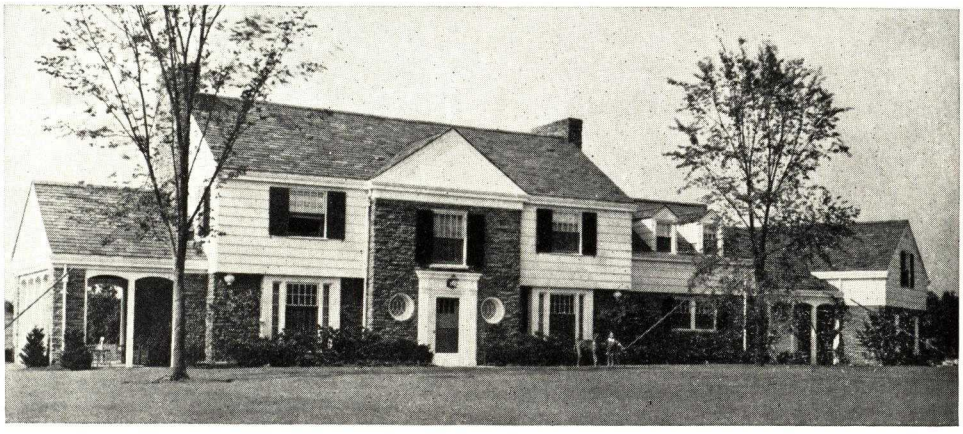
Pheasants—These richly colored rustic slate in various shades of golden, brown, bronze and rust stained blacks are used in many color combinations. As quarried and selected by us they make a permanent roof. These slate have been colored in years past by water seepage carrying with it different minerals which have produced the unusual and surprising colors. These colors, which will not change, are used in various proportions as an artist uses high lights on a painting. Any thickness or graduations from ¼ in. up.

Monson Maine—This slate which is unsurpassed for strength and lasting qualities recommends itself to the architect who is seeking the finest type of uniform *unfading black slate*. Particularly adaptable to the Normandy and French types of architecture and design. Any thickness or graduation from $\frac{3}{16}$ in. up.

Slate for Floors, Terraces, Walks and Gardens

We produce an exceptional quality of split, rubbed or planed surface, trimmed or sawed edges of flagging slate.

Irregular shapes, random sizes, rectangular shapes or regular size pieces. In full range of colors and any thickness. Samples and literature sent on request.



Curtiss Ginn, Residence, Ashland, Ohio
LOUIS ANDRÉ LAMOREUX, Architect, Mansfield, Ohio
A Moderate cost home of architectural merit, Germantown Colonial in design. Roof is Vermont Black and Gray Black, ¾ to ¼ in. thick, graduated lengths and random widths

MEMORANDA

ESTABLISHED 1917

SHELDON SLATE PRODUCTS CO., INC.

Manufacturers of Roofing Slate and Slate Products

43 Main Street, GRANVILLE, N. Y.

BRANCH OFFICES

ATLANTA, GA., 47 Alabama Street, S. W.
BOSTON, MASS., Rm. 409, 201 Devonshire Street
CHICAGO, ILL., 1645 So. Crawford Avenue
CINCINNATI, OHIO, 831 Temple Bar Building
CLEVELAND, OHIO, 917 Fidelity Building
DALLAS, TEX., 3905 Normandy Street
DETROIT, MICH., 180 E. Larned Street
MEMPHIS, TENN., 440 Decatur Street
NEW YORK, N. Y., 101 Park Avenue
PHILADELPHIA, PA., Architects Building
PITTSBURGH, PA., 259 Melwood Street
PORTLAND, ORE., 2603 S. E. Grand Avenue
SEATTLE, WASH., 1107 W. Idaho Street

Certified and approved manufacturers of slate products by National Association of Investigating Committees of Architects and Engineers based on visit to Vermont-NewYork slate district on behalf of members of the profession July 15, 1935, a general inspection of properties and facilities; acquaintance with personnel and favorable reports of architects and users of our products. (Official bulletin on request.)

Products

Manufacturers of Commercial and Architectural Roofing Slate and Slate Products of every description.

Personal executive attention is given every order.

Truck delivery by expert slate handlers will be made when required direct to the job within a radius of 300 miles of Granville.

Colors

All or any of the following colors can be readily supplied either for roofing, flagging or structural purposes.

Unfading Green and Gray—The green as deep in color as any to be found in the Vermont-New York slate belt. The gray of a medium light shade. Can be furnished singly or in such percentage of either color as may be desired.

Unfading Mottled Purple and Green—A mixture of green and purple tones in each individual slate. No two alike. Some with more green than purple—others vice versa—and some nearly purple. All of steadfast color. Although custom and trade names have given rise to the term, purple—the so-called purple tones are actually shades of dark maroon.

Mottled Gray Black—A dark gray background with lighter and darker gray mottlings. Available in both unfading and semi-weathering material.

Hard Vein Antiques—From rock formations centuries old, of a character that will not permit manufacturing into slate less than ⅜ in. up to ¾ in. and 1 in. thick. Background green and gray with showing of light and dark bronze.

Slates with brighter color effect known as "Golden Pheasants" available in limited quantity not exceeding ½-in. thickness.

Semi-Weathering Green and Gray—Colors furnished separately or so combined as result of special tests, uniform percentage weather on exposure to soft tones of buff and brown—balance retain original green and gray tones. Unexcelled for low initial cost and unlimited durability. Particularly effective and decidedly desirable for combining with other colors as a mellowing factor to avoid sharp contrasts. Modulus of rupture, 14,000 lbs. per sq. ft. Porosity, less than ¼ of 1%.

Unfading Red—Of steadfast color. Physical resources ample to insure unlimited supply. Available for roofing and structural installations, such as stair treads, floor tile, sills, etc. Red slate is particularly interesting and exclusive, inasmuch as it is only in Washington County, New York, that slate of this color has been found in deposits of commercial value. Costs less than red marble for structural uses.

Redstone—A crushed red slate product for walks and driveways. Packs down under use. Comparable in hardness to any other product used for same purpose. Will not injure automobile tires or shoes. A distinct adjunct to any landscaping project. Our Pulverized Red Slate has proved superior to other materials for surfacing of tennis courts and asphalt driveways and walks.

Special Rough Texture Slate—This ranges in promiscuous thicknesses $\frac{3}{16}$ to ⅜ in. Available in all of the colors described herewith. Use of these slates in accordance with our layout and specifications guarantees the finest low priced architectural roof obtainable. Architects desiring to reduce cost of a building, including the roof, will make no mistake in substituting either these rough texture or the commercial varieties.

Vermont Black and Gray Black—Intermingled shades. A semi-weathering product. A small percentage of these slates will usually be found an effective addition to any color scheme.

Sheldon's Olde English Combination No. 12—Generally conceded one of the highest achievements in the fabrication of architectural roofing slate. A beautiful blending of soft colors comprising greens, grays, buffs, in just the right proportion to develop a roof of unusual character. Simply specify "Roofs to be covered with Sheldon's Olde English Combination No. 12 (following with maximum and minimum thicknesses and exposures) as manufactured by Sheldon Slate Products Co., Inc., Granville, N. Y., in accordance with layout as approved by architect."

Laboratory Tests

Sheldon's slates will fully measure up to the standards of excellence established by any tests thus far devised for determining the inherent value of the material.

Architectural Service

Sketches, layouts, samples and general or technical information bearing on any phase of a slate installation promptly tendered. Roof applications or setting of slate for structural or underfoot purposes, personally supervised when required.

Residence at Larchmont, N. Y., Roofed with Sheldon's Vermont Blacks and Bronzes, ¾ to ¼-In. Thicknesses

C. W. Moody & Son, Builders Hunter McDonnell, Architect

Manufacturer's Certificate

Architects wishing to insure the complete fulfillment of their specifications may confidently incorporate in same the name of Sheldon Slate Products Co., Inc., and require contractor to furnish certificate that the slate furnished is in accordance with the specifications.

Metal Work, Flashing Details and Specification Forms

Standard practice covering all of these roof details, owing to limited space, cannot be given here but will be furnished any architect on request.

Samples

Samples on request.

THE NEW HAVEN COPPER COMPANY

ESTABLISHED 1849

Manufacturers of Sheet Copper Since 1849

SEYMOUR, CONN.

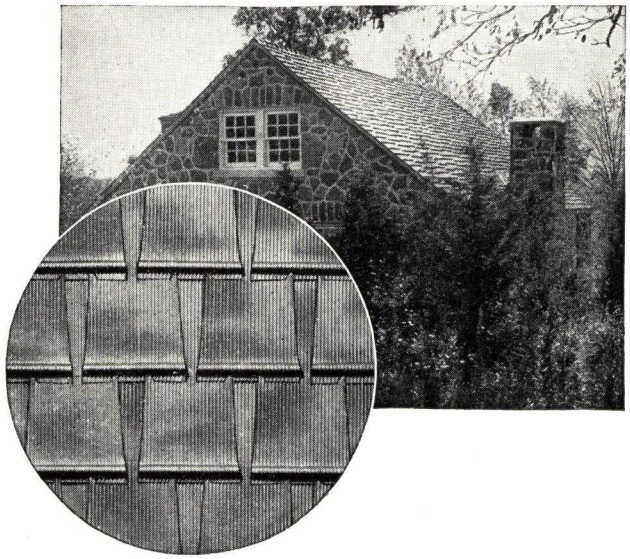
KENMAR *Copper* SHINGLES

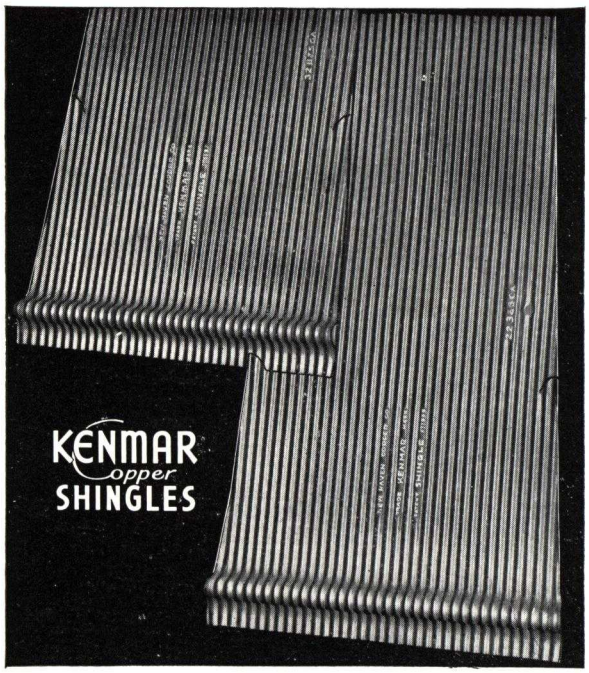
TECHNICAL DATA FOR ARCHITECTS AND CONTRACTORS

Kenmar Copper Shingles are made of pure sheet copper, ribbed or corrugated, with the ribs running the length of the shingle. The function of these corrugations is to give the shingles added strength, to prevent vertical distortion, and to amply provide for expansion and contraction under the utmost variations in temperature. While these corrugations fulfill a number of important practical purposes, it may be noted, however, that they are not discernible when viewed from a distance at which the normal roof is elevated from the ground.

The bottom edge of the shingle is made in the form of a roll approximately 5/8-in. in height which acts as a stiffener against buckling or horizontal distortion, and secondarily provides a raised butt which permits the architect to accentuate a horizontal roof design if desired. This toe roll also provides an ideal snow guard, and absolutely prevents dampening, due to capillary attraction, by reason of the air pocket formed at the base of each shingle.

The shingles are notched on each side 6 in. above the bottom. The extension of the toe roll of the overlying shingles fits into these notches. This interlocking is an absolute preventive against chatter, or wind effect. It also guarantees uniform exposure to the weather. If a staggered or random horizontal coursing is desired, however, this effect can be obtained without extra cost and without adding to the cost of installation, by varying the length of the extension of the toe roll.





The standard shingles are tapered toward the top, 1 in. on each side. The function of this taper is to economize in the amount of copper utilized without affecting in any way the weather tightness of the roof. While straight edge shingles can be supplied, it should be noted that the taper is not discernible from the ground.

Sizes and Weights

The shingles are all 15 in. in length, and may be supplied in 6, 8, 10, 12 and 14 in. widths. This length, with the 6 in. exposure to the weather, assures a 3 in. head lap, and the company specifies a maximum lateral spacing for any particular shingle width utilized. This assures absolute weather protection regardless of width of shingle and spacing diagram desired.

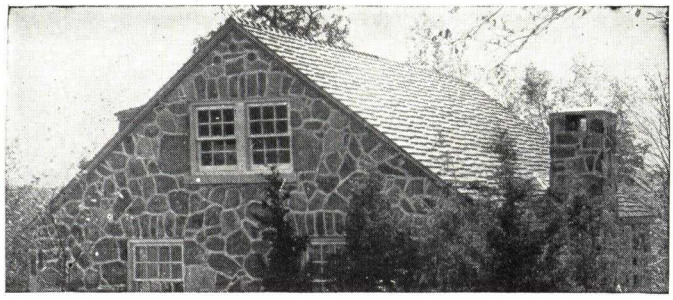
Weights per Square of Various Spacings

With the standard 6 in. weather exposure of shingles in each course, the weights per 100 sq. ft. laid, will be approximately as follows.

WEIGHT OF 100 SQUARE FEET LAID
Lateral Spacing Between Shingles

Gauge	Close	2 in.	4 in.	6 in.
32 B&S	91 lbs.	82 lbs.	75 lbs.	72 lbs.
30 B&S	114 lbs.	101 lbs.	95 lbs.	90 lbs.
29 B&S	128 lbs.	118 lbs.	106 lbs.	101 lbs.

Note: The width of spacing between shingles determines the amount of copper laid per square and naturally the cost per square.



Comparative Weights

The average weight of 100 sq. ft. of a Kenmar Copper Roof is about half that of the next lightest roof material. Note the comparative lightness of Kenmar as shown in the following table published by the Copper and Brass Research Association:

Approximate weights of 100 square	
Material	Feet laid
Clay Shingle Tile	1200—1800 lbs.
Clay Spanish Tile	650— 850 lbs.
Slate	450— 675 lbs.
Asbestos Shingles	300— 650 lbs.
Wood Shingles	200— 300 lbs.
Kenmar Copper Shingles	72— 128 lbs.

Nails

Two copper nails are utilized to fasten each shingle. Stencil marks approximately 8 inches above the bottom of the shingle clearly indicate where the nails are to be driven, thus eliminating any guesswork and giving assurance that there will be no exposed nail heads on the job.

Makes Copper Applicable to Any Pitched Roof

Kenmar Copper Shingles were not designed with the idea of imitating any of the other recognized quality roofing materials—either as to design, texture or form. They are copper in its latest and most practical form both as to foolproofness and economy of installation. The construction of Kenmar Shingles, however, lends itself to conformity with most general types of roof design, i.e. American Method butt to butt, with either regular or random horizontal coursing, or with irregularity of shingle size; or the Dutch lap method with a variety of spacing diagrams. This latter method of laying has been found particularly adaptable for re-roofing purposes where initial low cost was a factor, and also on certain types of new home design where regularity of horizontal, vertical or diagonal lines was desired.

Roof Pitch

Kenmar Copper Shingles can be used on roof slopes of lower pitch than most other roof materials because of their exclusive weather-resisting features. Slopes down as low as 5-in. rise per foot of run offer no problem when Kenmar Shingles are used. Under average conditions roof surfaces with as little as 4-in. pitch are weathertight when Kenmar Shingles are used.

Ease of Application

A Kenmar Copper Roof is one of the easiest to apply. Note the simplicity of application as explained herein. Any good roofer or carpenter can lay a Kenmar roof quickly and satisfactorily. Laying costs are low, one man being able to lay from 2-3 squares per day—depending upon the complexity of the roof, and the shingle width used. Due to lightness in weight, the helper's time is cut to a minimum.

Available in Bright Copper, Oxidized, Patinated and Lead Coated

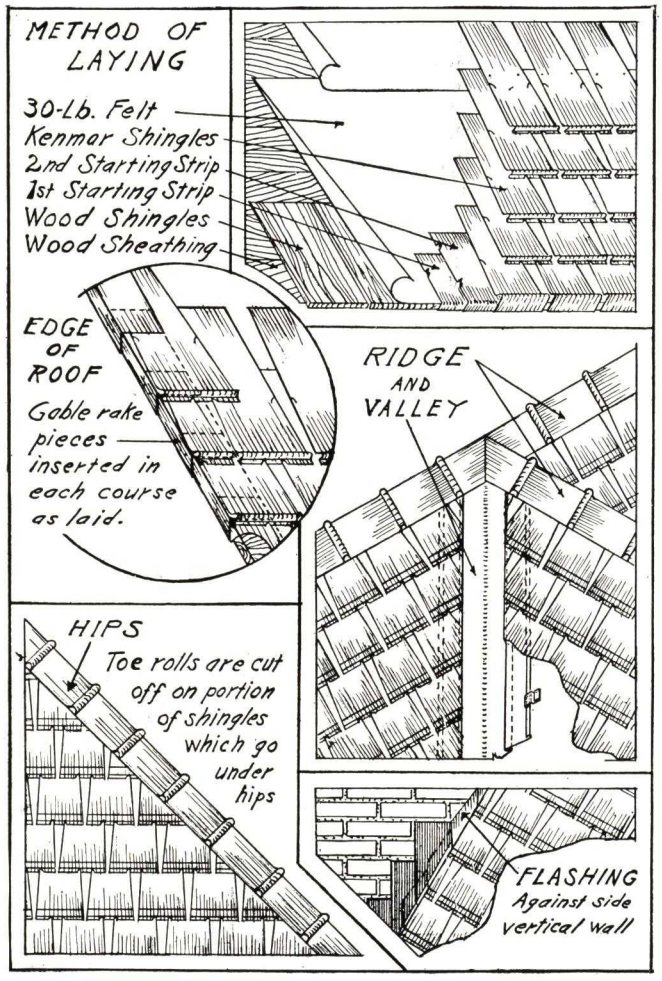
While Kenmar Copper Shingles are available in three copper finishes, these actually represent the progressive color steps through which copper goes before reaching, after long exposure, the ultimate verde-green patina.

Bright copper is the natural copper before exposure.

Oxidized shingles are pre-weathered at the factory toward the first color stage of natural weathering—a rich brown.

Patinated shingled are pre-weathered at the factory toward the final color stage of natural weathering—verde-green.

Lead coated shingles are dull grey when shipped from the factory. These weather further on the roof to the dark, mottled greys of old pewter.



Note: This important difference between other types of shingles and Kenmar Copper Shingles must be carefully observed. Copper must not come in contact with other metals; hence, with a roof of Kenmar Shingles all flashings, gutters, downspouts, nails, cleats, etc., shall be also of copper.

If any question arises as to application of copper to flashings, etc., consult Sheet Copper Handbook of the Copper and Brass Research Association, 420 Lexington Avenue, New York. Copies can be obtained from the Association.

THE EDWARDS MANUFACTURING CO.

Manufacturers of Metal Tile and Metal Shingles

403-413 Culvert Street
CINCINNATI, OHIO

NEW YORK, N. Y., Room 1101, 92 Liberty Street (Metropolitan Area Only)

DALLAS, TEXAS, Market and Corbin Streets (Texas Only)

Authentic Roofing Type

This Metal Tile is an authentic roofing type. The Romans gave us the first metal tiles —casting them from bronze. Next, these metal tiles were curved, the first course being laid with the roll down and covering the joints with tiles laid roll up, as on the circular temple of Vesta made from Syracusan Bronze. One of the Popes took tiles of this kind from several of the temples and covered the Basilica of St. Peter. Since the tenth century, lead and copper tiles of similar construction were used, particularly on the domes of Moscow and churches in Belgium and Germany. Edwards Spanish Metal Tile capitalized modern metal stamping equipment to provide a roof retaining all the beauty and massiveness of the old Moorish clay tile and at the same time overcoming some problems which it presents.

Fig. 367
Field Tile

Materials

Fabricated from Copper, Copper-bearing Galvanized Steel, Galvanized Tight-cote Steel, Tin (terne) Plate and Pure Sheet Zinc, all the above in any weight or gauge desired. Since metal is universally used to protect the structure at the weakest points of the roof—valleys, ridges, flashings, etc.—it is consistent to utilize it for the entire roof providing it is available in the proper form or design which will beautify as well as protect.

Advantages

(1) The only tile roof which is watertight in itself. Patented construction of interlocking joint provides perfect protection against elements, extreme ease of application, allowance for expansion and contraction.

(2) Edwards Metal Spanish Tile do not freeze, crack, or fall off due to climate changes.

(3) These tile do not absorb moisture which normally increases the weight of tile roofs of absorbent materials about 25%.

(4) Edwards Metal Tile is light in itself, about one-ninth the weight of clay tile, permitting much lighter framing and decreasing costs of laying.

(5) Makes the coolest roof by far as the metal radiates rapidly through the constant movement of air in the rolls. This movement is accentuated as the heat increases, thereby cooling the roof and the building.

Fixtures

Illustrations below show only a few of the many fixtures made to take care of different and special conditions. (See Catalog 72 for complete line of fixtures.) Illustrations show bungalow fixtures. Regular and Chinese fixtures also available. Illustration of roof section is scarcely large enough to show the variety of fixtures which embellish and beautify this roof treatment.

Engineering Service

Either send us the blueprints or a sketch showing the pitch, shape and dimensions of the roof, and our Engineering Department will furnish a list of the tile and fixtures required, together with quotation including freight to the railroad point nearest to site of building. Full directions will be furnished for application of tile and fixtures.

Specification

All pitched roof surfaces shall be covered with Edwards Metal Spanish Tile, manufactured by THE EDWARDS MANUFACTURING CO., Cincinnati, Ohio, to be made from.....

(Insert here: Tin Painted, Tight-cote Galvanized, No. 9 or No. 11 gauge Zinc, 9, 12 or 14-oz. Copper. If Painted, specify whether red or green.) Roof surfaces to be covered with felt or building paper. Tile to be applied straight and true so all horizontal lines are parallel with the eaves and all vertical lines are at right angles to the eaves. Fixtures shall be.....

(Insert here: Regular, Bungalow, or Chinese.)

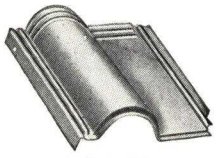


Fig. 400
Gable Tile

Fig. 425
Hip Flashing —Left

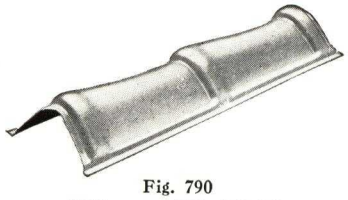


Fig. 790
Ridge and Hip Finish

Fig. 424
Hip Flashing—Right

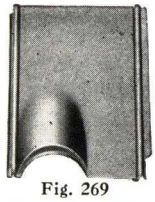


Fig. 269
Diverting Tile

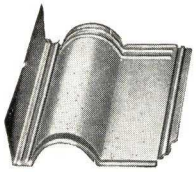


Fig. 399
Side Wall Tile

Fig. 381
Valley

Fig. 409
Ridge Flashing

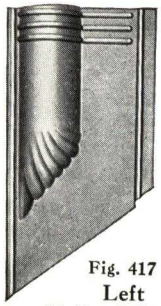
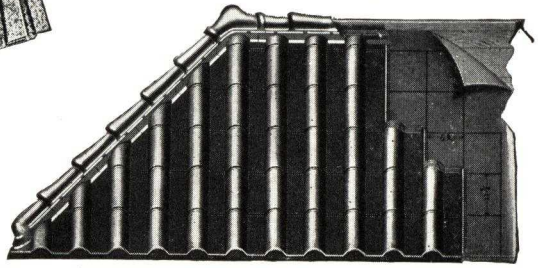


Fig. 417
Left Valley Tile

Fig. 416
Right Valley Tile



Section of roof with Edwards Spanish Tile

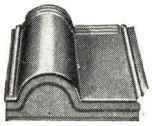


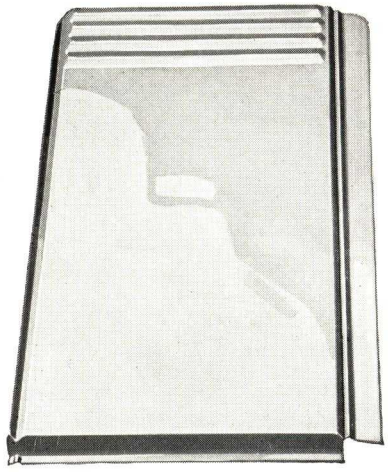
Fig. 369
Eave Tile

Write for Catalog 72 for fixtures for all points on roof and complete specifications.

EDWARDS METAL SHINGLES

Design

Edwards Metal Shingles are durable in performance and attractive in appearance. They have withstood the weather tests in various parts of the country, in heat, rain and heavy winter snows. During the many years of manufacturing, we have continually improved in design, locking devices and materials used. The five most popular designs are Old English, Roman, French Metal Slate, Queen Anne and Temco. These shingles are made of tin, tight-cote galvanized and copper bearing steel, zinc and copper; occasionally they are made of monel, nickel silver or aluminum. They may be obtained in red or green.



Old English Type Shingle

Directions for Applying

Felt—Put on a felt or paper covering on the solid board sheathing. This need not be expensive felt. Ordinary building paper answers the purpose very well. This is done to keep out drafts which might draw moisture through, and also to act as a deadening agent.

Line Roof—Take a chalk line and line roof horizontally parallel with the eaves—taking the covering length of the shingle. Then line roof vertically at right angles to eaves, same distance as covering width of shingle.

Laying the Roof—Begin at the lower left hand corner. The nailing flange is covered by locking the next shingle in place. In laying the second course, and alternate courses, begin with a half shingle in order to break joints.

Finish at the Eave—Nearly every house has a gutter. Apply the gutter first and see that this gutter has a 2 or 3-in. flange turned up on the roof. Then lay the first course of shingles, so that the ends of the shingles come even with the edge of the roof. If no gutter is used, let the first course project over the eaves about 1 in.

Hip and Ridge—If our Perfect or Imperial finishes with folded apron are used, they are to be applied before shingles are put on. Slide the shingles into the fold. If ordinary round Ridge Roll, Hip shingles or any other finish without folded apron is used, apply shingles first. If our Old English Hip finish is used, put on one piece for every course of shingles. The Hip finish is made extra long to take care of various pitches.

Valley—Always use our Imperial or Perfect Valley which comes in 10-ft. lengths. Apply the valley first and fasten by nailing the outer edge. In laying shingles at the valley cut the shingles at the same angle as the valley, about ½ in. past the fold and bend the shingles into the lock or fold in the valley. Do not drive any nails in the shingles through the valley.

Flashings and Fixtures—In order to take care of conditions around dormers, chimneys, stacks, etc., use end wall flashing and sidewall flashing. These are put on before the shingles are applied and the shingles are bent into the fold or lock on these flashings.

Architects' Specifications for Metal Shingles

All pitched roofing surfaces shall be covered with Edwards

.....

(Here insert design of shingle)

Metal Shingles, manufactured by THE EDWARDS MANUFACTURING CO., Cincinnati, Ohio, made from.....

.....

(Here insert whether Tin Painted (red or green), Tight-cote Galvanized, No. 9 or No. 11 galvanized Zinc, 9 oz. or 14 oz. Copper.)

Roofing surfaces to be prepared for metal shingles by covering with felt or building paper. Shingles to be applied straight and true so all horizontal lines are parallel with the eaves and the vertical lines are parallel with the rafters and at right angles to the eaves.

When specifying the Old English Shingles, insist that the Old English Hip and Ridge be used.

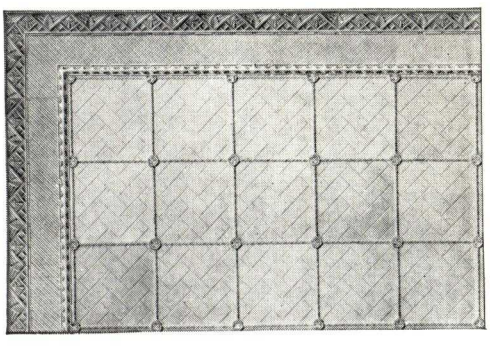
EDWARDS STEEL CEILING

Permanence

Edwards Steel Ceilings are made with the thought that each unit is to become a definite and permanent part of an enduring structure. Steel ceilings are used in industrial buildings and garages because they are known to withstand strains and vibration. In stores and business offices, they have proved their value because of low cost of installation and economical maintenance. In public buildings, steel ceilings are in demand for their permanence. Home basements are converted into recreation centers after covering unsightly joists with steel ceilings. They are popular for the bathroom and kitchens because they may be cleaned by applying soap and water.

Safety

Edwards Steel Ceilings are fire-resistive and remove danger of falling plaster. In the case of the Western Auto Supply store pictured below, plaster and lath completely fell from the joists due to excess water pressure, caused by floods. Many of our installations were completely submerged with very little damage. In flood areas particularly, the use of Edwards steel ceiling has been instrumental in saving time for making necessary repairs and the labor and material costs involved in the repair job. These ceilings present a uniform appearance and are level throughout. All that is required is an occasional washing and an occasional coat of paint.



Edwards Modern Ceiling

Two types of ceiling which are completely modern are the herringbone design illustrated, particularly suited to food stores and shops with tile sidewalls, and the Edwards Modernistic. The latter makes it possible to secure striking effects with color combinations without employing costly decorators. Where the quiet atmosphere of an all-over color is desired its lines and planes stand out in beautiful relief.

B. MIFFLIN HOOD COMPANY

Manufacturers of Roof and Floor Tiles, Face and Chemical Brick

PLANTS

DAISY, TENN., AND NORWOOD, N. C.

TELEPHONE OR TELEGRAPH, County 5606, Chattanooga, Tenn.

BRANCH SALES OFFICES

ATLANTA, GA., 686 Greenwood Avenue, N. E.
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CHICAGO, ILL., 5751 No. Campbell Avenue
MIAMI, FLA., 1720 Congress Building
NEW YORK, N. Y., 101 Park Avenue
NORWOOD, N. C.
PHILADELPHIA, PA., Hood Tile Co., DeLong Building
TAMPA, FLA., 310 So. Morgan Street
WASHINGTON, D. C., care Jas. R. Wheeler Co., 928 Eye Street, N. W.

Represented by Leading Roofers, Tile and Brick Dealers in Principal Cities

Products

An authentic ROOFING TILE for any type of architecture. Flat Shingle Tile, True Mission Tile, Tapered Mission Tile and Interlocking Shingle Tile.

Also manufacturers of brick of standard colors, shapes and textures. Fireplaces, Steps, Briquettes, Landscape Tile, Garden and Terrace Tile, Heavy Traffic Tile, Non-Slip Ramps, Brick and Stucco Inserts, Chemical Stoneware, Cylindrical Spiral Rings.

For our Floor Tile Page, see File Index.

Fighting Cocks Tavern

Yorkshire

Normandy

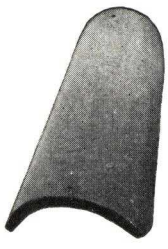
Devonshire

Dresden

Sussex

Barcelona

Toledo



Lombardy

Riviera

Habana

Shingle Tiles

"Fighting Cocks Tavern" — Hand-moulded in true reproduction of old European handmade tiles. Antique colors including soot black, moss greens, browns and soft shades of red. Soft texture, with irregular butts.

"Yorkshire" — Sanded texture, in extreme wide range of antique colors. An excellent tile for color graduation.

"Normandy"—Made from soft alluvial clays, especially adaptable to the warm climates. Smooth but non-light reflecting texture, in cool buff and tan colors.

"Devonshire" (rough scored texture) or "Sussex" (smooth)—Hardburned shale tile, made in red, fireflashed and buff shades. "Devonshire" is also produced in Moss Mottle green shades, and "Sussex" can be furnished in a range of slate colors.

"Dresden" — A side-locking shingle, with scored texture. Red and fireflashed colors. Also made in Moss Mottle green shades.

"Sussex"—A thin but strong hard shale tile produced in dark sprayed slate colors, as well as the regular red and fireflashed shades. Light weight and economical.

Curved Tiles

"Barcelona"—A true handmade tapered Mission tile, made in moulds from alluvial clays and shale in a wide range of clay colors. Has a soft sanded and pitted texture.

"Toledo" — A handmade 15-in. Tapered Mission, made of alluvial clays, with a hand-raked texture and wide range of clay and engobe colors.

"Lombardy"—Machinemade Tapered Mission, with smooth die surface and non-reflecting clay colors.

"Riviera"—Straight barrel Mission, made from shale, in either Rough scored, Smooth or lightly scored Needlepoint texture. Produced in wide range of Red, Fireflashed and Buff shades.

"Habana" — Straight barrel Mission, made from alluvial clays. Smooth texture only. Buff and Tan colors.

Samples cheerfully furnished upon request.

Name	Size, inches	Exposure to weather, inch	Pieces per square	Weight per square, lbs.
"Fighting Cocks Tavern"	7x14x½	6	355	1500
"Yorkshire"	6x15x½	6½	380	1550
"Normandy"	6x15x½	6½	380	1550
"Sussex" or "Devonshire"	9x12x½	5	335	1600
	9x15x½	6½	260	1450
	7x15x½	6½	325	1350
	6x15x½	6½	380	1550
"Dresden"	8x13	10	215	1000
"Sussex"	9x15x⅜	6½	260	1150
"Barcelona"	18x8	15	170	1150
"Toledo"	15x7	12	280	1500
"Lombardy"	18x8	15	170	1150
"Riviera"	15x8	12	210	1100
"Habana"	18x8	15	170	1100

MURRAY TILE COMPANY

INCORPORATED

Manufacturers of Roofing, Quarry and Promenade Tile

CLOVERPORT, KENTUCKY

SALES REPRESENTATIVES

CHICAGO, ILL., F. A. Doerr, 82 West Washington St.
MIAMI, FLA., H. J. Pilliod, 101 N. E. 25th St.
NEW YORK, N. Y.,Wm. H. Revis, Inc., 103 Park Ave.
ST. LOUIS, MO., R. V. Hughes, 911 Locust St.
NEW ORLEANS, LA., Roofers Material and Equipment Co., 439 Baronne St.

PRODUCTS

Spanish Roll Roofing Tile, Mission Roofing Tile and Flat Shingle Roofing Tile.

Packing House Heavy Duty Quarry. (For this item see File Index.)

Quarry Tile and Trim, for Floors, Wainscots and Promenade Roofs, Stair Threads, and Risers, Threshold Tile, Window Stools and Returns, Plinth Blocks. (For these items see File Index.)

MURRAY ROOFING TILES

Produced since 1904 from fine quality clays and shales, expert methods of manufacture insure a permanently beautiful, weathertight tile with definite insulating qualities. A variety of types, sizes and textures in appropriate colors afford a suitable selection to meet individual requirements of architectural design.

DESCRIPTION OF TILE

Rustic—

Shingle tile of slightly varying thickness and sufficient warpage to produce roof texture. Furnished in fireflashed shades of reds, browns, tans, gunmetal and burnt umber tones or in a graduation from black to red.

Victorian—

Flat slab shingle with wood-grained texture. Furnished in same shades as Rustic.

Rough Velvet—

Shingle tile with irregular machine scoring to absorb light rays and to present a soft velvety effect. Furnished in fireflashed shades of light and dark tan, reds, browns, and running into variation of deep gunmetal shades.

Saxony—

Shingle. Almost smooth in texture but with just enough fine combing to break light rays. Furnished in same colors as Rough Velvet.

Mission—

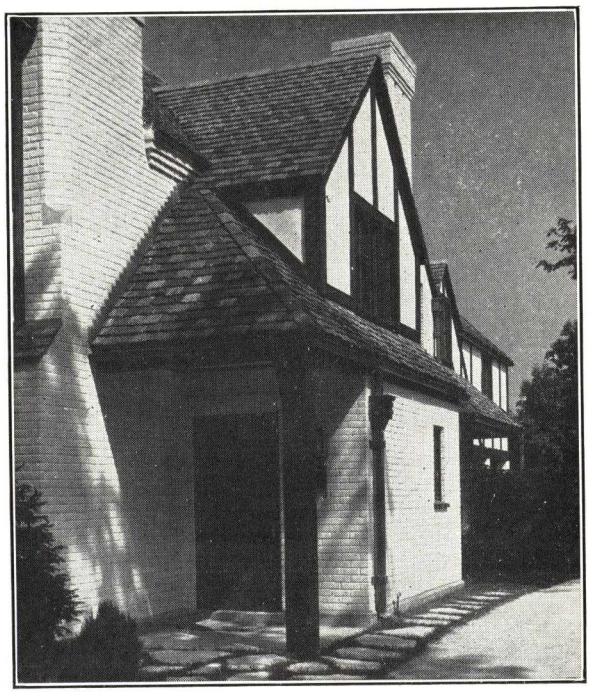
True Spanish Mission tile with fine needlepoint texture or rough machine scoring and available in a full range of shades, including variations of buff, orange, light and dark tan, mingled reds and dark flashed tones.

Spanish Roll—

Furnished in same shades as Mission.

OTHER COLORS

Murray roof tiles are also available in glazed green and dull slip colors of green, mingled brown, black and in some cases white upon special order.



Rustic Shingle Tile Red to Black Range—E. C. Austin Residence, Glencoe, Ill.

Ralph E. Stoetzel, Architect.
Frank Starr & Sons, Roofing Contractor.

Name	Size, inches	Exposure, inches	Pieces per square	Weight per square, pounds
Rustic Shingle	7x15x⅛-⅝	7x6½	317	1400
Victorian Shingle	7x15x⅛	7x6½	317	1250
Rough Velvet	8x15x⅛	8x6½	277	1250
Mission	8x18	15	170	1200
Spanish Roll	10½x13¼	8¼x10¼	171	900

LUDOWICI-CELADON COMPANY

Makers of "Ludowici" Roofing Tiles and "Ludowici" Wool Insulation

NEW YORK, N. Y.
CLEVELAND, OHIO

104 South Michigan Avenue
CHICAGO, ILL.

WASHINGTON, D. C.
OKLAHOMA CITY, OKLA.

AUTHENTIC IN EVERY DETAIL, "LUDOWICI" TILES FAITHFULLY REPRODUCE THE EFFECT OF OLD WORLD ROOFS

Products

Ludowici Roofing Tiles.
Ludowici Chimney Pots.
Ludowici Garden Walk Edging.
Ludowici Tile Slabs.
Ludowici Tile Flagging.
Also Ludowici Wool Insulation.

Manufacture

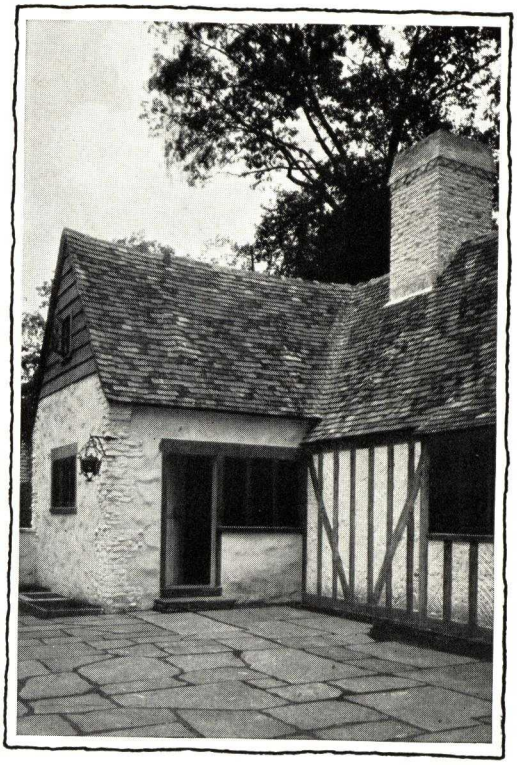
From the Ludowici clay pits of Ohio and Kansas come the finest clays obtainable. These clays, under our special manufacturing methods, produce hard-burned roofing tiles of non-reflective texture, whose soft, rich colors are obtained in the burning process—hence are permanent.

Texture

Ludowici Shingle Tile reproduce with historic accuracy the crude, rugged charm of the French farmhouse and the English countryside roofs, and give the required feeling of weight your design demands. The Colonial shingles reproduce in every detail the texture and color of old, hand-split wood shingles.

Closed Shingle, English Shingle, Mission, Spanish, Roman, Italian, and Greek tiles are also produced in various textures, including weathered surface effects.

Variations in great number, both as to color and texture can be had to meet the individual requirements of architectural design and taste.



Colors

Ludowici Shingle tiles are produced in a wide variety of colors, ranging from light tans and buffs through varying reds, browns and purples, to greys, brownish blacks and dark weathered greens.

Ludowici Spanish, Mission, French, English Shingle, Closed Shingle, Roman, Italian, and Greek tiles are offered in natural reds and fireflashed shades, or glazes of most any color.

Permanence and Durability

A roof of Ludowici tiles will last as long as the building it covers. Once laid, it provides a permanently beautiful, weathertight and fireproof roof, with distinct insulating qualities; assures lifelong protection without the expense of painting or repairs.

Reasonable in Cost

A Ludowici tile roof is moderate in price, and can be installed without any special framing for the substructure.

Service to Architects

We invite you to write or call your nearest Ludowici representative for samples of tile, complete specifications, and for aid on any roofing problem you may have. Estimates promptly furnished from architects' complete plans and specifications.

Provincial Shingle

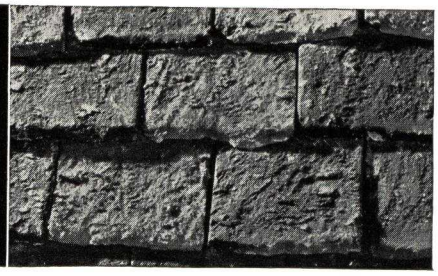
Size 7½" x 15" x ½"
Exposure 7½" x 6½"
295 pieces per sq.
Average weight per square, 1300 lbs.

Brittany Shingle

Size 7" x 12" x ⅝"
Exposure 7" x 5"
412 pieces per sq.
Average weight per square, 1650 lbs.

Antique Shingle

Size 7" x 12" x 9/16"
Exposure 7" x 5"
412 pieces per sq.
Average weight per square, 1525 lbs.



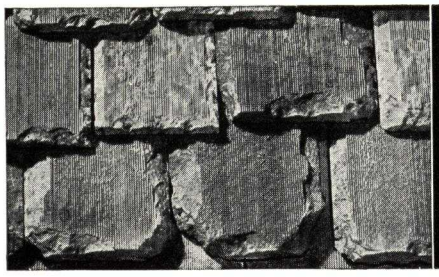
Colonial Shingle

Size 7" x 15" x ⅝"
Exposure 7" x 6½"
317 pieces per sq.
Average weight per square, 1600 lbs.

Norman Shingle

Size 7" x 12" x 9/16"
Exposure 7" x 5"
410 pieces per sq.
Average weight per square, 1360 lbs.

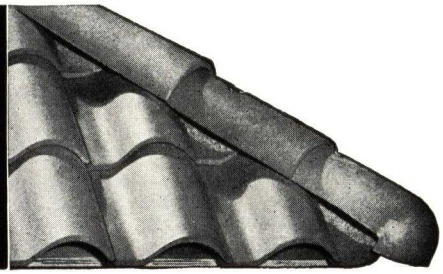
Yale Memorial Tile



Standard Sizes:
Lengths 12", 14", 16"
Widths 6", 7", 8".
Thicknesses 5/8", 3/4", 1". Exposure and weight varies according to the size of tile used.

Spanish

Size 13 1/4" x 9 3/4"
Exposure 10 1/4" x 8 1/4"
171 pieces per sq.
Average weight per square, 850 lbs.



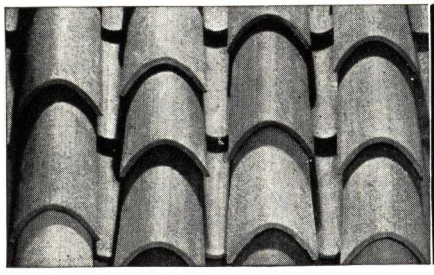
Straight Barrel Mission

Lengths, 18", 14 1/4"
Exposures 15" x 11 1/2" and 11 1/4" x 11 1/2".
18" length 166 pieces per sq. Wt. 1200 lbs. 14 1/4" length 224 pieces per sq. Weight, 1225 lbs.

Cubana Tapered Mission

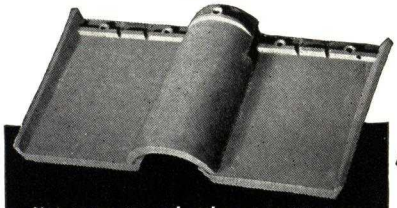
Size 18" x 11 1/4"
Exposure 15" x 11 1/4"
170 pieces per sq.
Average weight per square, 1300 lbs.
18" Straight Barrel Mission Pans.

18-in. Tapered Mission



Size 18" x 10"
Exposure 15" x 10"
192 pieces per sq.
Average weight per square, 1300 lbs.
18" Straight Barrel Mission Pans.

Roman

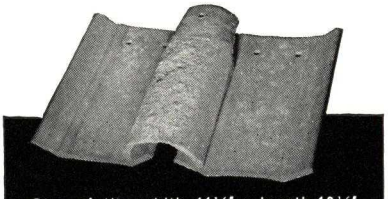


Made in two sizes: 10" x 12" exposure, 240 pieces per sq.; 15" x 19" exposure, 102 pieces per sq. Wt., small size, 1150 lbs.; large size, 1400 lbs.

Greek

Made in two sizes: 10" x 12" exposure, 240 pieces per sq.; 15" x 19" exposure, 102 pieces per sq. Wt., small size, 1285 lbs.; large size, 1450 lbs.

Italian



Size of tile width 11 1/4" x length 12 1/4". Exposure 9 1/4" x 11 1/4", 276 pieces per square. Average weight per square is 1350 pounds.

LUDOWICI CHIMNEY POTS FOR USE WITH WEATHERED-EFFECT TILES

Chimney pots are made to fit standard flue linings. They are available in various textures and colors, with glazed or unglazed finish.

C.P. 200

C.P. 300, 310, 320

STANDARD STOCK SIZES

NUMBER	FLUE	BASE	HEIGHT
C.P. 200	7½"x7½"	13"x13"	15"
C.P. 300	8" Diam.	14"	18"
C.P. 310	12" Diam.	18"	21"
C.P. 320	15" Diam.	21"	25"
C.P. 400	8" Diam.	14½"	25"
C.P. 410	12" Diam.	18½"	29"
C.P. 420	15" Diam.	21"	32"
C.P. 500	8" Diam.	14"	15"
C.P. 510	12" Diam.	18"	18"
C.P. 520	15" Diam.	21"	22"
C.P. 600	10" Diam.	13"	15"
C.P. 610	12" Diam.	15"	18"
C.P. 620	15" Diam.	18"	20"
C.P. 630	18" Diam.	21½"	23"
C.P. 640	23" Diam.	26"	30"
*C.P. 650	8"x12"	11"x15"	20"
*C.P. 660	12"x17"	15"x20"	30"

*Elliptical.

C.P. 400, 410, 420

C.P. 500, 510, 520

C.P. 600, 610, 620, 630, 640, 650, 660

THE M. N. CARTIER & SONS CO.

Only Manufacturers of "Clason" Wire Snow Guard for Roofs

Cartier Building, 275 Canal Street
PROVIDENCE, R. I.

"CLASON" WIRE SNOW GUARDS

For Slate, Tile, Asbestos, Shingle, Metal, and Other Steep Roofs

The Guards

The "Clason" has been used for many years and has given uniformly satisfactory service; it is one of the strongest guards made.

"Clason" Snow Guard for New Roofs

Note from the illustration that the "butterfly" loops brace and strengthen each other, while the extension brace lends additional strength.

Their Purpose

To lessen chances of damage suits against owners of property by increasing both personal and property safety.

There are many buildings so situated that the use of snow guards is essential to personal safety; there are more cases where the use of snow guards could protect the surrounding roofing and sheet metal work against costly damages.

Sliding snow and ice often injure roofings, and puncture or tear away gutters, etc. The use of our snow guards forestalls these dangers, as they hold the ice and snow where they form. They are a cheap and unobtrusive preventive against damage.

Important

We note a growing tendency to permit the installation of three, four, or five courses of snow guards near the roof eaves. The result is that a few guards are compelled to hold not only the weight of snow and ice which they are located to care for, but also to withstand the tremendous tearing force of slides starting from the roof surfaces above.

No guards will withstand such conditions, and their installation in such a manner precludes the *purpose* for which they are used. When specifying our guards please do so according to our table and *insist* upon the roofer following the specification.

An Installation of "Clason" Snow Guards

Manufacture

We make our guards in our own plant, and are not dependent upon the facilities or services of others. These guards are manufactured either from pure copper wire or galvanized steel wire, both selected for ductility and stiffness. No copper-covered steel wire is used.

Practicality

Our wire snow guards combine strength, long service, economy and unobstructive design.

Types of "Clason" Snow Guards

New roofs, 1 and 2-in. points.
Hook and friction for old roofs.
Solder-to-metal-roof.
Special for Spanish tile.
Special for asbestos shingles.
2-in. loop and 2-in. point "Clason" Snow Guards for flat tile and thick slate roofs.

Number Per Square

The following table gives the approximate number of snow guards which may be safely specified for use in each 100 sq. ft. of roof surface:

Roof Pitch	Number of Guards
One-quarter	50
One-third	75
One-half	125

Towers, and steeper roofs than above indicated, may require special consideration.

How to Specify

Apply to all pitched roofs "Clason" [for old roofs "Clason Special"] Snow Guards, as made by The M. N. Cartier & Sons Co., Providence, R. I. The guards to be made from pure copper [galvanized steel] wire.

(Here specify the number of guards required per square, dependent upon the pitch of the roof and other special conditions.)

In applying the snow guards, the eaves course of the roofing material shall be laid as usual, but the next course shall be laid with the joints slightly open to receive the shank of the snow guard.

After striking the line for the third course of the roofing material, place the guards in the joints, with the loop just below the lap of the course, and drive the prong into the roof decking; then lay the course, leaving only the loop exposed.

Care must be used to insure having the shank well sunk into the joints, so that the following course of roofing material will lie flat and not bear upon the guard.

(*Note:* The architect or engineer may omit at his discretion the method of application of the guards.)

DAVID LEVOW

Manufacturers of Snow Guards, Leader Straps, Skylight Gearing, Roof Strainers

TELEPHONE
CHelsea 3-2400

308 West 20th Street, NEW YORK, N. Y.

ADJUSTABLE PIPE SNOW GUARDS

"Fitrite" Adjustable Pipe Snow Guards

Made of galvanized malleable iron and bronze for roofs of slate, Spanish tile, and special design shingles.

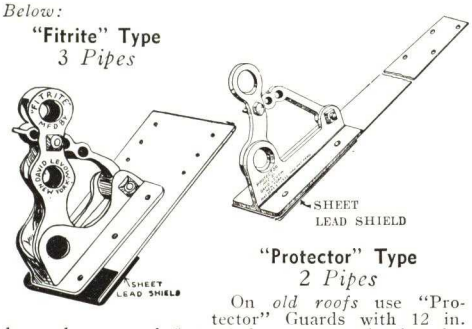
Size of Plate—"Fitrite" Snow Guard plates are the same size as slate, and are ⅛-in. thick for standard No. 1 slate, unless otherwise specified.

Application and Installation—Adjustable to any pitch. To be used with three (3) galvanized iron or brass pipes, ¾-in. I.P.S. (1.05 in. o.d.). "Fitrite" Pipe Snow Guards are installed along eaves of roof, placing brackets 5 or 6 ft. apart. Plate takes the place of slate and is fastened with No. 14 wood screws.

Features—Underside of snow guard is lined with a special sheet lead shield, which prevents sharp edges of plate from coming in contact with slate and eliminates the possibility of cracking or breaking of slate. Shield is so attached that rivets do not come in contact with slate.

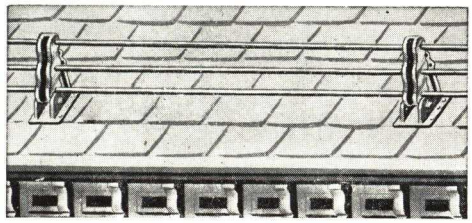
Below:

"Fitrite" Type
3 Pipes



"Protector" Type
2 Pipes

On *old roofs* use "Protector" Guards with 12 in. long plate spaced 5 to 6 ft. apart, push plate between slate nail holes being at joint of slates, fasten to roof with special copper screw nails through holes drilled in lower slate. To prevent water leaks, insert copper flashing to cover nail heads.



Adjustable to Pitch of Roof

"Protector" Adjustable Pipe Snow Guards

Especially designed for residential or other small buildings with slate roofs having rafters not over 18 ft. long.

This 2-pipe guard has all features of the "Fitrite" type popular for many years on larger buildings. Made of bronze with lead shield and copper plate 2-in. wide by $\frac{1}{16}$-in. thick, for two (2) brass pipes ½-in. I.P.S. (.84 in. o.d.)

On new roofs, "Protector" Snow Guards, with 24-in. long plates, are placed 5 to 6 ft. apart. (*For old roofs, see note at left.*) The bracket is set over one of the lower rows of slate and nailed through top holes in plate directly to roof boards with heavy copper screw nails. Next row of slate goes over the plates.

Short Specification

All slate roofs shall be provided around eaves with [“Fitrite” Adjustable Pipe Snow Guards] [“Protector” Adjustable Pipe Snow Guards] as manufactured by David Levow, 308 West 20th Street, New York, and installed in accordance with the manufacturer's instructions.

(Note: Detailed specification on request.)

(Specifications for Mission, Spanish or Shingle Tile are the same as for slate roof, except mention kind of tile to be used.)

A Few Recent Installations of Adjustable Pipe Snow Guards

(Building, Location and Architect)

†Hotel Pennsylvania, New York, N. Y., McKim, Mead & White
†Metropolitan Life Insurance Co., Sanitarium, Mt. McGregor, N. Y., D. Everett Waid
U. S. Post Office, Brooklyn, N. Y.
†Temple Emanu-El, Fifth Avenue, New York, N. Y., Robert D. Kohn
*Kings County Hospital, Brooklyn, N. Y., LeRoy P. Ward, Inc.
St. Joseph School, Maplewood, N. J., McKenna & Irving
Ridgewood High School, Ridgewood, N. J., Fanning & Shaw
St. Michael's Church, Amsterdam, N. Y., Morgan & Millaman
Roosevelt High School, Yonkers, N. Y., C. Howard Chamberlain
Howard University, Washington, D. C., A. I. Cassell
Museum of Natural History, N. Y., Trowbridge & Livingston
U. S. Government Theatre, Mitchel Field, Long Island, N. Y.
War Department Theatre, Fort Riley, Kan.
Veterans Hospital, Oteen, N. C.
‡Crippled Children's Home, Port Jefferson, L. I., N. Y., E. J. Berlenbach
Model Home, Elizabeth, N. J., C. Godfrey Poggi

*Mission Tile. †Metal Roof. ‡Spanish Tile

"FITRITE" BRONZE BEEHIVE STRAINERS

For Outside Leaders

Material and Sizes—Solid bronze. 3, 4, 5, 6, 7, and 8-in. diameter; also 3x4-in. square.

Features—Solid cast bronze strainer. Practically unbreakable. Will last for the life of the building.

Specifications—All outside leaders shall be installed with "Fitrite" Bronze Beehive Strainers of the proper size as manufactured by David Levow, 308 West 20th Street, New York, N. Y.

"FITRITE" HINGED BRONZE LEADER STRAPS

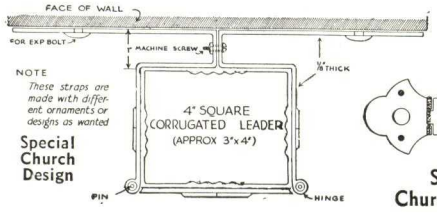
Material—Made in solid cast bronze. Heavy construction makes its use especially desirable where permanence is essential.

Sizes—Made for 3- and 4-in. round or corrugated pipe. Also for 3x4-in. square corrugated pipe and any special size to order. Straps can be furnished with cross, initials or other ornamentation, if desired.

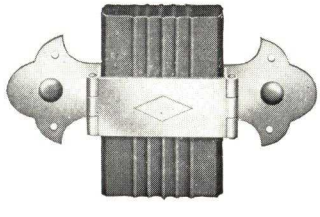
Installation—To be fastened to wall with four expansion bolts. (Holes in straps are properly spaced for brick joints). When installed, pipe remains 1 in. from face of building.

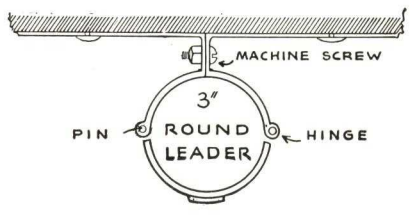
Features—Right side of strap is permanently hinged. Left side has loose-pin which permits removing leader for replacement without taking strap from wall. Strap is so constructed that machine screw can be adjusted to take care of variations in size of pipe and assures leader being held firmly in position.

Specifications—All leaders or conductor pipes shall be fastened to wall with "Fitrite" Hinged Bronze Leader Straps, of the proper size, as manufactured by David Levow, 308 West 20th Street, New York, N. Y.



Special Church Design





AMERICAN STEEL BAND CO.

Manufacturers of Felt-Cote Products

1400 Nixon Street, PITTSBURGH, PA.

SALES OFFICES IN PRINCIPAL CITIES

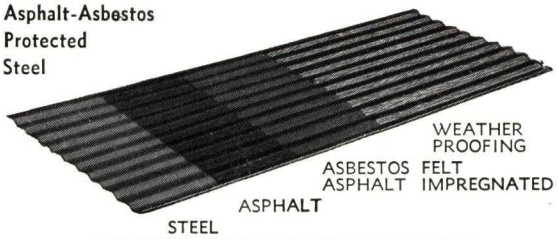
Products

ASPHALT-ASBESTOS PROTECTED SHEET STEEL, in both Factory and Field Finished Types.

The sheets are fabricated into roofing and siding sections, detailed on following page. Special sections obtainable on quantity requirements.

Louvres, Ducts, Hoods, Concrete Forms, and special Sheet Metal work, also available in Felt-Cote.

Burt Type Ventilators—Stationary, Motor Fan, and Monovent Continuous Ridge, made from Felt-Cote Sheets (for which see File Index).



FURNISHED WITH UNDERWRITERS LABEL

History

For over ten years we have manufactured protected steel sheets, in various forms. In this period, equipment improvements and product changes have been made, with the result that we feel Felt-Cote offers the greatest value available today (comparing life of product against long-term cost) in a permanent type covering for industrial buildings.

In determining specifications for Felt-Cote, we investigated, here and abroad, the various forms of protected steel which have been made since 1905. In addition to our own laboratory facilities, we enjoy the assistance of roofing technicians and bituminous research chemists. We investigated the products of four foreign sources, three American concerns, as well as virtually hundreds of methods and process of protecting steel with fabrics, bitumens, fibrous compounds, and other means.

The outstanding fact is, that, irrespective of who the manufacturer is, any protected steel comprising the following materials has enjoyed a wonderful service record:

(1) Special analysis steel core, cleaned and heated before coating; steel thickness suitable for safely spanning required purlin spaces.

(2) Asphaltic coating on both sides of steel core, sealing steel from corrosion; this coating applied hot by dipping and rolling, at proper rate of thickness. This asphaltic coating must be pure, inert to acids, possess great adhesiveness—yet remain unsusceptible to ordinary temperature changes during service.

(3) Asphalt impregnated long fibre asbestos felt, bonded to asphaltic compound over the steel by heat and pressure; this felt rolled onto both surfaces of the sheet; edges of felt turned and sealed, ends overrunning steel core, and sealed.

(4) Weatherproofing coating over the felt. (Felt-Cote is furnished in both *Factory Finished* and *Field Finished*—see below.)

Almost without exception, sheets consisting of the above elements have given sufficient service to earn large dividends on original cost, by reduction of maintenance.

Therefore, by adopting in our manufacture the benefits of past experience and knowledge in this practice, and creating our own improvements, it follows that Felt-Cote may be expected to render service fully comparable to other products in this field.

Points of Superiority of Felt-Cote

(1) Inert to attack of usual acids, corrosive fumes, vapors, or gases common to industrial localities.

(2) Extreme strength and flexibility permits use over wide purlin spaces, with high margin of safety.

(3) Not adversely affected by vibration, contraction, or expansion.

(4) Minimizes condensation and sweating. Excellent as a roof deck.

(5) Material cut to size at factory to suit each job, facilitates easy and rapid construction.

(6) Stainless steel straps, further protected by acid resistant coating, provide the ultimate in protection and strength.

(7) Felt-Cote Sheets create a "one-piece", tightly sealed, protected roof, eliminating leakage trouble inherent with many other forms of corrugated coverings.

(8) Each job being "made-to-order," carefully engineered and erected, provides best appearance and weather resistance.

(9) Virtual elimination of maintenance cost over long periods of time provides large savings. Though initial cost is slightly more than less efficient forms of coverings, Felt-Cote, on the basis of cost per square per year, will practically pay for itself from maintenance savings.

(10) By specifying Felt-Cote, industries having various plant locations are assured of a uniform product, with uniform engineering practice and construction of building coverings and accessories.

Services Provided

(1) **Estimating**—When you wish to know the cost of a given project, our Sales Department will promptly supply a complete detailed specification, with price. You need not go to the expense or trouble of detailing bills of material. We save this costly effort. All we need for estimating is a steel framing plan or, if not available, elevation drawings or dimensioned sketch will suffice.

(2) **Engineering**—When project is in design stage, our Engineers are available, without cost, to assist in determining the best and most economical treatment.

(3) **Erection**—Preferably by our forces, or our approved Contractors.

FELT-COTE SHIPPING WEIGHTS, POUNDS 100 SQUARE FEET

Gage	Field finished sheet		Factory finished sheet	
	2½" corrugated	Long span	2½" corrugated	Long span
26	160	...	160	...
24	187	215	180	212
22	212	245	210	242
20	242	280	240	278
18	297	345	295	342

Add 15 lbs. per square for shipments which are crated.
Field finished sheet weights include necessary flood coating.

USUAL PURLIN AND GIRT SPACINGS

Gage	2½" corrugated			Long span roofing
	Pitch over 4" in 12"	Pitch not less than 2" in 12"	Siding	
26	3' 9"	3' 3"	4' 3"	.....
24	5' 0"	4' 6"	5' 6"	7' 0"
22	5' 9"	5' 3'	6' 6"	7' 9"
20	6' 6"	6' 3"	7' 3"	8' 6"
18	7' 6"	7' 3"	8' 3"	10' 0"

Data for other sections furnished on request.

Manufacture of Felt-Cote

We use closely the procedure above described—full details and specifications will be submitted on request. Particularly, however, we wish the following to be noted:

(1) As in all protected sheets of this type, our factory coatings are applied first and sheet is formed later.

(2) We exert an exacting control over all materials used, especially the asphalts and compounds. These are carefully compounded and checked with the most complete and modern scientific equipment.

(3) Only full 15-lb. asphalt impregnated long fibre special asbestos felt, of proper grade and tensile strength, is used for Felt-Cote Roofing.

(4) Each step of manufacture on our modern equipment is carefully controlled, resulting in a uniform product checked by our laboratory.

(5) *Factory Finished Felt-Cote* (in addition to asphaltic compound and asbestos felt over the steel core) has a heavy coating on all surfaces, ends and edges of special patented asphalt compound, applied hot to sheets at factory; creating an impervious weatherproofing coating. Bolt heads are coated with asphaltic compound during erection. *Field Finished Felt-Cote* has a special patented weatherproofing compound applied over the felt at factory, and following erection, a flood coat (applied at rate of 1.8 gal. per square) of special asphalt, asbestos fibre compound, is brushed on. Flood coat seals entire roof, and doubly protects bolt heads.

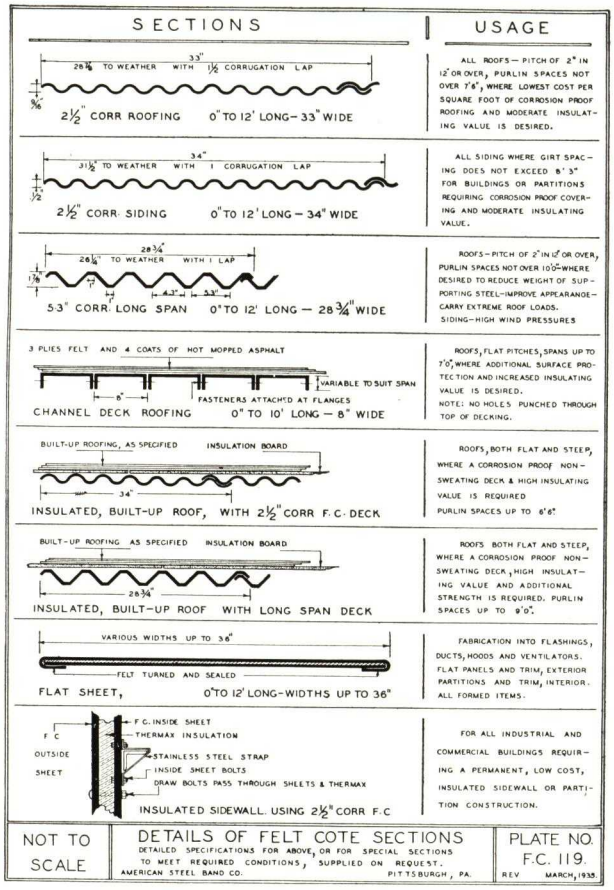
(6) With either sheet, our stainless steel strap assembly is used to attach to structure; special fasteners used where required for special conditions.

Considering the foregoing, you may have every confidence in using either of these Felt-Cote Sheets, of securing maximum service at a moderate and consistent cost.

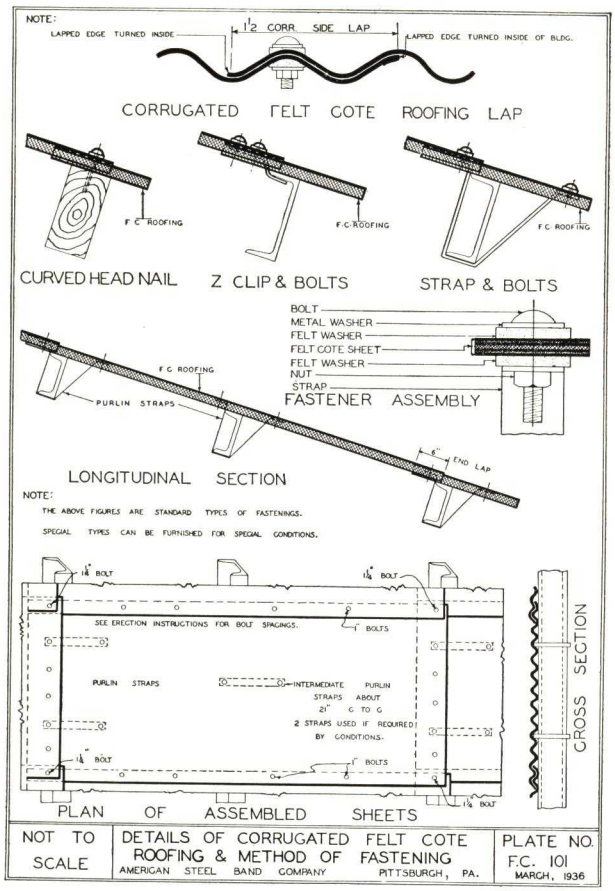
Installations

We have a great variety of installations with representative concerns in many branches of industry, and will be pleased on request to submit the results of service gained from these jobs,

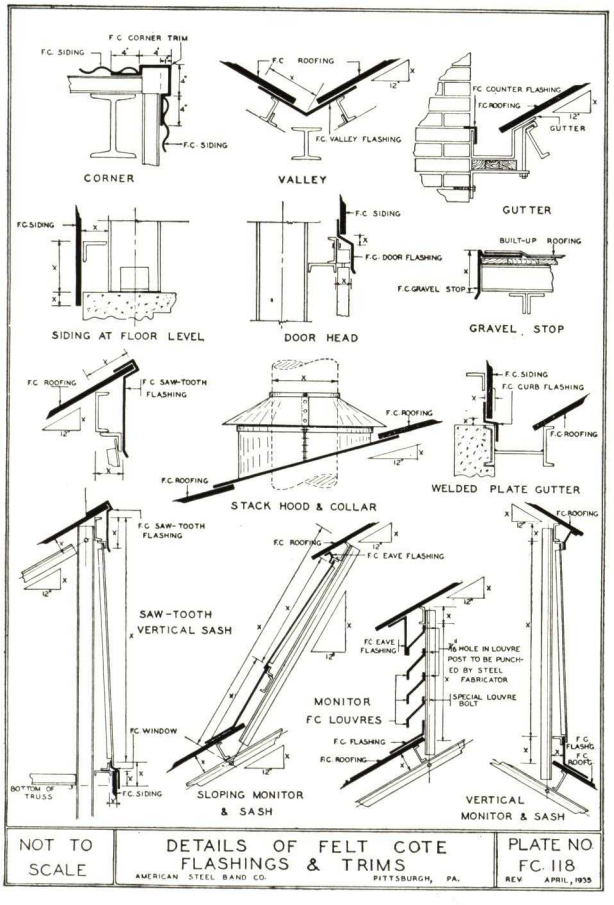
DETAILS OF FELT-COTE CONSTRUCTION



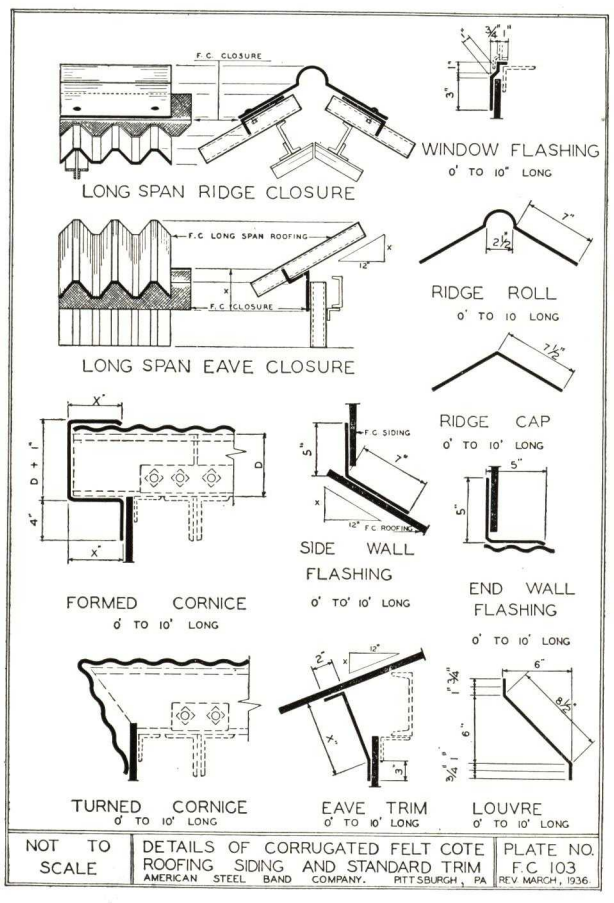
NOT TO SCALE	DETAILS OF FELT COTE SECTIONS DETAILED SPECIFICATIONS FOR ABOVE, OR FOR SPECIAL SECTIONS TO MEET REQUIRED CONDITIONS, SUPPLIED ON REQUEST. AMERICAN STEEL BAND CO. PITTSBURGH, PA.	PLATE NO. F.C. 119. REV. MARCH, 1935



NOT TO SCALE	DETAILS OF CORRUGATED FELT COTE ROOFING & METHOD OF FASTENING AMERICAN STEEL BAND COMPANY PITTSBURGH, PA.	PLATE NO. F.C. 101 MARCH, 1936



NOT TO SCALE	DETAILS OF FELT COTE FLASHINGS & TRIMS AMERICAN STEEL BAND CO. PITTSBURGH, PA.	PLATE NO. FC. 118 REV. APRIL, 1935



NOT TO SCALE	DETAILS OF CORRUGATED FELT COTE ROOFING SIDING AND STANDARD TRIM AMERICAN STEEL BAND COMPANY. PITTSBURGH, PA	PLATE NO. F.C. 103 REV. MARCH, 1936.

JOHNS-MANVILLE

EXECUTIVE OFFICES
22 East 40th Street, NEW YORK, N. Y.

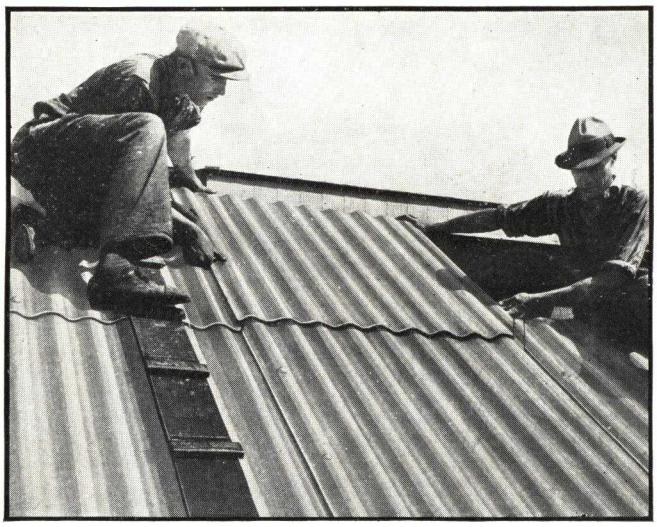
Products

JOHNS-MANVILLE TRANSITE PRODUCTS.
For the following Johns-Manville products, see File Index: Transite Walls; Acoustical Treatment; Asbestos and Asphalt Shingles; Built-up Roofs; Insulated Roofs; Home Insulation; Insulating Board; Pipe Coverings and Insulations; Tile Flooring; Asbestos Wainscoting and Flexboard; Steeltex and Welded Wire Reinforcement.

JOHNS-MANVILLE TRANSITE PRODUCTS

Corrugated Transite Roofing and Siding

Corrugated Transite Asbestos Roofing and Siding is made of asbestos fibres and portland cement united under hydraulic pressure into dense, unlaminated, monolithic sheets of great strength and rigidity. It is designed for application directly over purlins or girts of skeleton steel or wood frame construction. It will not burn or rust, rot, split, crack or curl. In color, it is an attractive light gray. It is weatherproof, highly resistant to corrosion and requires no painting or other maintenance.



Laying J-M Corrugated Transite Roofing
The cut corner construction permits a tight joint with straight lap lines

Transite can be readily drilled or sawed and is secured with bolts, screws, clips, etc., designed for that purpose. Special shapes of the same material for use as ridge roll, corner roll, louvres, etc., are available.

Sizes—Sheets are furnished 42 in. wide in lengths up to 11 ft. They are $\frac{7}{16}$ in. thick at ridges and valleys of corrugations and $\frac{5}{16}$ in. thick at the slope. The corrugations are 4.2-in. pitch. The over-all thickness of the sheets is 1½ in. Approximate weight, 4.1 lbs. per sq. ft. uncrated.

Corrugated Transite is also available in 2⅝-in. pitch.

Application—See following page. 4.2-in Transite may be applied over roof purlins spaced on not greater than 54-in. centers (minimum roof pitch 2 in. per foot), and on siding girts not over 66 in. center to center. Sheets are laid with a 6-in. end lap and a one-corrugation side lap, providing an exposure of 37.8 in. Complete details are given in Brochure TR-12A.

Flat Transite Sheets

Flat Transite has the same characteristics as Corrugated Transite. It is generally regarded as the outstanding fireproof, corrosion-resistant building sheet on the market today. Its attractive, light gray color and interesting texture also offer definite decorative possibilities.

Flat Transite does not become warped, distorted or weakened in service; in fact, it actually strengthens and toughens with age. It offers high resistance to acid fumes and severe weather conditions and finds a wide use in industrial plants, as well as in hospitals, libraries, office buildings, railway stations, machine shops, garages and residences. Its easy workability and the speed with which the large units can be erected are but two of its many advantages.

Transite weighs approximately 124 lbs. per cu. ft. Sheets are furnished in sizes 36x48, 42x48, 48x48 and 42x96 in., from ⅛ in. to 2 in. thick, and 48x96 in. from $\frac{3}{16}$ in. to 2 in. thick.

Transite Walls

Transite Walls for office partitions are fully described in another section. See File Index.

W. R. Transite

Both Flat and Corrugated Transite sheets can be furnished with a bituminous impregnation to afford maximum impermeability where the material will be subjected to extreme or sustained moisture or acid conditions.

W. R. Flat Transite is furnished in standard size sheets, 42x96 in., ¼ in. thick; 42x48 in., ⅛, $\frac{3}{16}$ and ¼ in. thick; and 36x48 in., ⅛ and $\frac{3}{16}$ in. thick. Smaller sizes can be furnished on special order. W. R. Corrugated Transite is furnished in the same sizes as standard Corrugated Transite, but in lengths only up to and including 8½ ft.

Transite Flues and Stacks

Transite Pipe, one of the newest J-M asbestos-cement products, is already being widely used for venting gas burning appliances because of its unusual resistance to corrosive gases and fumes. The material is supplied in either round or oval form and in a full range of diameters. For complete data on Transite Flue Pipe and accessories, ask for Brochure TR-13A.

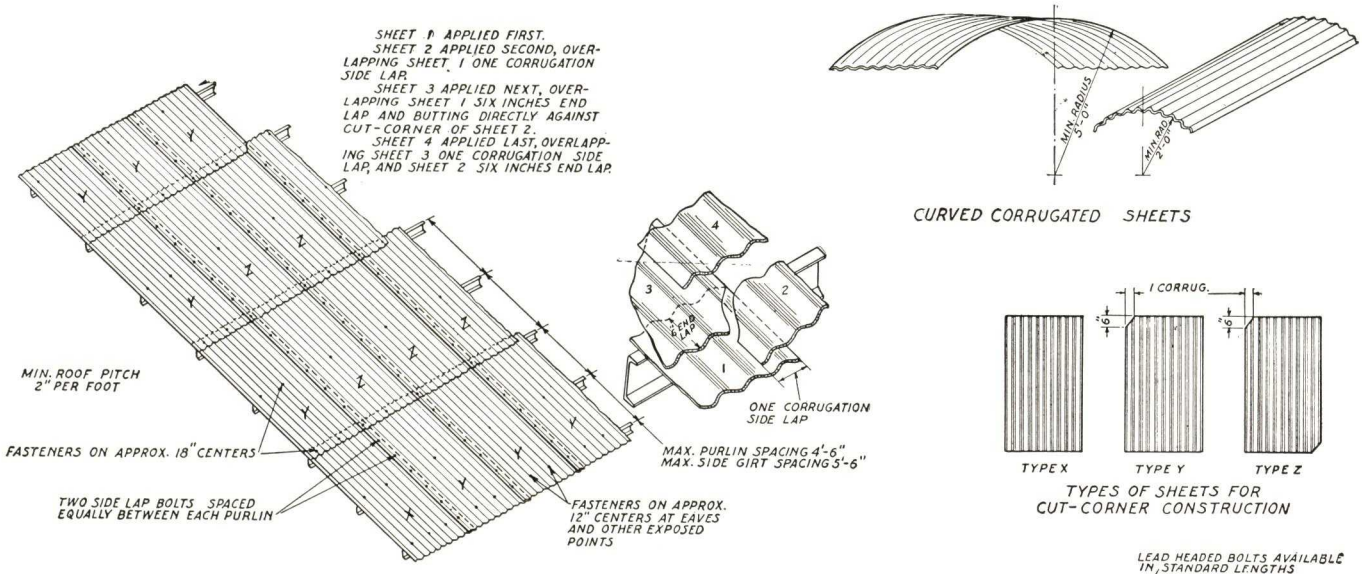
This same material is also being widely used as industrial stacks, particularly where corrosive fumes may be encountered.

Transite Ventilators

Transite Ventilators, made from Transite Pipe, are designed for use on all buildings where fireproof, fume-proof and weather-proof construction is desired. They are especially satisfactory for engine houses, gas and power houses, laboratories, factories, etc., where a corrosion-resisting ventilator is essential. They never need painting and have proved most economical because of their permanence and freedom from maintenance.

Sizes 10 to 24 in. are shipped assembled. Larger sizes are shipped knocked down.

4.2" CORRUGATED TRANSITE CONSTRUCTION DETAILS

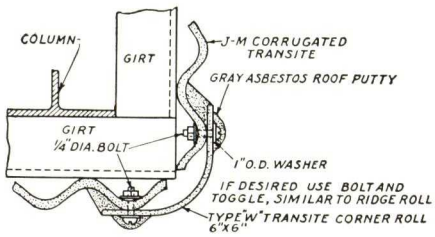


STRAIGHT LAP LINE CONSTRUCTION WITH CUT-CORNER SHEETS

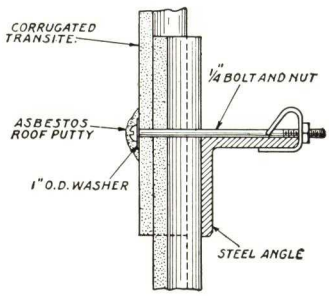
CURVED CORRUGATED SHEETS

TYPES OF SHEETS FOR CUT-CORNER CONSTRUCTION

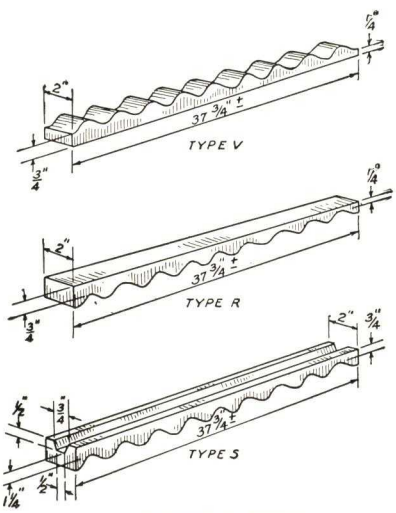
ALTERNATE TYPE, FASTENER BOLT



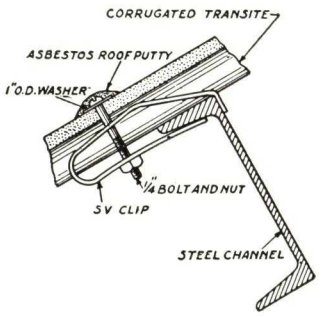
SECTION SHOWING CORNER ROLL



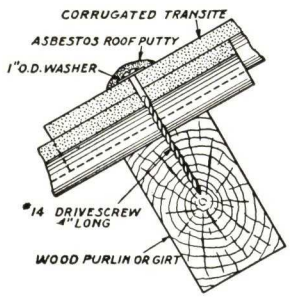
DETAIL OF HOOK CLIP



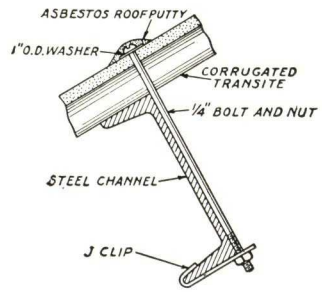
TRANSFALT STRIPS



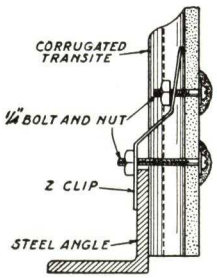
DETAIL OF SV CLIP



DETAIL OF DRIVESCREW

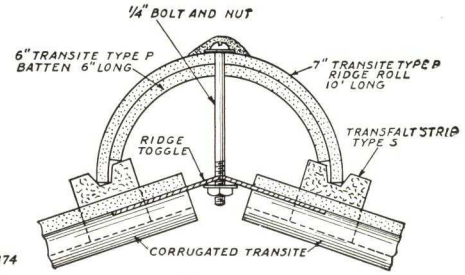


DETAIL OF J CLIP



PATENTS Nos. 1,489,474
2,015,129 & 2,021,929
PAT'D. CANADA 1925.

DETAIL OF Z CLIP



SECTION THROUGH RIDGE

MEMORANDA

KEASBEY & MATTISON COMPANY

AMBLER, PA.

DISTRICT OFFICES IN PRINCIPAL CITIES

For K&M Asbestos Roofing and Siding Shingles, Pipe, Sheet and Block Insulations, Mineral Wool, Sidewall and Ceiling Erection Systems, Trafford Tile, Decorative Wallboards, see File Index

K&M ASBESTOS CORRUGATED ROOFING AND SIDING

K&M Corrugated Asbestos is composed of asbestos fibres and Portland cement which after proper mixing, are subjected to great pressure. The result is a strong, dense, tough sheet of fire-resistant and weatherproof material. The corrugations not only increase the strength of each sheet, but permit correct alignment and result in water-tight joints.

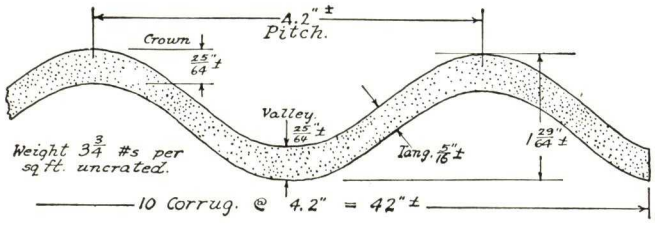
The natural color of K&M Corrugated Asbestos is a permanent, pleasing light gray.

K&M Corrugated Asbestos can be cut with a band saw or portable electric saw, and can be punched or drilled for nails, drive-screws or bolts. It is a very economical form of roofing and siding as it will not rot, rust, or corrode. It never needs protective painting. Initial cost of material and application is relatively low.

STANDARD LENGTHS—SQ. FT. AREA OF SHEETS

Length	Sq. ft. area	Length	Sq. ft. area	Length	Sq. ft. area
3′-0″	10.50	6′-0″	21.00	9′-0″	31.50
3′-6″	12.25	6′-6″	22.75	9′-6″	33.25
4′-0″	14.00	7′-0″	24.50	10′-0″	35.00
4′-6″	15.75	7′-6″	26.50	10′-6″	36.75
5′-0″	17.50	8′-0″	28.00	11′-0″	38.50
5′-6″	19.25	*8′-6″	29.75	11′-6″	40.25
				12′-0″	42.00

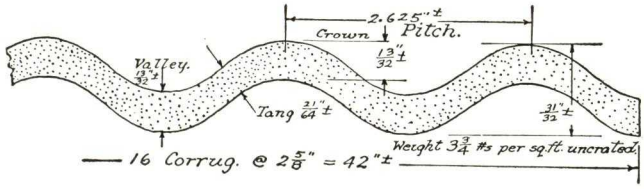
Complete details for application of roofing, siding, flashing, ridge and corner construction and fastening to structural members or flat surfaces will be gladly furnished by our Engineering Department.



Asbestos Corrugated

(4.2 in. pitch)

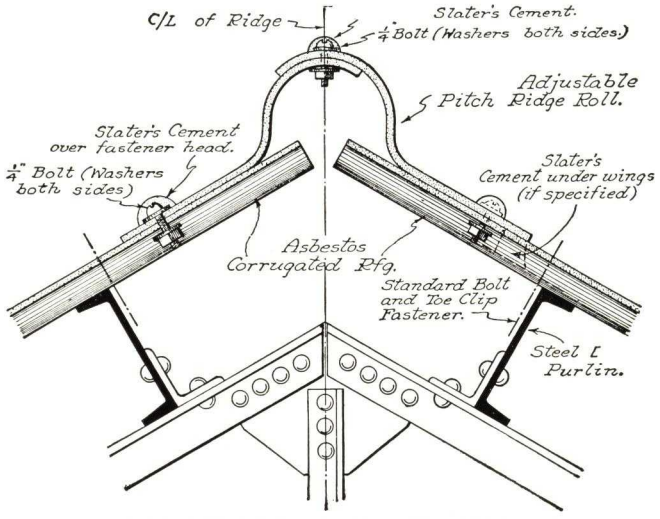
Width—42 in. (10 corrugations per sheet.)
Thicknesses—approximately
Ridge and valley—25/64 in.
Slope—5/16 in.
Depth—1 29/64 in.
Pitch—4.2 in.
Maximum purlin space (roof)—4 ft. 6 in.
Maximum girt space (siding)—5 ft. 6 in.
Weight—3.75 lbs. per sq. ft. uncrated.
Add 20% for crating.
Standard lengths—See table at top of next column.
Maximum length in 4.2 in. pitch is 12 ft.



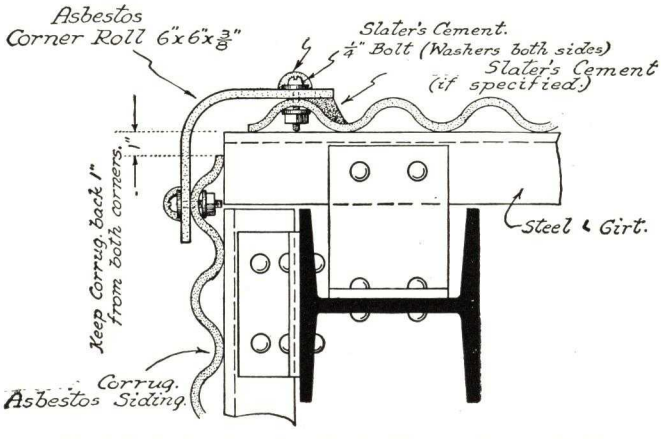
Asbestos Corrugated

(2.625 in. pitch)

Width—42 in. (16 corrugations per sheet.)
Thicknesses—approximately
Ridge and valley—13/32 in.
Slope—21/64 in.
Depth—31/32 in.
Pitch—2.625 in.
Maximum purlin space (roof)—4 ft.
Maximum girt space (siding)—5 ft.
Weight—3.75 lbs. per sq. ft. uncrated.
Add 20% for crating.
Standard lengths—See table at top of next column.
*Maximum length in 2.625 in. pitch is 8 ft. 6 in.

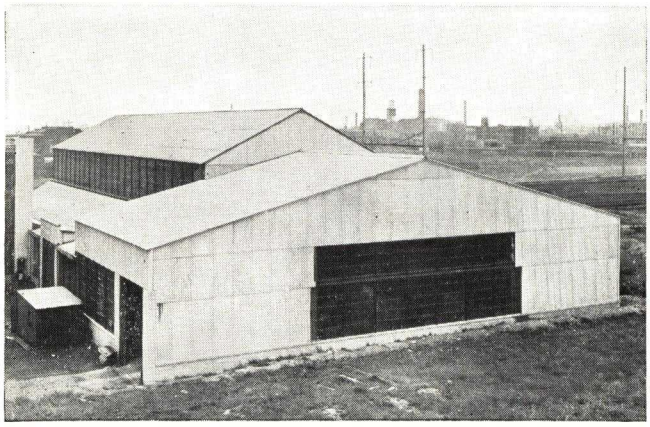


Typical Application Detail of Adjustable Pitch Ridge Roll



Typical Application Detail of Asbestos Corner Roll

K&M ASBESTOS CORRUGATED ROOFING AND SIDING (Continued)



Uses

General—Roofing, siding and partitions in skeleton frame industrial type buildings such as: storehouses, fair and exposition units, lumber mills, wood working plants, cooling towers, powerhouses, and similar structures.

Oil Refineries—"Flare Back Walls" around tanks to prevent spread of burning oil to adjacent tanks in case of fire. "Fireproof Aprons" and roofs over stills.

Railroads—Roofing and siding for: roundhouses, switch towers, freight houses, machine shops, car sheds, tool sheds, way stations and pedestrian overpasses.

Chemical Plants — Conditions surrounding these plants are usually more severe than in others. K&M Asbestos Corrugated has been successful for roofing and siding especially in: gas works, coke plants, smelters, fertilizer works, dye works and electro chemical plants. For extreme conditions W-R Asbestos Corrugated is recommended.

Mines and Quarries—Roofing and siding for: crusher sheds, conveyers, hoist houses, loaders, storehouses, explosive sheds.

Warehouses and Docks—Roofing and siding.

Hangars and Garages—Roofing and siding.

TRAFFORD TILE

Trafford Tile is composed of asbestos fibre and Portland cement and is a structural sheet material used for roofing and siding in industrial construction.

The main purpose in corrugating any material of this sort is to increase the strength of the sheet. The corrugations also help to obtain correct alignment during application. In Trafford Tile a new principle has been employed, whereby the corrugations are scientifically shaped and spaced to provide an unusually high degree of strength and rigidity. This is in accordance with the most modern engineering practice, which substitutes a scientific distribution of material for the older means of gaining strength through sheer volume and mass.

The result is that Trafford Tile combines relatively light weight with high strength. Aging increases this strength, and the material becomes harder and more durable with the passing of time.

Trafford Tile is fire-resisting and weather-resisting. The color is a pleasing gray, and the effect is that of Roman tiling.

Dimensions

Width—Nominal 43 in. (4 corrugations, 3 flats per sheet.) (Net coverage width, 40 in.)

Thickness—approximately ¼ in.

Maximum purlin space (roof)—3 ft. 6 in. centers.

Maximum girt space (siding)—5 ft. centers.

Weight—approximately 2.2 lbs. per sq. ft. uncrated. Add approximately 20% for crating.

Standard lengths 3 ft. up to 8 ft., rising in 6 in. increments.

TRAFFORD TILE (Continued)

Characteristics

Fire-resisting—Non-combustible, highly resistant to internal and external fires. Prevents spreading of fires from one building to another.

Weather-resisting—Unaffected by the natural elements. Dense, relatively low moisture absorption and little affected by sudden temperature changes common in many industrial processes, such as coke quenching stations.

Corrosion-proof—Will not corrode, rot or disintegrate. It will withstand practically all the acids and gases common in industry, such as fumes, and vapors around gas plants, coke ovens, smelters, chemical plants, refineries and roundhouses.

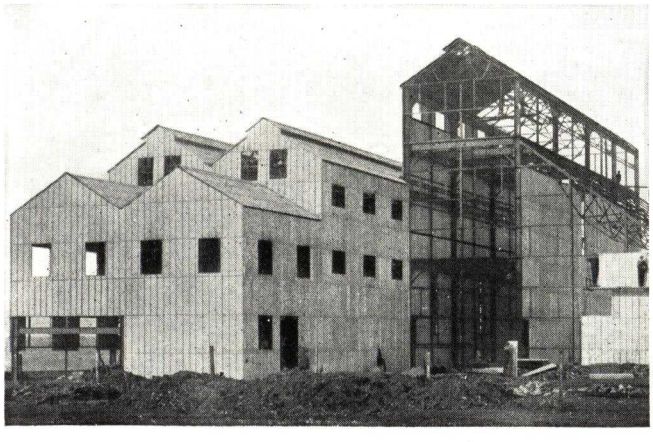
Strength—Portland cement, reinforced with asbestos fibres and formed with a scientific distribution of material, gives Trafford Tile great natural strength.

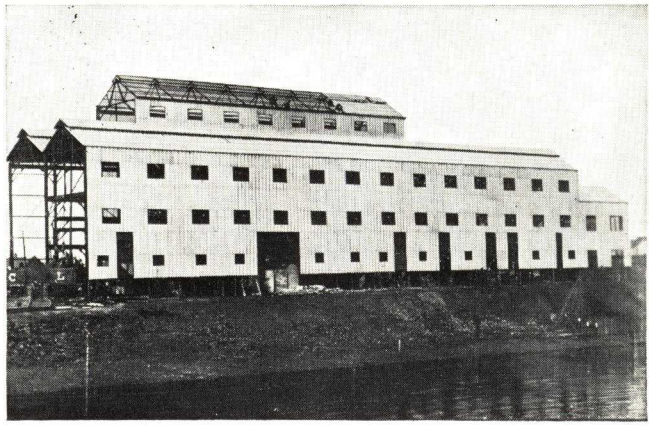
Appearance—The natural color is a pleasing, permanent light gray, resulting in an attractive building. Has advantages in light-reflecting properties in interiors and exteriors in reflecting the heat of the sun.

Workability—The material can be cut with a band saw or portable electric saw and is easily drilled for nails, drive-screws or bolts.

Economy—Trafford Tile is an economical form of structural material, as it will not rot, rust, or corrode. Because of its composition it requires no maintenance. Initial cost of material is relatively low. It offers exceptionally long life, becoming tougher and stronger with age. It never needs protective painting.

Uses—Trafford Tile is exceptionally well suited for all kinds of temporary construction, such as toolhouses, construction offices, workmen's bunkhouses and similar structures where its relatively low cost is an important factor. Trafford Tile has also been very successfully used in oil refineries, chemical plants, warehouses, hangars, and garages.





Uses

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Railroads—Roofing and siding for roundhouses, switch towers, freight houses, machine shops, car sheds, way stations and pedestrian overpasses.

Chemical Plants — Conditions in these plants are usually more severe than in the average plant. Trafford Tile has been successfully used as roofing and siding in gas works, coke plants, fertilizer works, dye works. Where extreme conditions exist W-R Trafford Tile is recommended.

Mines and Quarries—Roofing and siding for crusher sheds, conveyers, hoist houses, loaders, storehouses and explosive sheds.

Warehouses and Docks—Roofing and siding for these types of buildings, which are constantly subjected to fire risks, due not only to internal fires, but also to the presence of locomotives and steamships.

W-R Trafford Tile

Where greater resistance to moisture or chemical fumes is required, all types of Trafford Tile sheets are impregnated with a special asphaltic-compound and known as W-R Trafford Tile. This material is furnished in the same standard sizes, or curved sheets, and with ridge capping and other asbestos cement accessories. W-R Trafford Tile weighs approximately 0.20 lbs. per sq. ft. more than the unimpregnated Trafford Tile.

H. H. ROBERTSON COMPANY

Robertson World-Wide Building Service

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CANADA; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES, AGENCIES AND BRANCH OFFICES

ALLENTOWN, PA., H. N. Crowder, 446 Union St.
ATLANTA, GA., H. H. Robertson Company, 609 Forsyth Bldg.
BALTIMORE, MD., H. H. Robertson Company, 1635 Baltimore Trust Bldg.
BIRMINGHAM, ALA., H. H. Robertson Company, 2019 Sixth Ave., No.
BOSTON, MASS., H. H. Robertson Company, 14 High School Ave. (Quincy, Mass.)
BUFFALO, N. Y., H. H. Robertson Company, 602 Jackson Bldg.
BUTTE, MONT., Archie W. Adams, 618 Metals Bank Bldg.
CHARLESTON, W. VA., Fireproof Products Co., 422 Professional Bldg.
CHARLOTTE, N. C., Edwin C. Boyette, Jr., 1025 Arosa Ave. (Box 27)
CHICAGO, ILL., H. H. Robertson Company, 360 No. Michigan Ave.
CINCINNATI, OHIO, H. H. Robertson Company, 1315 American Bldg.
CLEVELAND, OHIO, H. H. Robertson Company, 1526 Hanna Bldg.
DENVER, COLO., James Q. Lalor, 1125 So. Vine St.
DETROIT, MICH., H. H. Robertson Company, 635 New Center Bldg.
EAST ORANGE, N. J., H. H. Robertson Company, 25 No. Harrison St.
EASTON, PA., H. N. Crowder, 103 No. Fourth St.
JACKSONVILLE, FLA., H. H. Robertson Company, P. O. Box 4523
KNOXVILLE, TENN., R. G. Jeffries, 409 W. Clinch Ave. (P. O. Box 2023)
LITTLE ROCK, ARK., Wherry & Company, 115 Center St.
LOS ANGELES, CALIF., H. H. Robertson Company, 816 W. Fifth St.
MARQUETTE, MICH., C. H. Cooper
MINNEAPOLIS, MINN., Hauenstein & Burmeister, 614 Third Ave., So.
NEW HAVEN, CONN., H. H. Robertson Company, 207 Orange St.
NEW ORLEANS, LA., H. H. Robertson Company, 736 Whitney Bank Bldg.
NEW YORK, N. Y., H. H. Robertson Company, 475 Fifth Ave.
PHILADELPHIA, PA., H. H. Robertson Company, 1307 Real Estate Trust Bldg.
PITTSBURGH, PA., H. H. Robertson Company, 2000 Grant Bldg.
PORTLAND, ME., W. O. Hutchins, 193 Middle St.
PORTLAND, ORE., Mercer Steel Company, 838 N. W. 13th Ave.
RICHMOND, VA., R. M. Nolting, 1103 E. Main St. (P. O. Box 1011)
ST. LOUIS, MO., H. H. Robertson Company, 1218 Olive St.
SALT LAKE CITY, UTAH, L. Brandenburger, 153 W. Second South St.
SAN FRANCISCO, CALIF., H. H. Robertson Company, 50 Hawthorne St.
SCRANTON, PA., F. H. Coffin, 210 Brooks Bldg.
SEATTLE, WASH., Arthur A. Dally, 332 Pioneer Bldg.
SOUTH BOSTON, MASS., Northeastern Metals Co., 307 Dorchester Ave.
SYRACUSE, N. Y., F. J. Ludwick, 1126 Chimes Bldg.
TULSA, OKLA., Murray R. Womble, 316 Atco Bldg.
WASHINGTON, D. C., J. R. Nichols, 428 Woodward Building

For England: H. H. ROBERTSON COMPANY, MERSEY IRON WORKS, Ellesmere Port, Cheshire

FOR CANADA: H. H. ROBERTSON CO., LTD.
TORONTO (MAIN OFFICE), 611 Metropolitan Building — MONTREAL OFFICE, 526 Confederation Building

Products

ROBERTSON PROTECTED METAL (RPM) ROOFING, SIDING, FLASHINGS, GENERAL BUILDING TRIM, DUCTS, etc.; also available in Ventilators, Louvres, Hoods and Ducts.

ROBERTSON PROTECTED METAL V-BEAM ROOFS for decks under insulated or built-up roofs; for extra-load-carrying roofs without insulation; or for siding.

COPPER COVERED ROBERTSON PROTECTED METAL—RPM with an attractive outer covering of Anaconda "Electro-Sheet" Copper. Also furnished with aluminum foil surface and with an aluminum paint finish.

For Robertson Ventilators, Weatherproof Skylights, Side-wall Sash, Robertson Steel Floor Wiring System, and Robertson Steel Floor, see File Index.

TRADE-MARK

Patents

Robertson Protected Metal, Robertson V-Beam Sheets, Aluminum Covered RPM, Aluminum Finished RPM, and Copper Covered RPM are protected by United States Patents: Nos. 1,366,999; 1,398,991; 1,410,790; 1,418,347; 1,418,348; 1,421,338; 1,432,512; 1,536,549; 1,536,550; 1,593,205; 1,812,732; 1,838,349; 1,864,971; 1,904,341; 1,973,193; 2,025,929; 1,465,563; 1,534,868; 1,863,186; 1,889,770; 1,936,228; 1,956,219; 1,982,243. Other patents allowed and pending in United States, Canada, England, France, Belgium, Australia, Japan, and New Zealand.

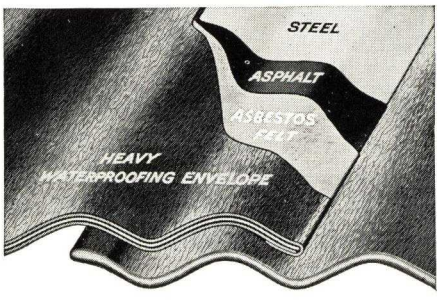
ROBERTSON PROTECTED METAL (RPM)

Robertson Protected Metal is a steel roofing and siding protected against rust, weather and corrosion by a series of external, factory-applied coatings. These coatings are shown on the cutaway drawing below. Copper Covered RPM (described on next page) is the same, except for the outer coating, which is of beautiful Anaconda "Electro-Sheet" copper.

Types of Destructive Agencies It Withstands—RPM has successfully withstood the destructive agencies listed below, on all types of buildings and in all climates. Installation lists are available.

Sulphuric acid	Caustic soda	Various alkalies
Hydrochloric acid	Nitric acid	Moisture
Hydrofluoric acid	Benzoic acid	Smoke
Hypochlorous fumes	Acetic acid	Condensation
Phosphoric acid	Ammonia fumes	Salt air, etc.

Complete figures showing results of comparative tests on RPM and other materials under actual conditions and the savings in costs over a period of years may be obtained on request.



Robertson Protected Metal

Cutaway view showing protective layers which cover the steel and prevent corrosion: (1) asphalt; (2) asphalt-impregnated asbestos felt; (3) heavy waterproofing envelope (a factory applied sealing coat)

Reduction of Heat Loss—RPM provides greater insulation than unprotected metal sheets, because of the natural insulation of the protective coatings on each side, and also because the slightly "tacky" nature of the external envelope of RPM causes the overlapping sheets to seal themselves together into one continuous sheet and thus prevents infiltration of cold air.

DIMENSIONS, GAUGES, WEIGHTS, COVERAGE OF ROBERTSON PROTECTED METAL

Lengths, 5 to 12 ft., inclusive. Also in odd lengths as specified

	Number of corr. or beads	Width and depth of corr., in.	Gross width of sheet, in.	Net covering width, in.	Side lap	Ga.	Weight per 100 sq. ft. material area, lbs. Net	Crated
Corrugated roofing...	12½	2⅝x⅜	33	29¾	1½ corr.	24	185	200
						22	210	225
Corrugated siding....	13	2½x⅜	33	31	1 corr.	20	240	255
Mansard....	6*	2½x1	33	30	1 bead	18	295	310
V-beam.....	5**	1¾ Deep	29	26¾	½ v.	24	215	240
						22	245	270
						20	280	305
						18	345	370

*6 in. c. to c. **5.3 in. c. to c.

RPM is furnished in two standard colors: black and maroon. It can also be supplied with aluminum finish (bright or dull) on one or both sides, also with surfaces of Anaconda "Electro-Sheet" Copper and aluminum foil.

RECOMMENDED PURLIN AND GIRT SPACINGS FOR RPM

Ga.	Corrugated Roofing: Slopes over 3 in. in 12 in. ft. in.	Corrugated Roofing: Slopes under 3 in. in 12 in.* ft. in.	Siding, ft. in.	V-Beam, ft. in.
24	4 9	.....	4 10	7 0
22	5 9	4 9	5 10	8 0
20	6 6	5 9	6 8	8 9
18	7 6	6 6	7 8	10 0

*Where roof slope is less than 3 in. in 12 in. all side and end laps should be laid in Robertson Cement. Corrugated sheets should not be laid where slope is less than 2 in. in 12 in. Mansard sheets should not be laid on slopes of less than 3 in. in 12 in.

General Advantages—RPM permanently eliminates the need for painting and other maintenance. It is easily erected. It is light in weight and the supporting structural steel framework can be correspondingly lighter. It is adaptable to wide purlin spacings without danger of sagging.

Vibration will not cause it to break or loosen where it is bolted to the framework nor cause it to leak where the sheets are joined. It can be bent or lapped to fit around corners or gables, to fit curved walls or roofs, to fit warped or uneven surfaces.

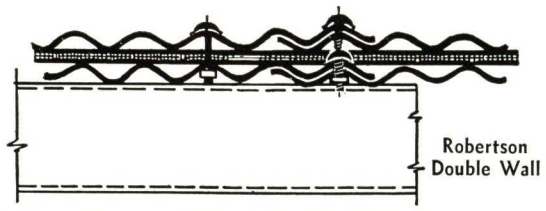
20% Wider Than Commercial Corrugated Sheets—This reduces the number of side laps, thus reducing the percentage of loss in covering capacity.

Flashings and Fasteners—Standard flashings and building trim are furnished in RPM in the same colors as the roofing and siding sheets and in corresponding gauges. Maximum length, 10 ft.

The standard method of fastening RPM is with protected metal straps around the purlins or girts, bolted to the RPM sheets. These patented straps are protected in the same manner as RPM. Bolts are sherardized ¼ in. with mushroom shaped heads. For fastening siding sheets where legs of girts face up, there is a sherardized clip and bolt fastening. For applying RPM on wood, special nails with mushroom heads are used.

Pre-fabricated—All special pieces are cut to fit the plans at our factory and are numbered for ease in erection.

ROBERTSON PROTECTED METAL DOUBLE WALL CONSTRUCTION



Robertson Protected Metal Double Wall Construction consists of two sheets of Robertson Protected Metal with insulating material between. This form of construction is becoming very popular in the construction of roofs and sidewalls.

Advantages—This RPM Double Wall Construction is distinguished by the following advantages: *Lightness of weight*—which effects savings in foundation construction. *Adaptability*—its method of construction is easily adapted to conventional mill construction practice. *Correct thermal insulation*—an impervious construction which gives approximately the same insulating value in wet weather as in dry. RPM Double Wall Construction approximates the insulating value of a 12-in. brick wall. *Economy*—first cost compares favorably with best masonry construction, and maintenance cost is low. *Rapid erection*—work may be carried on in weather unfit for masonry construction and with far greater speed, thus providing for more rapid occupancy. *Salvability*—because of the combination of endurance, corrosion-resistance, light weight, prefabrication, and patented application methods. *Proven performance*—many successful installations have been made and have proved their excellence in actual service.

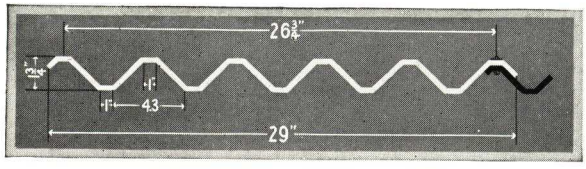
ROBERTSON PROTECTED METAL V-BEAM ROOFS

V-Beam Robertson Protected Metal is a special "deep-corrugation" sheet which represents a great advance in the form and application of corrugated materials. In addition to the corrosion-resistant and maintenance-free characteristics of the standard Robertson Protected Metal, the V-Beam sheet provides a higher degree of strength and resistance to deflection than the ordinary types of corrugation. In effect, the RPM V-Beam sheet provides the structural effect of a series of beams, and because of its extra strength, makes possible important economies in supporting steel work. The deep V-Beam corrugations possess such high drainage efficiency that exceptionally low roof pitches become practical. In addition to its advantages as a self-contained roofing material, the RPM V-Beam sheet also offers great advantages as a corrosion-resistant, maintenance-free deck for flat and built-up insulated roofs.

Dimensions, gauges, weights, coverage, purlin spacings, etc.—See tables on preceding page.

Dead loads—V-Beam, uninsulated, 3 to 5 lbs. per sq. ft.; insulated, 7 to 10 lbs. per sq. ft., depending on gauge used.

Applying Insulation and Built-up Roofing—The usual procedure is followed. Rigid board insulations are recommended. If one layer is used, it is bolted directly to the V-beam sheets. If additional sheets are used, the multiple layers are stapled together or are monolithic and are mopped with asphalt and bolted to the deck as a unit. The upper layer of insulation is mopped with asphalt to receive the first layer of built-up roofing. Successive layers are applied in the usual manner.



LOAD TABLES FOR V-BEAM SHEETS

Based on simple beam conditions, for a *clear span*, and a uniformly distributed load. Loads shown are those at which the steel core sheet has a maximum fibre stress in bending of 16,000 lbs. per sq. in. on the nominal thickness of material. The deflections shown correspond to the loads given for the various gauges and for the particular span.

For a 35-lb. total load (approximately 30-lb. live load) the gauges and spans indicated by bold type *will provide the greatest over-all economy.*

Gauge U. S. Standard	24	22	20	18	Deflection in Inches
Nominal Thickness of Core Sheet	.025	.03125	.0375	.050	
Clear span length	Safe loads—pounds per square foot, uniformly distributed —live load plus dead load.				
4′-0″	115	140	170	260	.15
4′-6″	93	112	135	180	.20
5′-0″	75	93	110	145	.24
5′-6″	62	77	90	120	.29
6′-0″	52	65	77	102	.35
6′-6″	45	55	65	88	.41
7′-0″	**38**	48	57	77	.48
7′-6″	33	42	50	66	.55
8′-0″	29	**36**	43	58	.62
8′-6″	25	32	38	52	.70
9′-0″	23	28	**35**	46	.80
9′-6″	21	25	30	40	.87
10′-0″	.....	23	28	**37**	.96
10′-6″	.....	22	25	34	1.05
11′-0″	.....	.....	23	30	1.15

COPPER COVERED ROBERTSON PROTECTED METAL (RPM)

Copper Covered RPM is an especially attractive addition to the Robertson Protected Metal line. It is long-lived RPM with surface of durable and beautiful Anaconda "Electro-Sheet" copper. This new form of RPM is offered the builder who requires a roofing and siding material possessing distinctive eye-appeal as well as long life. Its cost is only slightly more than that of standard RPM; yet it combines the beauty of copper, the long life of RPM and the strength of steel.

Copper Covered RPM is ideally adapted for erection on industrial buildings, public and commercial buildings, bridges between all types of buildings, canopies for railroad stations, airplane hangars, substations and many other types of modern structures.

The outer surface of Anaconda "Electro-Sheet" copper covers dependable RPM, a product that is backed by over thirty years of outstanding accomplishment in all phases of industry, throughout the world.

Also available are: Aluminum Covered RPM (with aluminum foil surface) and Aluminum Finished RPM (with aluminum painted surface). Ideal for light-reflecting interiors.

THE AMERICAN BRASS COMPANY

Manufacturers of Sheet, Roll and Strip Copper

GENERAL OFFICES

WATERBURY, CONNECTICUT

MANUFACTURING PLANTS

ANSONIA, CONNECTICUT
BUFFALO, NEW YORK
TORRINGTON, CONNECTICUT
DETROIT, MICHIGAN
WATERBURY, CONNECTICUT
KENOSHA, WISCONSIN

OFFICES AND AGENCIES IN PRINCIPAL CITIES

IN CANADA: Anaconda American Brass Limited, NEW TORONTO, ONT.

For Other Pages, see File Index

ANACONDA ECONOMY COPPER ROOFING

Copper roofing, rustless and durable, combines to a degree unrivaled by other materials these important qualifications: it is water-tight, permanent in spite of time and weather, relatively light in weight, non-inflammable and safe against flying embers. Snow and ice do not adhere readily to its smooth surface. It is easily installed and, above all, most economical over the years.

ANACONDA
from mine to consumer
REG. U.S. PAT. OFF.

In developing ANACONDA Economy Copper Roofing primarily for residences and similar small roof areas, recognition was accorded to the facts that (1) standing seam construction for sheet metal roofing had been proved both practical and economical; that (2) existing practice resulted in seam spacing too wide for good design in small roofs; and that (3) the cost of the standing seam 16-oz. copper was too high to permit of its widespread use for residential roofing.

Consequently, space between vertical seams was narrowed to 13¾ ins. and the height of the seam reduced to ¾ in. This made possible the use of 10-oz. copper without sacrificing the strength, rigidity and wind resistance obtained from wider, thicker sheets. The use of lighter metal, and its correspondingly greater workability, reduces cost to a point where ANACONDA Economy Copper merits consideration wherever quality roofing is desired.

SAMPLES DISPLAYED WITH ARCHITECTS SAMPLES CORPORATION NEW YORK, N.Y.

Installation Procedure

Although the principles and practices of standing seam construction are known and approved by the majority of sheet metal men, it has been deemed advisable to prepare and present a series of drawings consolidating the opinions and methods used by recognized experts in the field.

These drawings have just been compiled in the form of a book—available to architects upon request. It is the purpose of this book to show each step in the application of a standing seam copper roof without resorting to the use of solder. In general, it may be said that the procedures illustrated are also applicable to 16-oz. copper. Ask for ANACONDA Publication AC7-I.

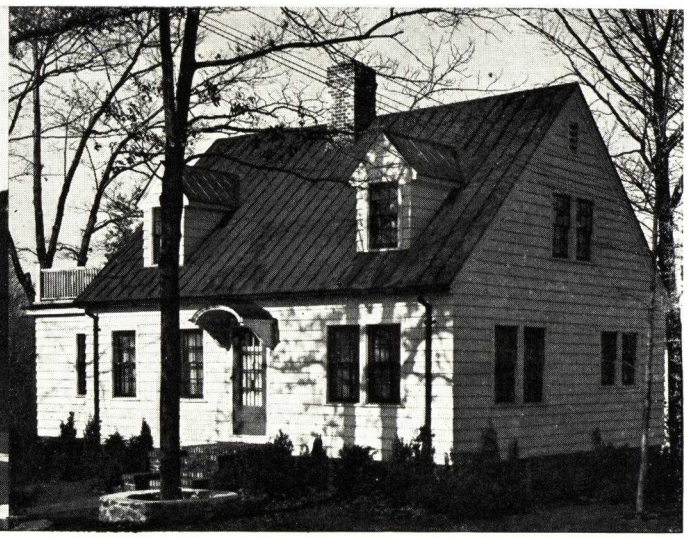
Readily Available

ANACONDA Economy Copper Roofing is readily available to the trade from stocks maintained by authorized distributors of ANACONDA Sheet Copper in leading cities throughout the country.

Electro-Sheet for Built-Up Roofs

THE AMERICAN BRASS COMPANY also offers copper in thin, wide sheets, under the trade-name "Electro-Sheet" Copper, for use as a membrane between layers of asphalt in built-up flat-deck roofs. Detailed information upon request.

Home with Anaconda Economy Copper Roof In Newton Highlands, Mass.
Built by DAVIS & VAUGHN, Boston



An Anaconda Economy Copper Roof Gracing a Really "Small House"
Built as a model F.H.A. home at Waterbury, Conn.

ANACONDA ECONOMY COPPER ROOFING
SUGGESTED SPECIFICATION

Preparation of Surface

The roof boarding to be laid solid without open joints and shall be thoroughly inspected. All nails to be driven home, and imperfections in the boarding to be repaired.

Felt Lining

Furnish and apply a 15-pound asphalt-saturated lining felt over the entire roof area before applying the copper. This to be done in the usual manner, weather-lapping the edges at least 2 ins., and nailing with flat head copper roofing nails.

Copper

The roofing material to be of ANACONDA 10-ounce Economy Copper Roofing, and shall be supplied in sheets 16 ins. x 72 ins., with parallel edges and square ends.

Method of Construction

The Economy Copper Roofing to be applied according to the installation methods suggested by THE AMERICAN BRASS COMPANY'S booklet "ANACONDA Publication AC7-I," or as approved by the architect, following the conventional standing seam system of construction. The seam spacing to be laid out by means of chalk lines on the roof surface, centered so as to give an equal spacing at the ends, and must be approved by the architect before the work is begun.

The roofing to be installed without the use of solder, except in unusual instances where soldering is absolutely necessary to make flashing joints water-tight.

Valleys

The valleys to be [10-oz.] [16-oz.] copper. They shall have ¾-in. edges turned back on each side. The end joints to be made with at least 1-in. seams. They, as well as the joints with the roof pans, are to be single flat locks, *without solder.*

Fastening

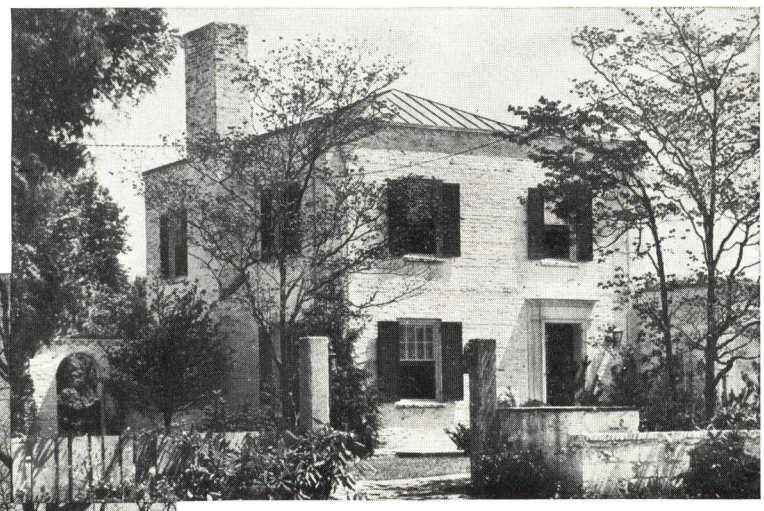
The edging strips to be of lengths not exceeding 8 ft., and to be installed with a 1/16 in. clearance between the strips. The strips to be fastened by solid nailing at intervals of 4 ins. or less. The roof pans, valleys, etc., to be fastened by means of 1¼ ins. x 2¾ ins. 10-oz. copper cleats spaced not over 12 ins. apart along each edge or seam, using two nails to each cleat, the end of the cleat folded over to cover the nail heads.

Nails

For all fastenings of copper, ⅞-in. No. 12 flat head copper roofing nails to be used.

Miscellaneous

In general, the seams are to be rolled or locked in the right-hand direction, but at the valleys all seams are to be rolled in the same direction as the flow of water.



Below: **Home in Marblehead, Mass.**
DONALD C. GOSS, Architect
Copper was used extensively throughout this house

Above:
The 1936 "Good Housekeeping" House at Wychwood, Westfield, N. J.
DWIGHT JAMES BAUM, Riverdale-on-Hudson, N. Y., Architect

Hundreds of installations in all sections of the country have shown the adaptability of Anaconda Economy Copper Roofing to many different styles of architecture.

THE AMERICAN ROLLING MILL COMPANY

Makers of ARMCO Ingot Iron Sheets and Plates, Armco Galvanized Paintgrip, and Armco Stainless Sheets, Plates and Strip

EXECUTIVE OFFICES

308 Curtis Street, MIDDLETOWN, OHIO

DISTRICT OFFICES

ATLANTA, GA., 1437 Citizens & Southern National Bank Building
BOSTON, MASS., 201 Devonshire Street
BUFFALO, N. Y., 504 Seventeen Court Street Building
CHICAGO, ILL., 310 South Michigan Building
CLEVELAND, OHIO, 1516 B. F. Keith Building
DALLAS, TEX., 1111 Santa Fe Building
DETROIT, MICH., 5-261 General Motors Building
INDIANAPOLIS, IND., Circle Tower
KANSAS CITY, MO., 7100 Roberts Street
MIDDLETOWN, OHIO, 703 Curtis Street
NEW ORLEANS, LA., 3505 So. Carrollton Avenue
NEW YORK, N. Y., 50 Church Street
PHILADELPHIA, PA., 1808 Lincoln-Liberty Building
PITTSBURGH, PA., 1632 Oliver Building
ST. LOUIS, MO., 1725 Ambassador Building

Distributors in Principal Cities Can Supply Contractors' Requirements Promptly

For Stainless Sheets and Other Armco Products, see File Index

ARMCO GALVANIZED PRODUCTS

ARMCO Ingot Iron and steel sheets; galvanized or Paintgrip galvanized, flat and corrugated.

Roofing (Galvanized or Paintgrip Galvanized ARMCO Ingot Iron, and Copper Bearing Steel and Steel): Roll, V-Crimp, Standing Seam, Pressed Standing Seam, Corrugated.

Manufactured building products made of Armco galvanized sheets: Gutters, downspouts, flashings, valleys, hips, ridges, scuttles, and other roof and roof drainage fittings are carried in stock by Armco distributors throughout the country. Other architectural uses: Cornices, marquees, heating and ventilating ducts, roof ventilators, skylights, signs and ornamental work. Sheet metal contractors can supply these to meet your specifications.

Standard Sizes and Gauges

ARMCO Ingot Iron galvanized sheets are carried in stock in the following sizes: Gauges—16, 18, 20, 22, 24, 26 and 28. Widths—24, 26, 28, 30, 36 and 48 ins. Lengths—96 and 120 ins.

ARMCO Ingot Iron galvanized corrugated sheets for roofing and siding purposes are made with 5, 3, 2½ and 1¼-in. corrugations. For general building purposes use 2½-in. corrugated sheets 26 ins. wide (after corrugating) for siding, and 27½ ins. wide (after corrugating) for roofing. This size covers 24 ins. in width and allows for a one-corrugation lap for siding and one-and-one-half corrugation lap for roofing. These sheets are stocked as follows: Gauges 20, 22, 24, 26, 28. Widths—26 and 27½ ins. Lengths—60, 72, 84, 96, 108, 120, 132, 144 ins.

Thrifty for Clients

On a cost-per-year basis, galvanized ARMCO Ingot Iron has proved its ability to save money. This evidence is found in the record of 31 years of satisfaction—the longest actual service record of any low-cost, rust-resisting sheet metal. Outstanding records pertaining to specific types of service will be submitted upon request.

ARMCO PAINTGRIP GALVANIZED SHEETS

The Armco Paintgrip process gives galvanized ARMCO Ingot Iron and copper bearing steel or regular steel sheets also made by Armco a special finish that enables them to be painted immediately after fabrication or installation. It eliminates the necessity of weathering or acid-etching before painting. Armco Paintgrip sheets meet three vital structural and architectural requirements:

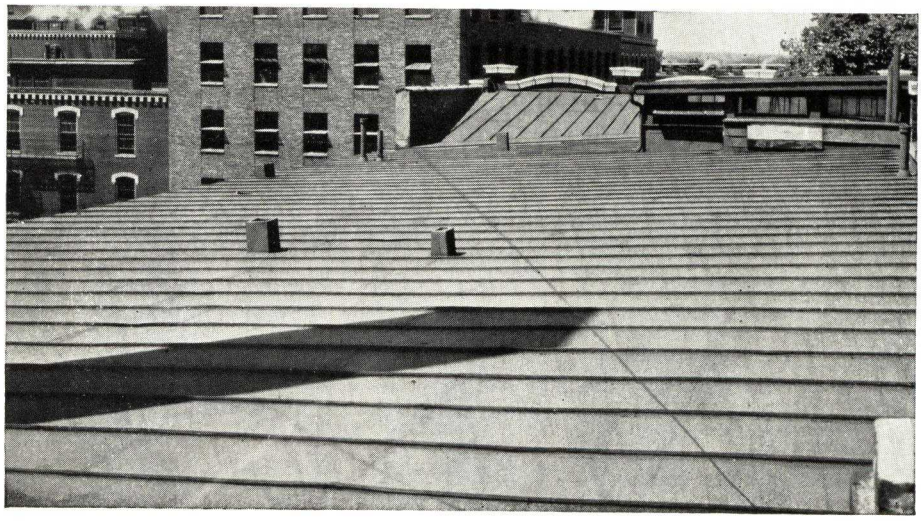
(1) An iron or steel sheet having full-weight pure zinc coating.
(2) Good physical surface for mechanical adhesion.
(3) Chemical neutrality that retards aging and failure of paint.

Grades Available

Base metals can be ARMCO Ingot Iron, a highly refined metal, plain or copper bearing steel. The galvanized coating can be heavy, medium, tight or special tight coat. Armco Paintgrip is provided in two surface finishes: regular and extra-smooth. The regular finish is recommended for roofing, siding, outdoor signs and other uses where a very smooth surface for painting is not required. Armco Extra-Smooth Paintgrip is desirable for cabinets, refrigerators, and indoor signs where a smooth, glossy paint must be applied. All grades of Armco galvanized Paintgrip sheets can be stretcher leveled for exceptional flatness.

Summary of Armco Paintgrip

Briefly summarized, the outstanding advantages of the Armco Paintgrip treatment for galvanized iron or steel sheets are: (1) Maximum protection from rusting; (2) Immediate painting with every assurance of a tenacious paint bond; (3) A good physical surface for mechanical adhesion, plus chemical neutrality that retards drying out of essential elasticity of paint; (4) Makes acid treatment unnecessary; (5) Eliminates delays required for natural weathering.



Bundy Apartments, Middletown, Ohio

Galvanized ARMCO Ingot Iron roof installed in 1909. Inspected in 1937 and found to be in excellent condition—good for many more years of service

Write for Further Details

For a small test sample and additional information regarding Armco Paintgrip sheets and their many useful architectural applications, communicate with nearest Armco district office above.

ROOFING STYLES

For ARMCO Ingot Iron Galvanized Regular and Paintgrip Sheets

Figure 1

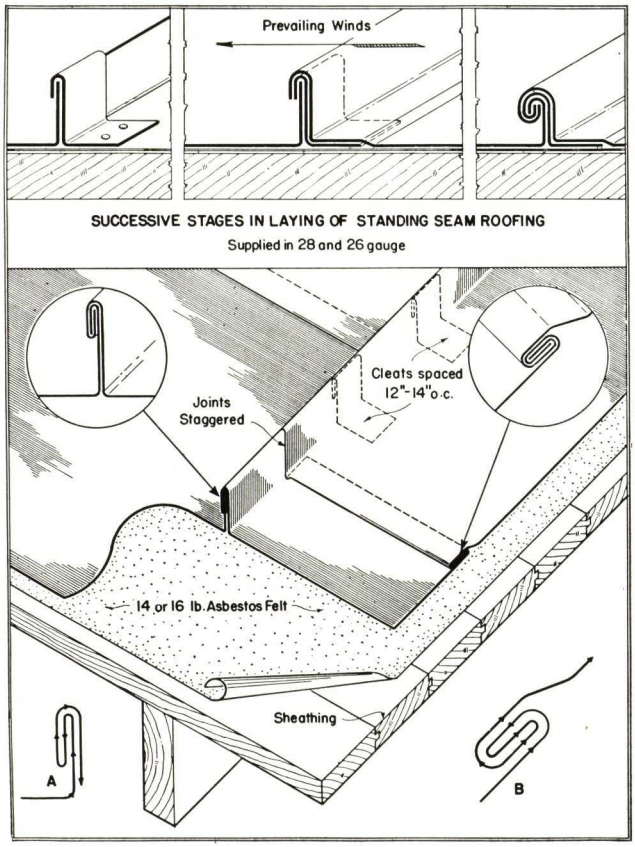


Figure 2

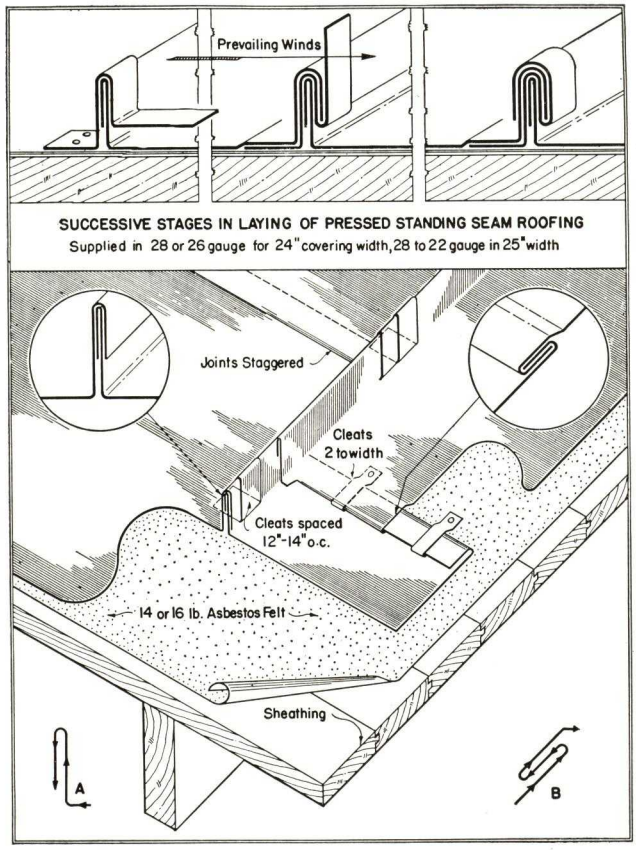


Figure 3

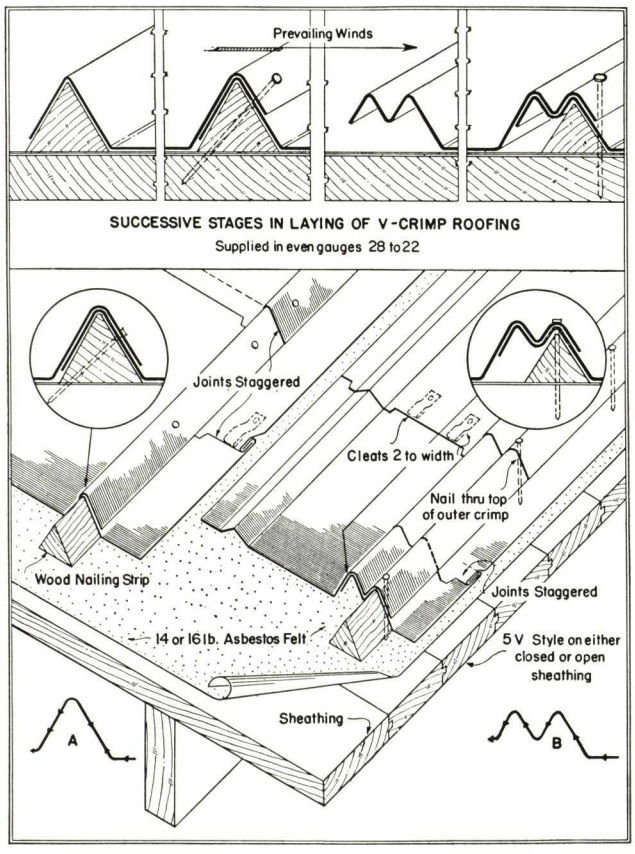
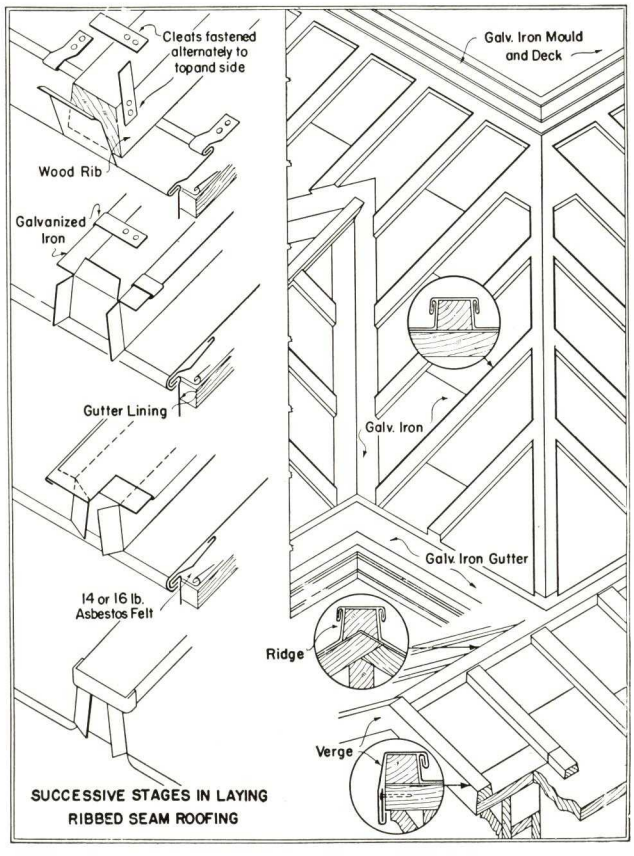


Figure 4



AMERICAN ZINC INSTITUTE, INC.

"Seal of Quality" Heavy Coated Galvanized Sheets for Roofing and Siding

60 East 42nd Street
NEW YORK, N. Y.

Product

SEAL OF QUALITY HEAVY-COATED GALVANIZED SHEETS are a specially manufactured product designed to meet the fast-growing and insistent demands for a more durable roofing and siding material.

The zinc coating on SEAL OF QUALITY SHEETS is extra heavy, fully two ounces per square foot. Because of this thick rust-preventive protection, SEAL OF QUALITY SHEETS can be depended upon to give long extra years of rust-free service at a minimum "per year" cost.

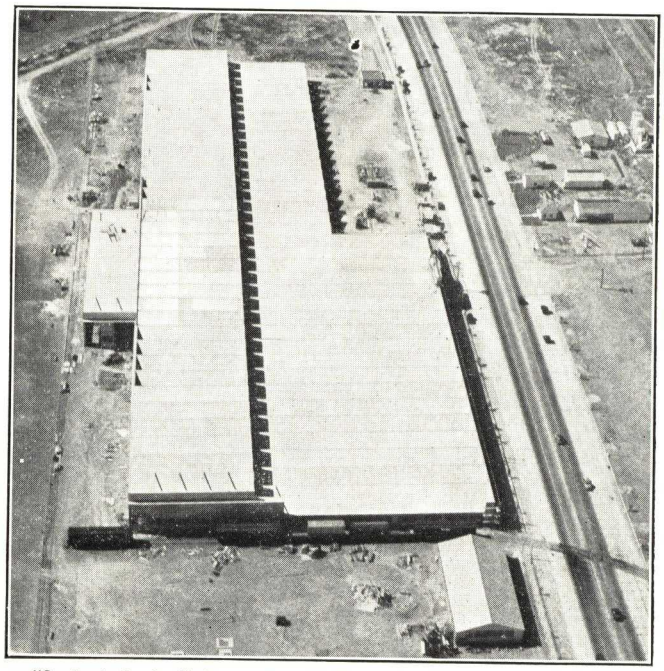
Need of Heavy Zinc Coating

Increased durability of galvanized sheets makes possible substantial savings in upkeep and replacement costs.

Various base-metals are used in such sheets, including Bessemer and open-hearth steel, copper-bearing steel, pure iron, wrought iron, copper-bearing iron, etc. All of these will *begin to rust as soon as exposed to the atmosphere*—the rate of corrosion, or rusting, varying for the different types, as shown in numerous tests which have been made upon the uncoated or "black" sheets.

To *prevent rust,* these sheets are coated with zinc, which, as stated in U. S. Bureau of Standards Circular No. 80, is "by far the best" protective metallic coating for the rust-proofing of iron and steel. Zinc, being electro-negative to iron and steel, exerts "galvanic" protection against corrosion of the base-metal, even where the latter is exposed over a small area, as for instance by a scratch in the coating. Most other non-ferrous metals used in coating iron and steel tend to accelerate or increase rusting under such conditions instead of inhibiting it.

When zinc-coated or "galvanized" sheets are exposed to the elements, *the time elapsing before the appearance of unsightly and destructive red rust depends not upon the nature of the base-metal, but upon the weight or thickness of the zinc coating.* The heavier the coating the longer the service life; in fact, except in severe industrial atmospheres, heavier coatings have been shown to give much more than a proportionate increase in life.



"Seal of Quality" Heavy-Coated Galvanized Sheets on plant of Consolidated Aircraft Corporation, San Diego, California

SEAL OF QUALITY HEAVY-COATED SHEETS are specially made by licensed manufacturers and carry an extra-heavy zinc coating—two ounces per square foot. Their high standard is maintained by rigid tests and inspections, which are checked by the engineers of the AMERICAN ZINC INSTITUTE, INC. Both the "SEAL OF QUALITY" brand and the trade-mark or name of the manufacturer appear on *every* sheet, thus giving double assurance of quality.

The small additional cost of SEAL OF QUALITY HEAVY-COATED SHEETS is much more than offset by their increased life.

Sizes and Styles

Available in No. 28 gauge and heavier, in all standard widths and lengths.

Sold mainly as formed roofing and siding, particularly in the 2½-in. and 1¼-in. corrugated styles. Corrugated sheets are the strongest form of sheet metal known, and are not appreciably affected by expansion and contraction. Also sold in V-crimped styles by certain manufacturers.

SEAL OF QUALITY HEAVY-COATED SHEETS are not suitable for more severe forming operations unless special measures are taken to prevent damage to the heavy zinc coating.

Licensed Manufacturers

Apollo Steel Company, Apollo, Pa.
Bethlehem Steel Company, Bethlehem, Pa.
Carnegie-Illinois Steel Corporation (Subsidiary of U. S. Steel Corporation), Pittsburgh, Pa.
Columbia Steel Company (Subsidiary of U. S. Steel Corporation), San Francisco, Cal.
Continental Steel Corporation, Kokomo, Ind.
Granite City Steel Company, Granite City, Ill.
Inland Steel Company, Chicago, Ill.
The Newport Rolling Mill Company, Newport, Ky.
The Reeves Manufacturing Company, Dover, Ohio
Republic Steel Corporation, Cleveland, Ohio
Republic Steel Corporation, Gulf States District, Birmingham, Ala.
Tennessee Coal, Iron & Railroad Company (Subsidiary of U. S. Steel Corporation), Birmingham, Ala.
Wheeling Corrugating Company, Wheeling, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.
The Youngstown Sheet and Tube Company, Youngstown, Ohio

American Zinc Institute Service

Additional information concerning SEAL OF QUALITY HEAVY-COATED GALVANIZED SHEETS gladly furnished on request.

The services of the AMERICAN ZINC INSTITUTE, INC. are available without charge to anyone interested in the utilization or application of zinc or zinc products.

BETHLEHEM STEEL COMPANY

GENERAL OFFICES
BETHLEHEM, PA.

DISTRICT OFFICES

ALBANY	BUFFALO	DALLAS	JOHNSTOWN, PA.	PHILADELPHIA	SAN ANTONIO	TOLEDO
ATLANTA	CHICAGO	DETROIT	KANSAS CITY, MO.	PITTSBURGH	SAN FRANCISCO	TULSA
BALTIMORE	CINCINNATI	HARTFORD	LOS ANGELES	PORTLAND, ORE.	SAVANNAH	WASHINGTON, D. C.
BOSTON	CLEVELAND	HONOLULU	MILWAUKEE	ST. LOUIS	SEATTLE	WILKES-BARRE
BRIDGEPORT	COLUMBUS	HOUSTON	NASHVILLE	ST. PAUL	SYRACUSE	YORK
		INDIANAPOLIS	NEW YORK	SALT LAKE CITY		

EXPORT DISTRIBUTOR: Bethlehem Steel Export Corporation, 25 Broadway, NEW YORK, N. Y.

For Other Bethlehem Pages, see File Index

STEEL SHEETS AND SHEET PRODUCTS

OPEN-HEARTH STEEL SHEETS: galvanized, hot-rolled, hot-rolled annealed, hot-rolled pickled, hot-rolled annealed pickled, cold-rolled sheets, and special sheets such as porcelain enameling, japanning, red hard, blued stovepipe, Mayari R.

COPPER-BEARING (BETH-CU-LOY) STEEL SHEETS: galvanized, hot-rolled and hot-rolled annealed.

Formed Sheet Products of Either Beth-Cu-Loy or Open-Hearth Steel

Roofing: Corrugated, V-crimp, Stormproof and Roll.

Siding: Corrugated, Plain Brick, Rock-faced Brick and Rock-faced Stone.

Ridge Roll: Corrugated, Stormproof Adjustable, or Plain.

Formed Valleys.

Any of these products may be furnished either galvanized or painted in Beth-Cu-Loy or open-hearth steel grades, except Stormproof, which is supplied in galvanized finish only.

Galvanized Sheets

Bethlehem Galvanized Sheets are furnished in either open-hearth or copper-bearing steel grades. These sheets are made of VisControlled Steel which is open-hearth steel refined by the VisControl process developed by Bethlehem Steel Company and which results in steel which is consistently uniform in quality. This process enables Bethlehem Steel Company to manufacture sheets which are always dependable in bending or forming operations.

The galvanizing on Bethlehem Galvanized Sheets is a coating of Prime Western spelter which finishes the sheets with a bright, full-spangled lustre. The galvanizing is bonded to the base metal tightly and uniformly, affording full protection against corrosion, even after forming.

Galvanized Open-Hearth Steel Sheets

These sheets are supplied in commercial, tight and extra tight galvanized coatings. When desired, sheets can also be furnished with the Seal of Quality coating—2 oz. of zinc per sq. ft.

Galvanized Beth-Cu-Loy (Copper-bearing) Sheets

Beth-Cu-Loy Sheets are made of copper-bearing steel containing from 0.20% to 0.30% copper which assures the maximum protection against corrosion of the base metal. This content of copper adds little to the cost yet much to the life of these sheets.

Impartial tests conducted in corrosive industrial atmospheres by A.S.T.M. show that copper-bearing steel with the copper content of Beth-Cu-Loy sheets, has a useful life two to three times greater than that of ordinary carbon steel. The summarized data covering the findings of these tests are now available.

Beth-Cu-Loy Sheets have the same soft, easy-forming properties found in other Bethlehem Sheets. For all sheet metal work exposed to corrosive conditions, these sheets provide exceptional durability at moderate costs.

Corrugated Sheets

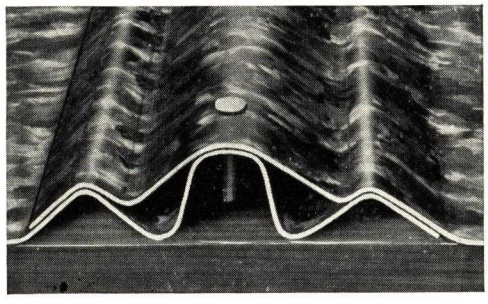
Made with 1¼ and 2 in. corrugations in 20 gage and lighter, and 2½ and 3 in. corrugations in 14 gage and lighter. Standard lengths from 5 to 12 ft. inclusive. Supplied either galvanized, painted or uncoated.

V-Crimp Sheets

Made in 2, 3 and 5 crimps, and in 20 gage and lighter, either galvanized or painted. Supplied in standard lengths from 5 to 12 ft., inclusive. Coverage width, 24 in.

Bethlehem Stormproof Roofing

This is an attractive looking, economical type of roofing that will not leak. It is made of galvanized sheets that are formed with a special side-lap construction of three corrugations. The two air chambers, formed by the large steep-pitched central corrugation, act as drainways which permit all water entering the lap by reason of wind pressure or capillary attraction, to drain off to the eaves. The area of lapped portions in contact is sufficient to insure a firm, tight-fitting, rigid joint. Stormproof roofing will nail down firmly and stay watertight.



Bethlehem Stormproof roofing is supplied in 26, 27, 28 and 29 gages, in standard lengths of 5 to 12 ft., inclusive, with a coverage width of 24 in.

Bethlehem Roll Roofing

Furnished in rolls of 50 ft. each having a coverage area of 100 sq. ft. Supplied in gages from 24 to 29 inclusive. Standard full width, 26½ in., coverage width, 24 in. Cross locks are either single or double seamed. Can be supplied in either galvanized or painted finish.

Delivery

Bethlehem Sheet Mills are located at Sparrows Point, Md. and Lackawanna, N. Y., at water's edge. Fast delivery by either land or water is thus assured in any quantities desired.

Literature

Literature descriptive of all types of Bethlehem Sheets is available at any of the offices listed above. Your request will be promptly answered.

LYON, CONKLIN & CO., INC.

ESTABLISHED 1860

Manufacturers and Distributors of Lyonore Metal Products

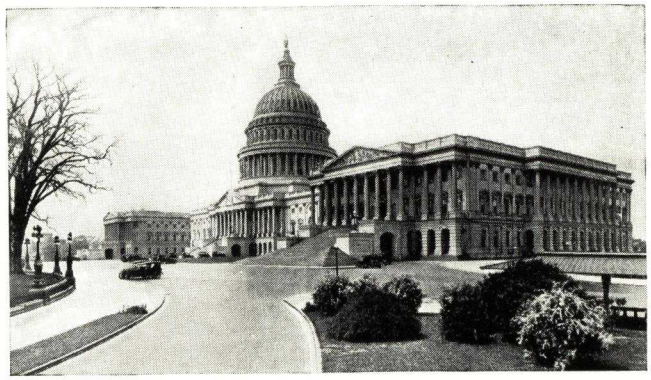
MAIN OFFICE AND PLANT

McComas Street at Hanover Street Viaduct
BALTIMORE, MD.

BRANCH OFFICE: 930-932 E Street, N. W., WASHINGTON, D. C.

Products

GALVANIZED SHEETS, BLACK SHEETS, CORRUGATED and FORMED ROOFING SHEETS, GALVANIZED ROLLED ROOFING, "LYON BRAND" 40-LB. COATED ROOFING TIN, CONDUCTOR PIPE, and EAVES TROUGH, and ELBOWS.



United States Capitol

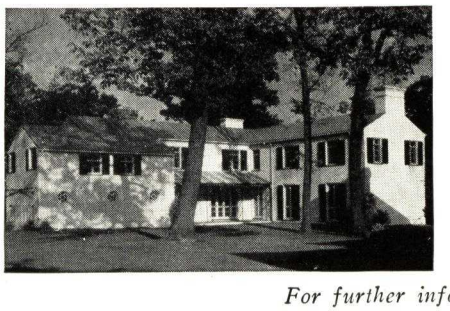
Lyonore Metal specified and used for ventilating and air conditioning ducts in both wings of one of the best known buildings in the world

Why You Should Specify Lyonore Metal Chromium-Nickel-Copper-Iron Alloy Products

Lyonore Metal is iron alloyed with chromium and nickel, with a small amount of copper. It is made according to a formula which provides in a commercially practical sheet metal, remarkably high resistance to atmospheric corrosion. Its principal elements, chromium and nickel, have long been known by metallurgical science to be able to withstand longer than any other semi-precious metals the destructive attacks of time and weather. In the manufacture of Lyonore Metal, its elements are so proportionately and homogeneously combined that they are not unduly influenced by electrolysis. As a result, Lyonore Metal, Chromium-Nickel-Copper-Iron Sheets are exceptionally long-lived—and, figured over any period of years, cost much less to install than other sheet metals of similar character.

Uses

Lyonore Metal has been specified and used by architects and engineers for all sheet metal work—ventilating ducts, dust collector systems, smokestacks and breechings, flashing, roofing, elevator shaft linings, metal buildings, etc.—in many of the finest office and public buildings, hotels, hospitals and schools along the Atlantic Seaboard. It is used for countless industrial purposes such as canopies, vat linings, air conditioning systems, factory roofing and siding, etc.



Galvanized Lyonore Metal and Lyonore Metal base tin plate are widely used for roofing conductor pipe, eaves, trough, flashing, etc., on private dwellings of every description. Lyonore Metal is generally adaptable to any sheet requirement.

Identification

For positive identification, each sheet of galvanized Lyonore Metal is stenciled with the accompanying trade mark in red three times diagonally lengthwise. Each length of pipe, gutter and fittings is die-stamped "Lyonore Metal" and gauge.

Sizes

Lyonore Metal Galvanized Flat Sheets are available in all standard widths, lengths and gauges. For ventilating ducts and dust collector systems, the following table of sizes and gauges is recommended:

16-in. diameter and smaller	No. 26 gauge
17 to 30-in. diameter	No. 24 gauge
31 to 40-in. diameter	No. 22 gauge
41 to 60-in. diameter	No. 20 gauge
61-in. and over diameter	No. 18 gauge

Lyonore Metal Corrugated Sheets are furnished in all standard gauges and lengths from 5 to 12 ft.; standard corrugations are ⅝, 1¼, 2, 2½, 3 and 5 in.—although 1¼ and 2½ in. are usually specified—covering width is 24 in.

Galvanized Lyonore Metal is also available in Pressed Standing Seam, V-Crimped, Weatherboard Siding, Beaded Ceiling, Brick and Stone Siding, etc.

Lyonore Metal Conductor Pipe and Eaves Trough

Conductor Pipe—Made in 10-ft. lengths in six styles: Plain round and square, corrugated round and square, crimped round and square. Ends are deeply crimped to slip easily into place and to bind snugly and tightly when fitted. Furnished in gauges 28, 26, and 24 galvanized and in 40-lb. coated 26-gauge terne plate — each length die-stamped with the gauge and, for quick identification, "Lyonore Metal, an alloy."

Eaves Trough—Made in 10-ft. lengths in a wide variety of styles: Single or double bead—slip or lap joint—gauges 28, 26 and 24 galvanized and in 40-lb. coated 26-gauge terne plate — each length plainly die-stamped with the gauge and "Lyonore Metal, an alloy."

For conductor pipes, hanging gutters, eaves trough..No. 26 gauge
For cornices and skylights.....No. 24 gauge
For gravel strips and flashings.....No. 26 gauge

Lyonore Metal Base Roofing Tin Plate

"Lyon Brand" has a Lyonore Metal base—carefully selected, perfect sheets—carrying a 40-lb. coating of new tin and new lead—coated by the pure palm oil process. In specifying "Lyon Brand" Tin Roofing, the following is recommended:

All roofing—IC thickness; valleys and gutters—IX thickness.

Long ternes for valleys, wall capping, skylights, secret gutters, pipes, etc.—26 gauge.

For further information, write for Architects' File AIA File No. 12-A-31

SINCE 1888

OVERLY MANUFACTURING COMPANY

Overly Method of Sheet Metal Roof Construction

GREENSBURG, PA.

For pages on Kalamein Doors and Puttyless Skylights, see File Index

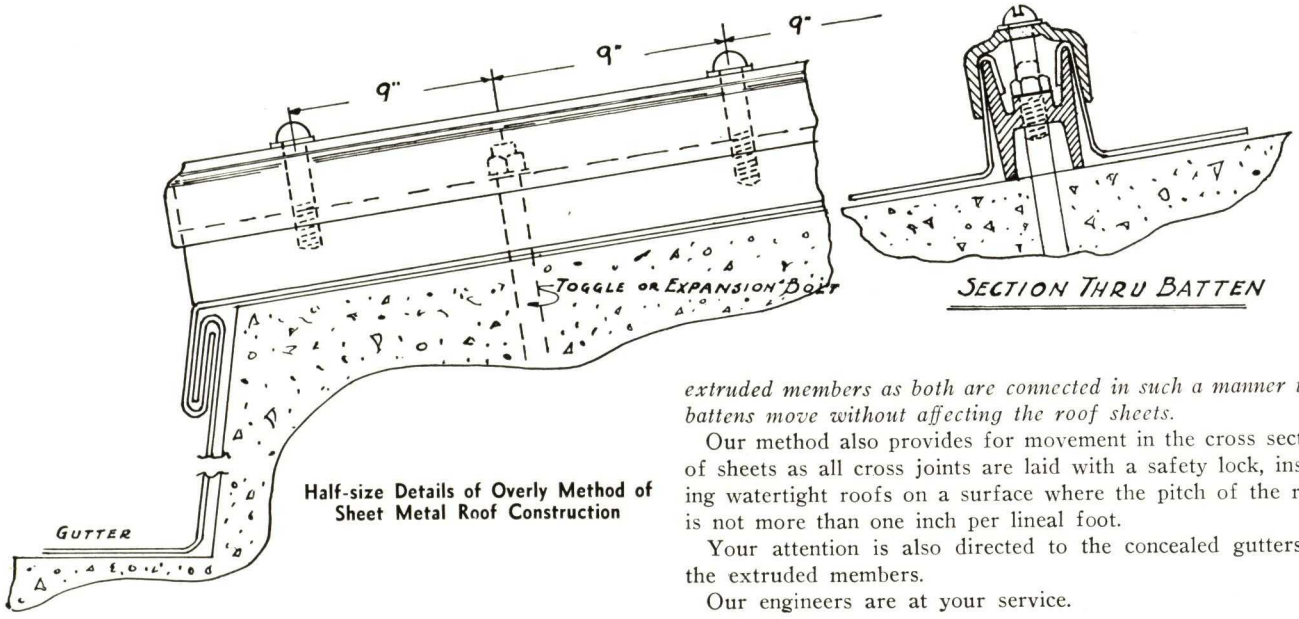
OVERLY METHOD OF SHEET METAL ROOF CONSTRUCTION

Goodwin extruded metal batten roofing provides for liberal expansion and contraction of aluminum, stainless steel or copper roofing.

These metals are very difficult to control due to excessive expansion and contraction.

Many architects would prefer the adoption of these metals but their past experience has been unsatisfactory because proper expansion and contraction had not been provided.

In our extruded metal battens, details of which are shown herewith, the metal battens are applied to the roof structure, the roofing material turned over edges and a cap with slight tension applied. This method permits the extruded batten and cap to move, as a slotted hole in the bottom permits the metal to move longitudinally on a bolt in the roof structure. *Both batten member and cap member, being of the same material and of the same thickness, will move together. The roof sheets, being of a much lighter weight of material, necessarily expand or contract more quickly and have free movement in extruded members as both are connected in such a manner that battens move without affecting the roof sheets.*

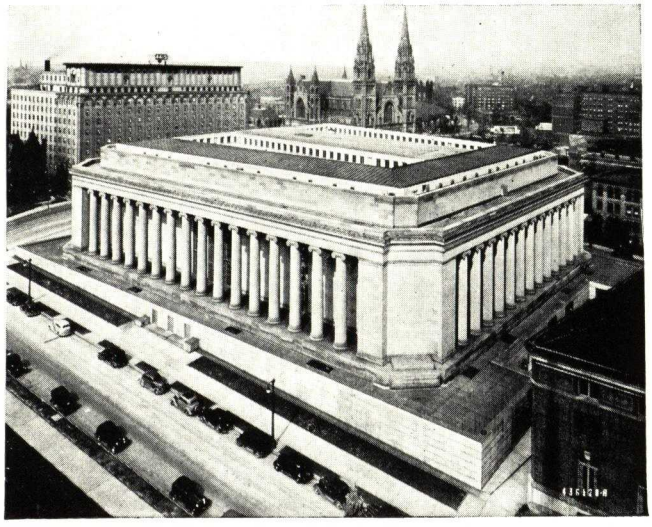


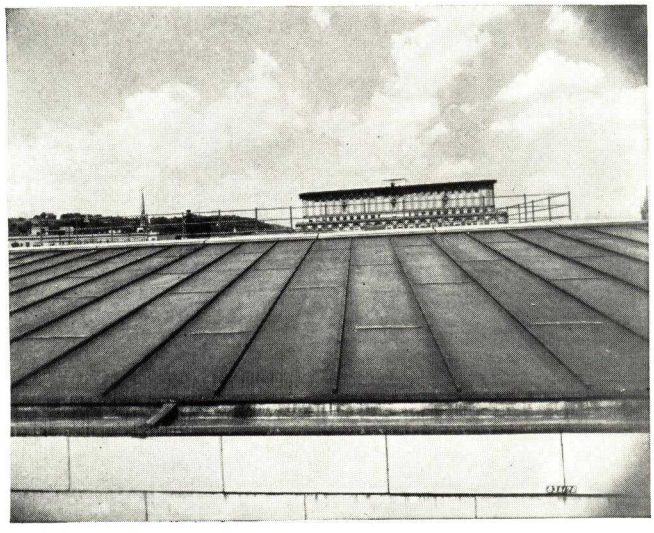
Half-size Details of Overly Method of Sheet Metal Roof Construction

Our method also provides for movement in the cross section of sheets as all cross joints are laid with a safety lock, insuring watertight roofs on a surface where the pitch of the roof is not more than one inch per lineal foot.

Your attention is also directed to the concealed gutters in the extruded members.

Our engineers are at your service.





Mellon Institute Building, University of Pittsburgh, Pittsburgh, Pa.

MELLON-STUART CO., Pittsburgh, Pa., Contractors
JANSSEN & COCKEN, Pittsburgh, Pa., Architects

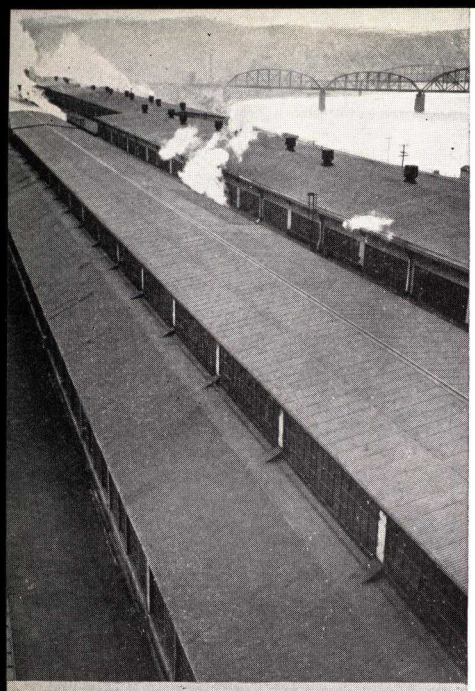
MEMORANDA

USS

STEEL SHEETS *and* ROOFING TERNES

FOR ROOFING ★ SIDING ★ FLASHING
DUCT WORK ★ FORMED PRODUCTS

UNITED STATES STEEL



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Why U·S·S Symbolizes Leadership in High Grade Sheet Products

To the property owner, steel presents an ideal roofing and siding material. In the long run he will find steel is easy on his pocketbook and that steel combines the advantage of *reasonable first cost* with *long life, low maintenance cost* and *maximum protection.* To the architect and builder, steel roofing and siding offer the additional benefit of *ease* of *installation.*

Add to these advantages the *leadership in steel making* symbolized by the letters U•S•S and you have six tangible reasons for specifying U•S•S Sheet Products. Monticello, the home built by Thomas Jefferson in Virginia, is shown on the front cover. This beautiful building is roofed with U•S•S Copper Steel Ternes.

Leadership, as interpreted by the United States Steel Corporation Subsidiaries, is a word signifying four outstanding services to users of steel:

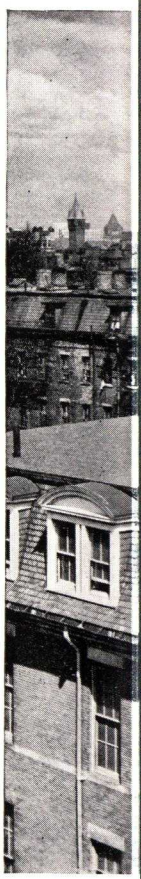
(1) Modern mills with the most advanced equipment for making steel.

(2) Unexcelled research facilities for developing new steel products.

(3) Efficient distribution of U•S•S Sheet Products by means of jobbers and warehouses throughout the country. Our delivery is fast because our mills are close to you in miles and hours.

(4) A consulting service offered to architects and engineers at no obligation. Write to our nearest district sales office. (See list on page 12.)

U•S•S Sheet Products carry the assurance of uniformity and full standard weight. They are products of known value, backed by the universally recognized symbol U•S•S.



The Complete Line of U·S·S Sheet and Terne Products

There is more to a steel sheet than how it works on a particular job. Quality is determined in service, and the dependability of U•S•S Steel Sheets under all conditions is the reason why architects and fabricators have preferred to specify them for many years. U•S•S Steel Sheets are available in four principal types, namely: U•S•S Black Sheets, U•S•S Galvanized Sheets, U•S•S Roofing Ternes and U•S•S Stainless Steel Sheets.

You can obtain U•S•S Black Sheets in varying degrees of finish, ductility, and other needed qualities. The gauges supplied for ordinary architectural applications include United States Standard Gauge numbers 10-30, that is, thicknesses from 0.1345 inches to 0.0120 inches (see table on page 8). For special purposes, consult our nearest district sales office or your supplier of sheet metals.

U•S•S Galvanized Sheets not only have a scientifically prepared steel base but special attention has been given to the zinc coating to insure a firm and lasting bond between the zinc and the base sheet. These galvanized sheets are furnished in various weights of coating, with as wide a range of selection as you find with U•S•S Black Sheets. For products involving unusually severe forming, specify U•S•S Galvannealed Sheets.

U•S•S Black and Galvanized Sheets are both available with the extra protection of copper alloyed with the high-grade steel base. Tests made under actual weather conditions by many metallurgical authorities in a wide variety of locations have proved that U•S•S Copper Steel Sheets show greater resistance to rust and corrosion than non-copper metals of substantially the same basic composition.

U•S•S Roofing Ternes are made exclusively from U•S•S Copper Steel Sheets, surface coated with a mixture of lead and tin. Rigid service tests on fine homes and public buildings have proved beyond doubt that a terne roof, properly applied, will last 100 years. U•S•S Copper Steel Long Ternes and U•S•S Copper Steel Short Ternes are available in numerous grades and weights of coating. The ternes are moderate in price, last indefinitely, cost the minimum for maintenance, for repairs, and form a lightweight, attractive permanent roof.

Look at the picture of Monticello on the cover, reroofed with U•S•S Copper Steel Ternes in 1926.

Consult a sheet metal worker or a sheet steel distributor in your neighborhood. He will tell you that ternes are *easy to apply* as roofing or flashing, *durable* and *economical.*

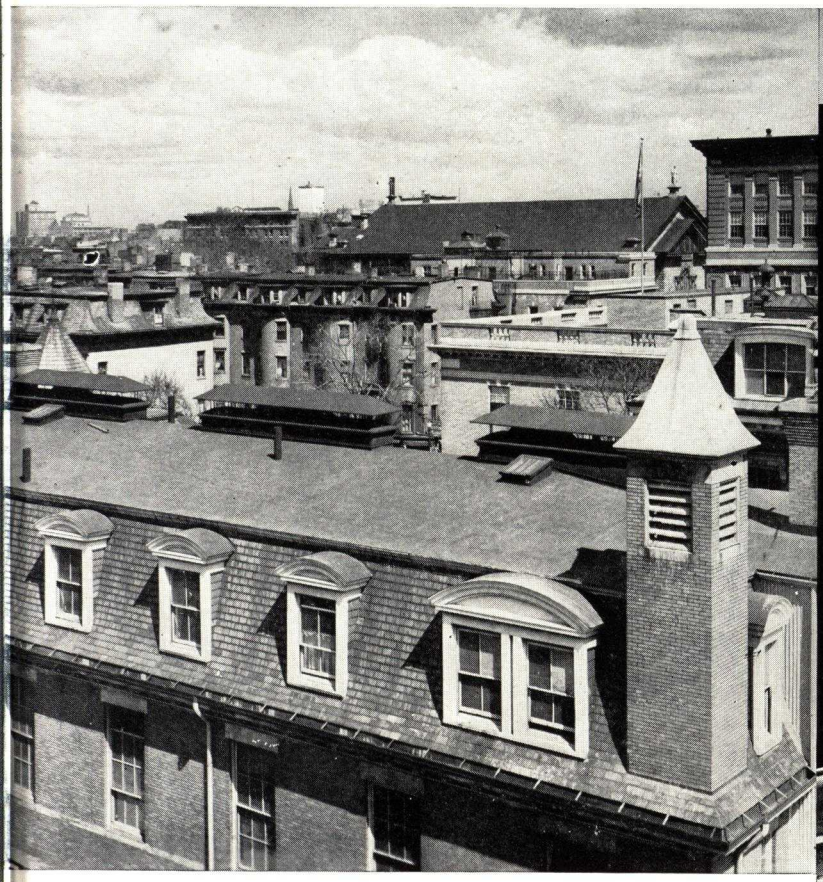
For information on U·S·S Stainless Steel Sheets, please refer to the File Index.

What are the Advantages of a Terne Roof?

Among steel roofing materials, two types have particular advantages to architects.

For fine residences and public buildings, we recommend U•S•S Copper Steel Ternes. A roofing terne plate is a steel sheet coated with a mixture of tin and lead. The name *Terne* is probably derived from "ternary," meaning an alloy of three constituents — in this case, steel, tin and lead. Ternes are ductile, durable and economical — three big advantages from an architectural standpoint.

Terne roofs have lasted 80 years in service, as is exemplified by the Moravian Seminary in Bethlehem, Pennsylvania. The White House is roofed with ternes. So is Monticello, Thomas Jefferson's home in Virginia, reroofed in 1926 with U•S•S Copper Steel Ternes. This beautiful building is shown on the cover. Old Swedes' Church in Philadelphia, the Morris Colonial Home, the old Germantown Inn, and many of the historic colonial mansions in the South bear testimony to the long life of terne roofs.



Service. Terne roofs when properly installed and painted last indefinitely with a minimum of attention. They are satisfactory under any climatic conditions.

Fireproof, Waterproof, Lightningproof. Not long ago, The Metal Club of Philadelphia tested terne roofs with a fire test. They found that ternes withstood intense heat where other materials failed. A terne roof is an unbroken sheet of metal with no cracks or openings of any kind to admit fire. Insurance underwriters grant more favorable rates to buildings roofed with ternes because of experiences in notable fires in Chelsea, Massachusetts; Indianapolis, Indiana; Scranton, Pennsylvania, and elsewhere.

Terne roofs, when properly applied, using any of the 5 standard methods illustrated, are waterproof. Ternes are cleated together, soldered and laid as a single piece of metal. In addition, ternes are prepared for painting so that a terne roof can be painted while it is being laid, if speed is essential.

Terne roofs are unaffected by wind and snow, for the metal is impervious to weather, when properly painted.

The safest place during a thunderstorm is in a building roofed with steel, properly grounded. According to experts, a building roofed entirely with steel has never been penetrated by lightning nor the occupants injured.

Adaptability is an important factor in selecting a roofing material. Terne roofs are adaptable to any roofing purpose, from the flat to the perpendicular. Naturally, different types of seams are used for roofs with different pitches.

QUESTIONS AND ANSWERS ON U·S·S ROOFING TERNES

Q: What does a 40 pound coating mean?
A: It means that there are 40 pounds of tin and lead used to coat 112 sheets of 20" x 28" steel on both sides of the sheet.
Q: With what coatings are U·S·S· Ternes supplied?
A: In coating from 8 pound to 40 pound. For roofing, the 25 pound coating is the lightest which should be used. To insure maximum life, specify U·S·S· Copper Steel Ternes with heavier coatings up to 40 pound.
Q: How should U·S·S· Ternes be protected against the weather.
A: Ternes should be painted on the under side before laying, and with two coats on the upper side, as soon as the roof is finished.
Q: How shall I order U·S·S· Roofing Ternes?
A: Consult with your contractor, your sheet metal distributor or our nearest district sales office. U·S·S· Roofing Ternes are available with numerous finishes designated by trade names. For instance, U·S·S· MF Ternes and U·S·S· "Eagle" Ternes have long been popular.

Easy to solder and form are the U•S•S Roofing Ternes used to make gutters and eave troughs.

U•S•S Copper Steel Ternes are adaptable to any roofing purpose — including valleys, gutters and flashings. When a building is roofed with other materials, it may economically be repaired by laying roofing ternes over it.

Appearance is important, and if you look at the photographs of terne roofs shown here, as well as those on historic buildings, you will agree that terne roofs are attractive. The color of a terne roof is a matter of individual taste. The finishing coat of the new terne roof or the repainting of the old can be done in any color or shade preferred. For example: Light green, lead gray, and nut brown are favorite colors. You can have harmony or contrast, as you choose, with the color scheme of the building. (See section on Painting, page 6.)

Economy. A terne roof means long-run economy. Little or no repairing is required. A well-laid roof of U•S•S Copper Steel Ternes has an amazingly low cost per square foot. Consult your local distributor of roofing supplies.

The Five Standard Methods of Applying U•S•S Roofing Ternes

Lap Seam. The lap seam, illustrated in Figure 1, is the simplest type of the seams used in applying U•S•S Roofing Ternes.

Usually, lap seams are made 1 inch wide, with the edges of the sheets soldered for a total distance of 1½ inches. U•S•S Ternes are easily soldered, preferably with a good grade of solder containing about 80% tin.

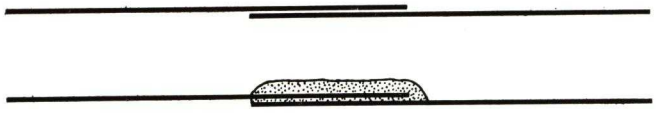


Figure 1

The Standing Seam. In Figure 2 are illustrated the four steps in laying a standing seam roof. This type of construction gives an attractive and interesting ribbed appearance.

The standing seam is literally a double-lock standing seam. It is developed as outlined in the four steps shown. The edges of the two ternes are bent at right angles, 1¼ inches on one edge and 1½ inches on the other edge. Then the two ternes are placed on the roof with the 1¼ inch face of one against the 1½ inch face of the other. The projecting ¼ inch of the 1½ inch face is turned 180° over the 1¼ inch face, and the lock is completed by a fold of the joined edges.

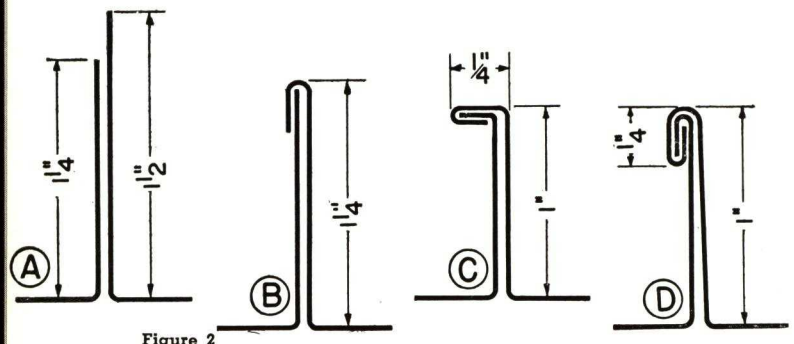


Figure 2

The standing seam thus finishes 1 inch high. Cleats are used for nailing, as indicated by the seven steps of Figure 3.

Standing seam roofs are particularly adaptable to roofs with a rise of 2 inches per foot and greater. The sheets are laid from ridge to gutter, that is, lengthwise.

U•S•S Long Ternes in sizes from 28" x 96" to 30"x 120" may be used. U•S•S Short Ternes, 20" x 28", are also suitable, and in both cases coatings from 20 to 40 pounds should be specified. See the Questions and Answers on Ternes on Page 3.

Flat Seam. For a wide variety of terne roofs, including all "flat" roofs — with a rise of ¼ inch per foot and greater — the most common construction is the flat seam.

The hook or flat-lock seam, shown in Figure 4, is one example of this type of laying. In developing the seam, the edges of the sheets are tinned and bent at right angles. One face is 1 inch high, the other ½ inch high. The edge of the 1-inch face is turned over the edge of the ½-inch face, and then both are flattened and soldered, using a good tin solder, as indicated above. U•S•S Ternes are specially *prepared for soldering* and are *ductile so that the bends required in forming seams are easily made.*

Figure 5 shows a single flat-lock seam with a cleat. The cleat is placed against the sheet and is nailed to the roof, turning the end back over the nails, so that the metal surface of the roof is unbroken.

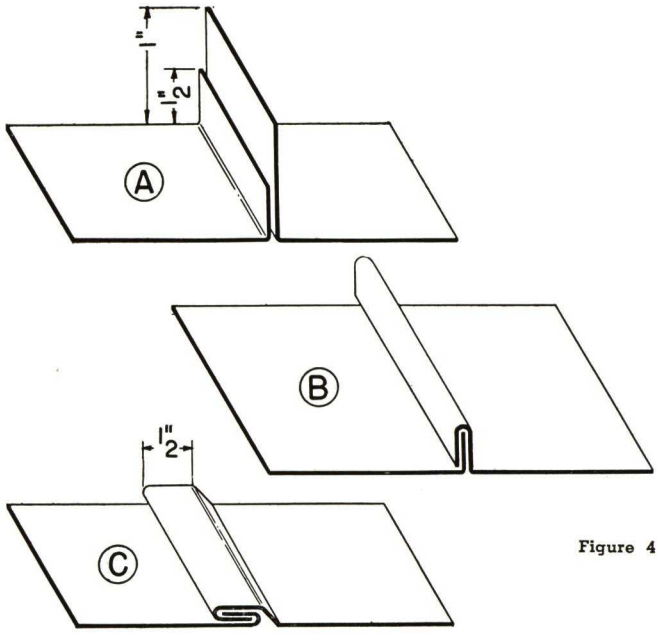


Figure 4

Batten or Ribbed Seams. For a roof where the decking is laid in *battens*, either in vertical "ribs" or horizontal "steps," construction with U•S•S Roofing Ternes is ideal. This type of construction is relatively simple, yet the number of variations possible makes batten roofs a pleasing possibility for architects who wish originality.

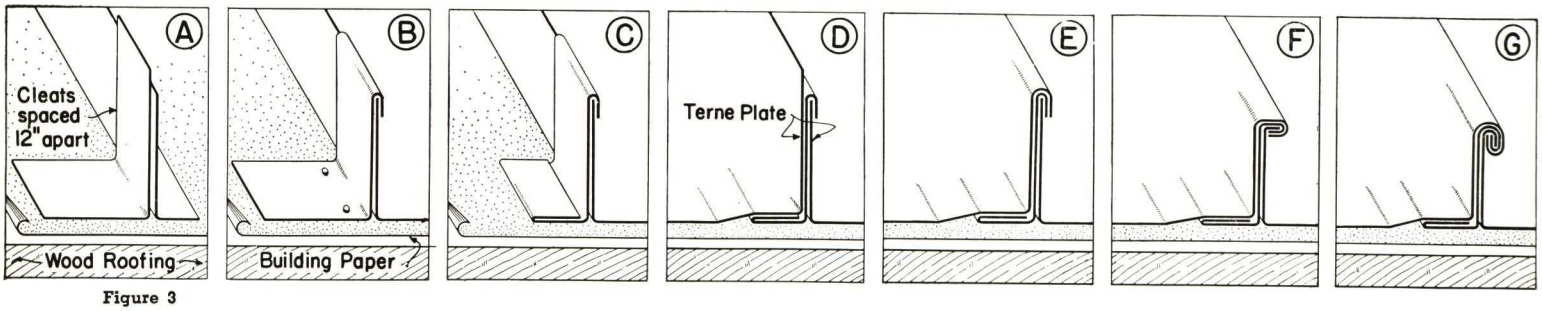


Figure 3

Five types of wood battens are shown in Figure 6 together with the types of terne "caps" used in each case. In Types A and B a separate piece of capping is cut from a U•S•S Long Terne, and the cap flashings are made in about 3-inch widths to the length which you specify.

STEEL HOUSES ARE COMING!

Any modern architect is keenly aware of the interest in steel houses. Soon, builders of good houses in every price class will be using U·S·S· Sheet Products for the two principal types of steel houses.

The first type is the Steel Frame House, where steel structural members are substituted for other materials. Steel mesh, bars, wire, tubes and other steel products made by United States Steel Corporation Subsidiaries—as well as U·S·S· Steel Sheets —are substituted for other materials.

A second type of construction rapidly becoming popular is the Frameless Steel House. This type embodies prefabricated sections of sheet steel which may be easily and quickly assembled on the house site. For details, write or call our nearest district sales office.

For example, you may design a roof which has a length from ridge to gutter of 40 feet. Using U•S•S Long Ternes, 30"x120", four ternes will satisfactorily cover the distance from ridge to trough of the roof, except for the 1½ inches of terne required at each flat end seam. The total of three flat-lock seams required to join the four sheets uses up 4½" of the 480" (40 feet.)

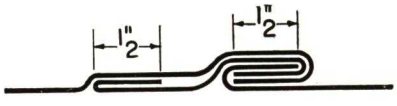


Figure 5

This 4½-inch gap is covered by a terne flashing cut by the sheet metal worker from either a U•S•S Long Terne or a U•S•S Short Terne, 40-pound coating. The flashing may be in the form of an eave capping or of an addition to the gutter. In the latter case, the terne flashing is locked to the bottom sheet of the roofing with a flat-lock seam, and the gutter may be made of the same piece of terne, thus providing a leak-proof roof.

It is important that seams be soldered with a good grade of solder, so that the finished construction will be permanent as well as attractive.

Seven Simple Rules:

1) In general use 40 lb. ternes for roofing, flashing and gutter work.

2) Use cleats to facilitate nailing and cover nail holes.

3) Use flat head wire nails, spaced 6" maximum for fastening strips and cleats. U•S•S Leak Proof Nails are recommended.

4) Make ample size joints and seams.

(a) Standing seams at least 1" finished.

(b) Flat lock seams at ½" finished.

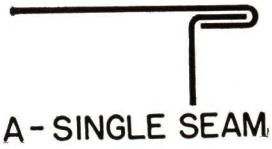
(c) Lap seams to be soldered 1½" finished.

5) Prepare the laying surface carefully and see that it is smooth and even.

6) Use enough good solder to cover all the surface.

7) Use a rosin flux rather than an acid flux.

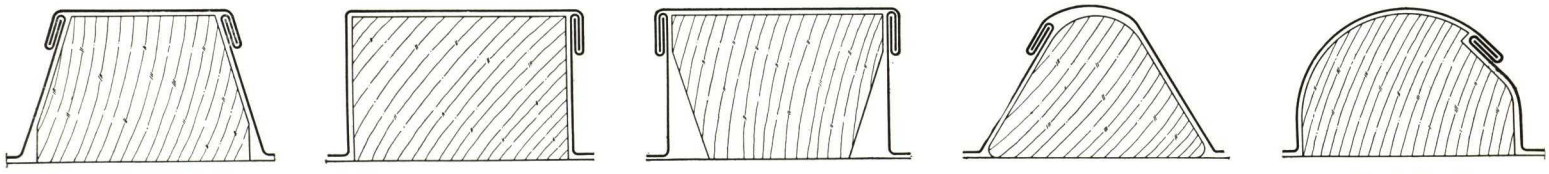
Combination Seams embody the same principle as the standard types described above. They have no wide use in roofing or flashing work but are used generally ornamentally. Single-seam and double seam corner locks are useful when ternes are laid over angles as sharp as 90 degrees. The double seam is more secure and forms a drip edge. It is preferable. See figure 7.



A - SINGLE SEAM

Figure 7

B - DOUBLE SEAM

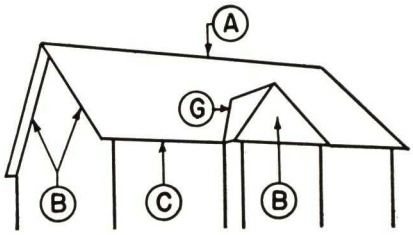


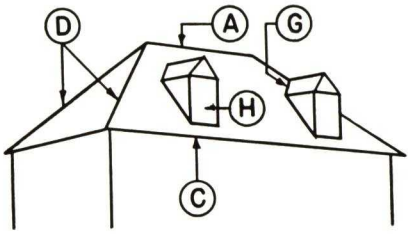
TYPE A TYPE B TYPE C TYPE D TYPE E

Figure 6

Principal Types of Roofs

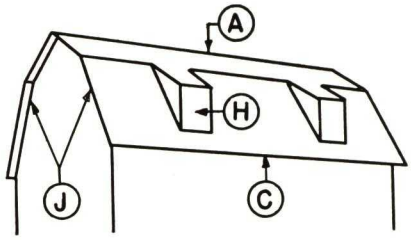
1. The Gable

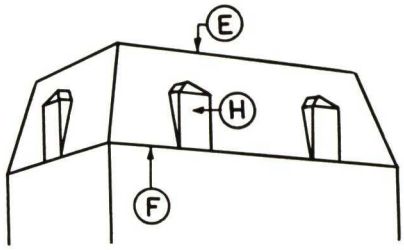




3. The Gambrel

2. The Hip





4. The Mansard

5. The Flat

Roofs may be flat, pitched or made in a combination of slopes. The five classifications above, illustrated in Figure 8, are often called by architects the principal types.

U•S•S Roofing Ternes, because of their many advantages, ductility, permanence, light weight, etc., may be adapted to these five main classifications and to the many variations which a clever architect will conceive.

Directions for Painting U•S•S Ternes. All U•S•S Ternes are prepared for painting. Before application, the ternes should be painted with one coat on the under side. Two coats of paint should later be applied on the exposed surface immediately after laying. These first coats should be composed of 15 pounds of red lead to 1 gallon of raw linseed oil, with not more than ½ pint of oil drier. For the color scheme you select, use subsequent coats of a good paint. A typical paint has the proportions of 15 pounds of white lead to 1 gallon of raw linseed oil with not more than 5% of oil drier and the necessary color to give the desired hue, matching the color scheme you select.

U•S•S Roofing Ternes May Be Applied on Many Surfaces

Wood Sheathing: Well-seasoned wood sheathing forms an excellent laying surface for U•S•S Long and Short Ternes. Sheathing boards should be ship-lap, tongued-and-grooved, or splined. Ship-lap is probably the simplest to lay and offers least trouble from warping and swelling. The ternes, before application, should be painted to the color you specify.

Remember that terne roofs have outlasted houses! Some terne roofs are still good after 100 years.

Concrete as a Base: When steel sheets of any kind are laid on concrete, the latter surface should be made smooth by a wash of neat cement or a heavy coat of acid-free asphalt paint.

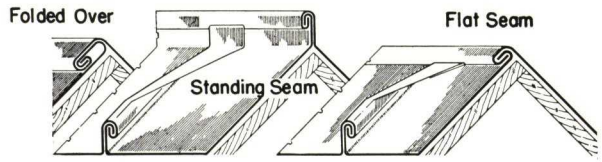
When cinder concrete is used, the protection of a heavy coating of acid-free asphalt paint must be utilized.

Some provision must be made for receiving the nails, whether or not cleats are used. Wood battens or expansion inserts can be set into the concrete. Also, various nailing concretes are manufactured.

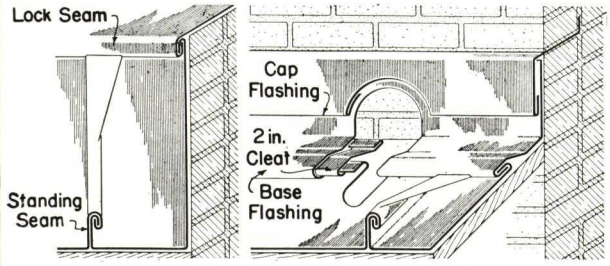
Gypsum as a Base: Gypsum also is well adapted for use as a base for terne roofing. What has been said above about concrete applies, except that gypsum can be nailed into directly.

The proper nails must be specified, since a 2-inch nail penetration into gypsum is required. Specify U•S•S American Nails, made by the American Steel and Wire Company, for greatest stiffness and lasting power. U•S•S Leak Proof Nails with a special spring head are also durable; and the head covers the rail hole.

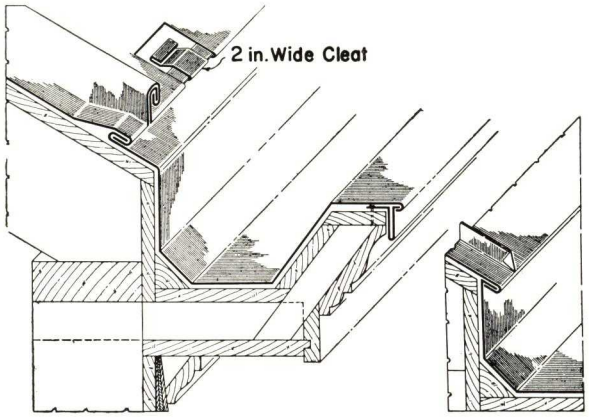
Terra cotta, stone, brick, or stucco may be covered with a flashing of U•S•S Roofing Ternes. Such surfaces should be treated with neat cement or asphalt, as is concrete.



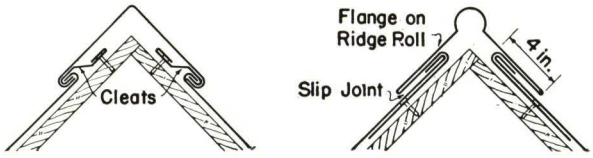
RIDGE DETAILS (1)



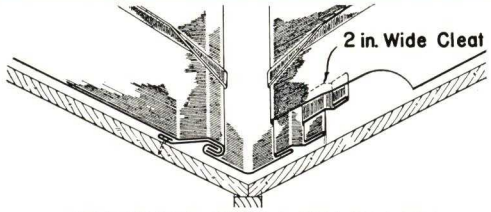
FLASHING AT WALLS (2)



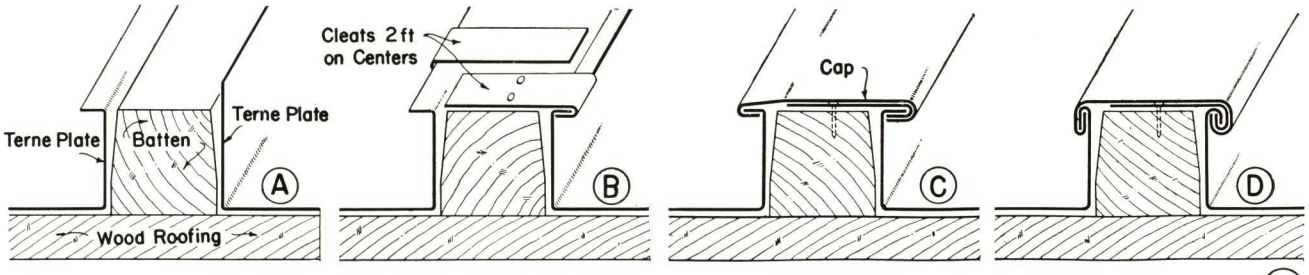
CONNECTING STANDING SEAM ROOFING TO GUTTER LINING (6)



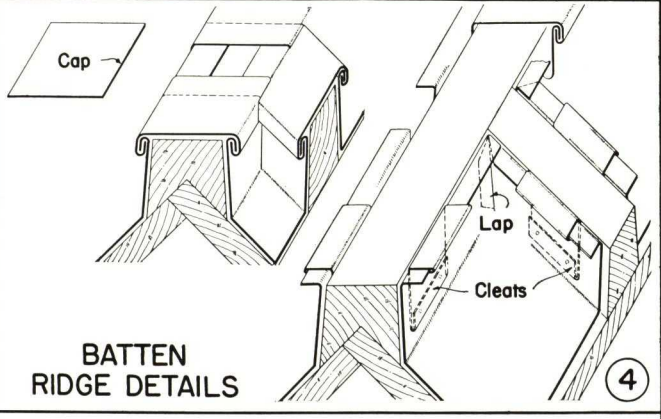
RIDGE DETAILS (3)



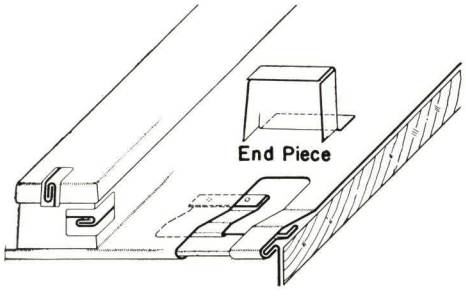
STANDING SEAM AT VALLEY (7)



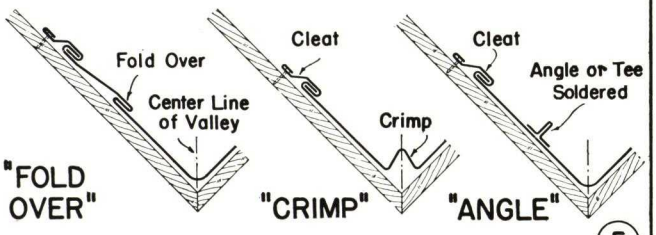
STEPS IN FORMING A BATTEN SEAM (8)



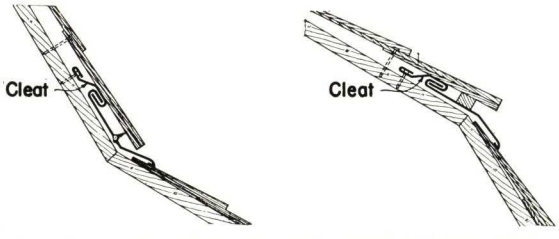
BATTEN RIDGE DETAILS (4)



FINISHING BATTEN END AT GUTTER (9)



VALLEY FLASHING (5)



FLASHING AT CHANGE OF ROOF SLOPE (10)

Where to Specify U·S·S Black and Galvanized Sheets

For industrial buildings such as factories, machinery sheds, mine offices and other industrial structures such as conveyors, tipples, etc., U·S·S Black and Galvanized Sheets have twelve definite advantages. Briefly, these are:

Long Life. When properly painted, U·S·S Copper Steel Black and Galvanized Sheets have lasted 30 or 40 years as a roofing material.

Economy. Steel roofing and siding compare most favorably in price with other building materials.

Ease of Application. U·S·S Formed Roofing and Siding products do not require experienced labor to apply them. For most roofing, only one tool is essential—a hammer. This feature adds to the economy of steel building materials.

Strength and Rigidity. Steel construction provides great strength and rigidity without adding undue weight. The use of corrugated patterns, particularly, imparts additional strength without the need of closely laid sheathing. (See the table of approximate safe loads on this page.)

Fire Protection. Steel roofing and siding are strongly advocated by fire insurance underwriters.

Lightning Protection. A dramatic incident took place in a southern state some time ago. A building roofed and sided with metal was struck thirty times during a protracted thunderstorm without sustaining sufficient damage to require repairs.

Vermin Protection. When you are specifying building materials for rural construction, steel is your best choice. No rat, mouse, field mouse, chipmunk, or termite has ever yet succeeded in getting through a steel roofing or siding sheet.

Neat and Sanitary. Roofing and siding made of U·S·S Sheets have a smooth surface. The wind keeps buildings sheathed with steel clean with the aid of rain water, and carelessly thrown stones cannot break or crack steel sheets. U·S·S Galvanized Sheets are used for cisterns because of their smooth, clean surface.

Adaptability. The various forms of U·S·S Formed Roofing and Siding make it possible to construct practically any type of building, with roof construction from nearly flat to that of the steepest pitch.

Resistance to Weather. Sudden changes of weather or temperature are harmless to U·S·S Steel Roofing and Siding. If properly applied, steel sheets do not suffer from contraction or expansion and do not buckle or rattle. The highest grades of rust-resistant alloys and coatings found in U·S·S Sheets protect them for many years against the ravages of corrosion under atmospheric attack.

Low Upkeep Cost. Steel roofing and siding are the only building coverings which combine reasonable first cost with low upkeep cost over a long period. Painting at reasonable intervals is the only attention ever necessary with U·S·S Sheets. The saving in fire insurance rates alone often more than covers this very nominal expense.

Full Weight Sheets. The products of the Subsidiary Companies of the United States Steel Corporation are strictly standard, complying accurately to the fixed table of gauges on this page.

TABLE OF APPROXIMATE SAFE LOADS FOR CORRUGATED SHEETS — SUPPORTED AT ENDS ONLY

$\frac{W}{4}$ = Safe Load.

$W = \frac{99900\ D\ B\ T.}{L}$

D = Depth of Corrugations in inches.

B = Width of sheet in inches.

T = Thickness of sheet in inches.

L = Supported length of sheet in inches.

W = Breaking weight distributed in pounds.

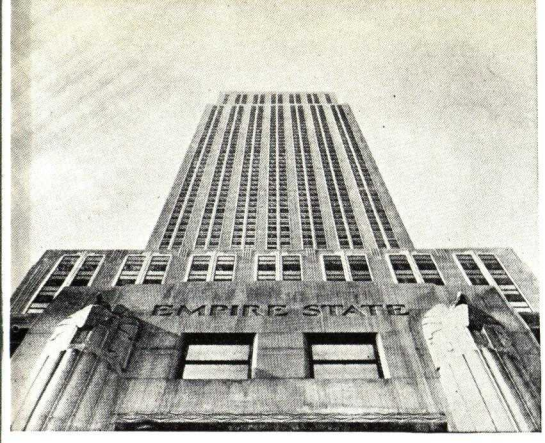
	Gauge	16	18	20	22	24	26	27	28
1¼" Corrugated sheet 26" wide	6'0" Span	211	169	127	106	85	64	58	53
	7'0" Span	181	145	109	91	73	55	50	45
	8'0" Span	158	127	95	79	64	47	44	40
	9'0" Span	141	113	85	70	56	42	39	35
	10'0" Span	127	101	76	64	51	38	34	32
2½" Corrugated sheet 26" wide	6'0" Span	352	282	211	176	141	106	97	88
	7'0" Span	302	242	181	151	121	91	83	75
	8'0" Span	264	211	158	132	106	79	73	66
	9'0" Span	235	188	141	117	94	70	65	59
	10'0" Span	211	169	127	106	85	63	58	53

⅜-in. Depth used for 1¼-in. Corrugated Sheet.
⅝-in. depth used for 2½-in. Corrugated Sheet.

UNITED STATES STANDARD GAUGE
FOR SHEET STEEL

Gauge No.	Weight per Sq. Ft. Ounces	Weight per Sq. Ft. Pounds	Approx. Thickness Steel In.	Gauge No.	Weight per Sq. Ft. Ounces	Weight per Sq. Ft. Pounds	Approx. Thickness Steel In.
3	160	10.000	0.2371	17	36	2.250	0.0538
4	150	9.375	0.2242	13	32	2.000	0.0478
5	140	8.750	0.2092	19	28	1.750	0.0418
6	130	8.125	0.1943	20	24	1.500	0.0359
7	120	7.500	0.1793	21	22	1.375	0.0329
8	110	6.875	0.1644	22	20	1.250	0.0299
9	100	6.250	0.1494	23	18	1.125	0.0269
10	90	5.625	0.1345	24	16	1.000	0.0239
11	80	5.000	0.1196	25	14	.8750	0.0209
12	70	4.375	0.1046	26	12	.7500	0.0179
13	60	3.750	0.0897	27	11	.6875	0.0164
14	50	3.125	0.0749	28	10	.6250	0.0149
15	45	2.812	0.0673	29	9	.5625	0.0135
16	40	2.500	0.0598	30	8	.5000	0.0120

(Below) This mine office is well protected with a durable roof of U·S·S Copper Steel Galvanized Sheets



Why Architects are Specifying U·S·S Copper Steel Galvanized Sheets for Air-Conditioning Work . . . .

Copper steel is an alloy made by adding small amounts of copper to molten steel, thereby increasing the resistance of steel to rust. Metallurgists, railroad construction engineers and independent chemists all say that, according to their tests, a fraction of 1% of copper added to molten steel doubles the life of the steel. The experts agree that their tests proved U•S•S Copper Steel to be an alloy which resists atmospheric corrosion longer than ordinary steel.

In specifying U•S•S Copper Steel Sheets for air-conditioning work, you are taking advantage of steel sheets which have 100% more life for about 5% more in cost, under ordinary atmospheric conditions.

Other advantages which U•S•S Black and Galvanized Sheets offer to the architect who specifies air-conditioning systems include the ease of fabrication and tight adherence of coating of these sheets.

Corrosion Resistance Year After Year in the Central Station

A modern skyscraper usually presents an attractive feature to summer visitors. Many large buildings are now completely air-conditioned. In the basements of these buildings are labyrinths of duct work. It is important that this duct work be constructed of steel sheets which are not only easy for the sheet metal worker to handle but are also made of the most durable materials. You can secure maximum speed of installation, long life and ultimate satisfaction for the owners of the building by specifying U•S•S Copper Steel Galvanized Sheets for your duct work.

For example: The Empire State Building, tallest building in the world, is efficiently air-conditioned. U•S•S Black Sheets and U•S•S Galvanized Sheets were used in the extensive ventilating systems of this building. Shreve, Lamb and Harmon were the architects.

The Chrysler Building, the Irving Trust Company Building and the New Waldorf-Astoria Hotel, New York City; The New Park Plaza Hotel, St. Louis, Missouri; The First National Bank Building, St. Paul, Minnesota, are other modern buildings where U•S•S Sheet Products were specified for air-conditioning of the finest type.

Not only are U•S•S Copper Steel Galvanized Sheets resistant to ordinary atmospheric conditions, but they have certain other special advantages when applied to air-conditioning. The presence of the small amount of copper in the steel base adds known resistance to corrosion from water, industrial gases, and other liquids or vapors that may attack metal.

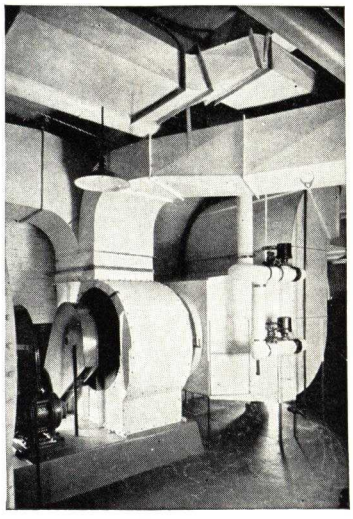
Below is shown a table of the gauges of sheets which are commonly used for ducts of varying diameters. For example, since a duct of large diameter requires a heavy gauge sheet, the table shows that duct work over 50 inches in diameter should be constructed of 18 gauge steel. This is a thickness of about .05".

GAUGES OF STEEL SHEETS USED FOR DUCT CONSTRUCTION

HEATING AND VENTILATING				Planning Mill and Other Exhaust Systems	
Round Ducts		Rectangular Ducts			
Diam., Inches	Gauge	Width, Inches	Gauge	Diam., Inches	Gauge
6 to 19	26	4 to 18	26	Up to 8	24
20 to 29	24	19 to 30	24	9 to 14	22
30 to 39	22	31 to 60	22	15 to 20	20
40 to 49	20	61 to 118	20	21 to 30	18
50 and above	18	118 and above	18		

In the above table rectangular ducts are to have cross breaks for the gauges shown, otherwise two gauges heavier should be used. One inch standing seams should be used on widths up to 48", 1½" seams on widths over 48", and for widths over 60", the seams should in addition be provided with reinforcing bars or angles.

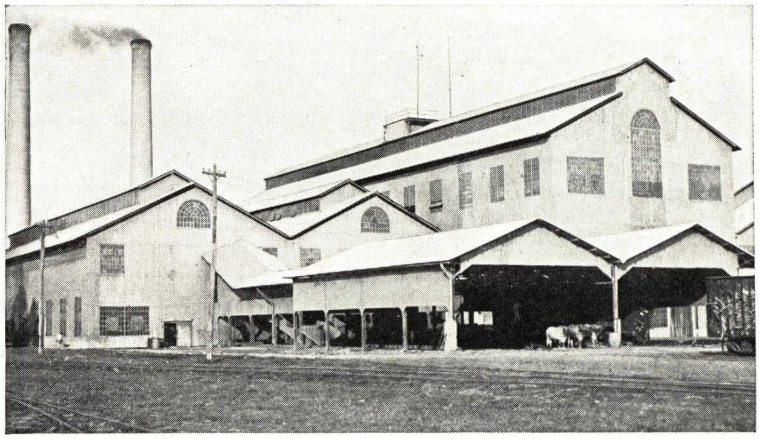
(This material is reprinted from "Fan Engineering," Buffalo Forge Co.)



Duct work demands the extra corrosion resistance of U·S·S Copper Steel Sheets.

Galvanized sheets carrying the U·S·S symbol are uniform and workable.

There is the Traditional U·S·S Quality Built into These Formed Products



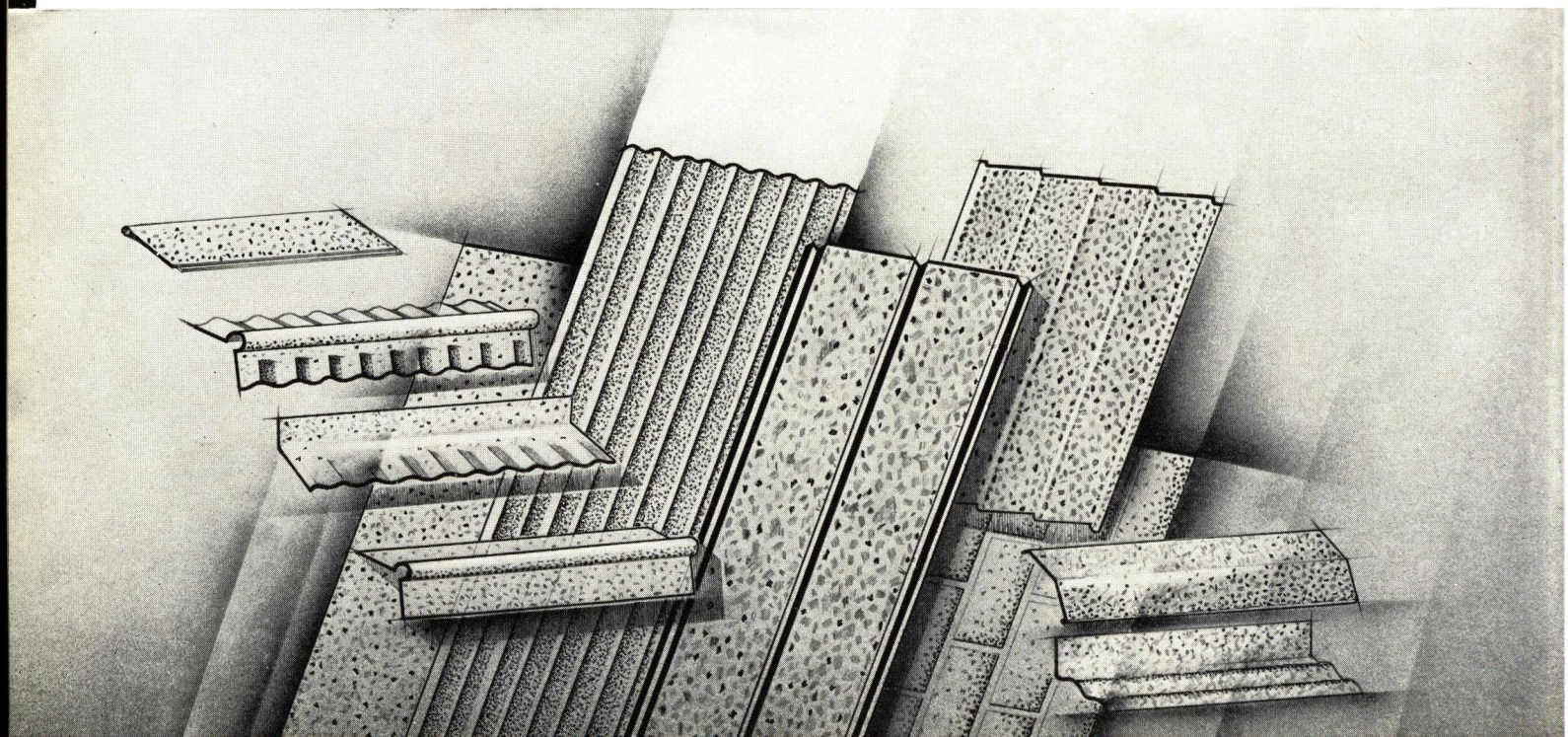
A vast number of U•S•S Formed Roofing and Siding products are available for the architects who want to take advantage of the economy, speed of erection and long life of steel construction.

Shown below are types of V-crimp roofing and an example of U•S•S Corrugated Galvanized Roofing. Corrugated sheets are obtainable in both flat and curved forms, and are thus applicable for side walls of various sizes and shapes. Curved corrugated sheets have been particularly adapted to arches, awnings, dormer and ventilator roofs and similar purposes; and also for culverts, cellars and underground use.

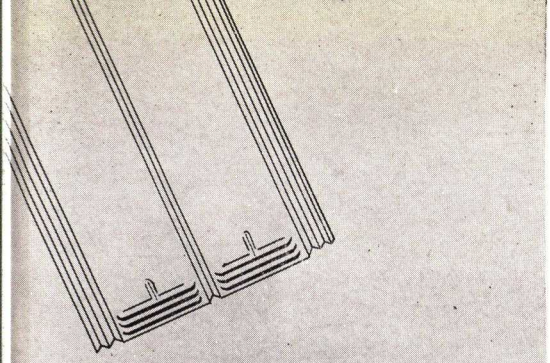
U•S•S Syphon Seal Roofing is the name for two new types of non-syphoning, leakproof galvanized roofings. One is a 1¼ inch, corrugated, non-syphoning design; the other designs are 2 and 3 V-crimp non-syphoning roofings with a special cup-like channel designed to keep buildings dry in the worst kind of weather.

In addition, roll cap roofing, roll and cap roofing, and a number of fittings such as ridge roll, ridge angle, side wall and end wall flashing, and Gambrel joints are available in styles suited to the purse and the artistic sense of the builder.

Steel houses have come into much prominence recently, and some of the steel siding products such as the beaded ceiling or siding, the plain brick siding, the weatherboard siding, the rock face brick siding and the rock face stone siding will be interesting to architects who are keeping abreast of the latest developments of steel construction. For instance, by the use of the rock-face type of siding, a construction which looks very much like stone can be achieved with the advantages of light weight, strength, economy and ease of erection.



Two New U·S·S Roofings



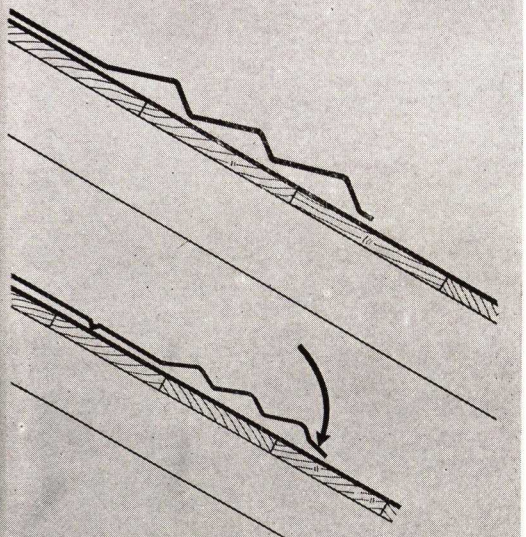
1.

U·S·S TENNESEAL ROOFING—Inexpensive, leakproof, with four special features.

The Triple Cross Crimp on U•S•S Tenneseal Roofing Sheets keeps rain from being blown or drawn under end laps by capillary attraction. Rain cannot pass these three strong dams.

The Pressure Lip is another feature, consisting of a slight depression in the lower end of the sheet, insuring a pressure contact between overlapping sheets at the end laps. It prevents leaks when the sheet is nailed in place on the roof decking.

The V-Drain is a new design of drain which prevents leaks at the side laps. If rain is blown or drawn under the lap by capillary attraction, it is caught in the V-Drain and flows quickly off the roof at the eaves.



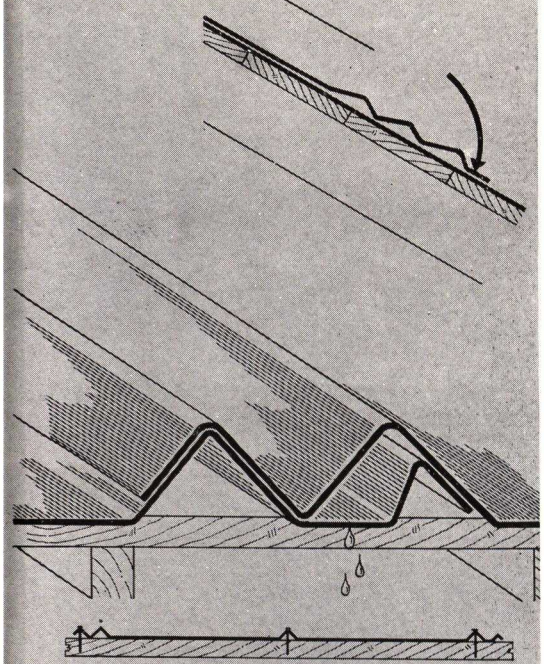
2.

The Tension Curve is another important feature of U•S•S Tenneseal Roofing. After nailing, each sheet fits snugly and closely to the roof decking.

U·S·S STORMSEAL ROOFING—Self-draining, positively stops leaks under severe conditions.

U•S•S Storm Seal Roofing is another design which may appeal to the property owner. Instead of the two V-crimps at each side of the sheet, there is a single fitting into which a nail may easily be driven. The flat top of the V makes this nailing easy.

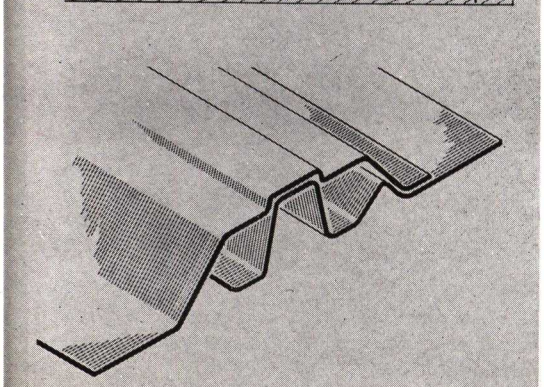
In addition to the features of the Triple Cross Crimp, the Pressure Lip and the Tension Curve, which are included in U•S•S Tenneseal Roofing, U•S•S StormSeal has a Twin-Drain feature. Notice the two channels at either side of the central V. These channels act as gutters and serve as drains for any water which may syphon in by capillary attraction.



How to Lay These New Roofings

In applying U•S•S Tenneseal Galvanized Sheet Steel Roofing and U•S•S Storm-Seal Galvanized Sheet Steel Roofing, the sheets are not laid in rows from left to right or right to left across the roof. Instead, they should be laid in rows from eave to ridge. The first sheet should be applied at the lower left gable end, with the Triple Cross Crimp at the bottom. Then lay the second sheet above the first. The third sheet is then laid above the second, etc., until the first vertical row is finished. After the first row from eave to ridge is completed, each additional row is applied in the same way. An end lap of 6" is ample.

3.



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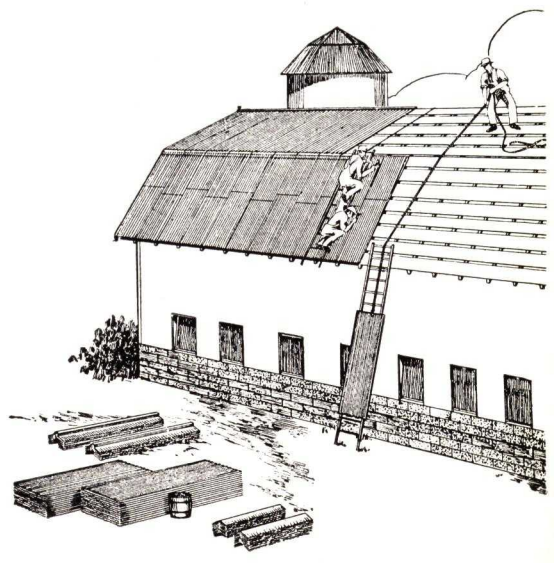

5.

CAPTIONS TO DRAWINGS

1. The Triple Cross Crimp
2. The Pressure Lip
3. The V-Drain (U·S·S Tenneseal)
4. The Tension Curve
5. A Neat, Leakproof Lap—U·S·S Stormseal

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ST. LOUIS, MO., 955 Telephone Bldg.
SAN FRANCISCO, CALIF., 562 Russ Bldg.
SEATTLE, WASH., 317 Pioneer Bldg.

Products

REVERE SHEET, STRIP and ROLL COPPER and REVERE LEADTEX (Lead-Coated Copper) for roofing, flashing, conductor pipes and ornamental work.

For Cheney Flashing, Revere Thru-Wall Flashing, Revere Brass Pipe, Revere Copper Water Tube and Architectural Metals in Sheets, Extruded and Drawn Shapes and Tubes, Revecon System and Herculoy, see File Index.

REVERE SHEET COPPER

Revere Sheet Copper, with over a century of reputation for quality, is made by Revere Copper and Brass Incorporated, and marketed under the Revere Red, White and Blue Label.

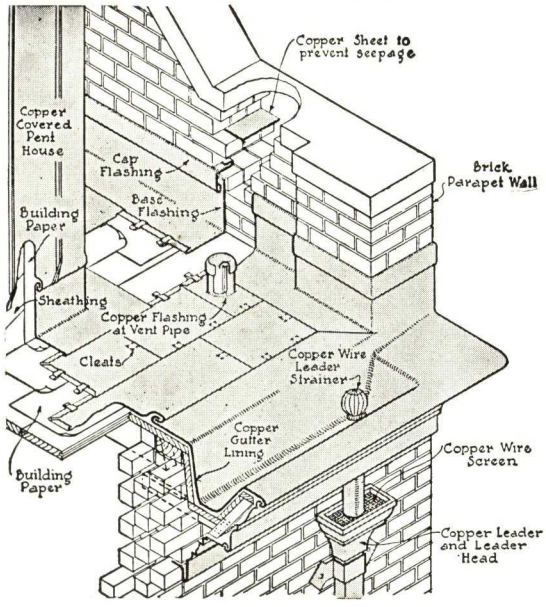
Revere makes every type of sheet copper in use today, including plain copper, in soft and hard tempers, lead-coated copper, nickel and chromium plated copper, and tinned copper.

Sheet Copper for Roofing

Revere Sheet Copper is the ideal roofing material. Because it cannot rust, and because of the absolute protection it affords under all types of weather conditions, it is also an economical material.

It does not require painting or protective treatment; the first cost is the only cost involved. For these reasons, the ideal roof is one in which copper is used throughout.

However, where the preference of the home owner or style of architecture dictates roofs of other materials—such as slate, shingles, or composition shingles, clay or cement tile—Revere Sheet Copper also plays an important part.



Flashings, valleys, ridges, cornices, gutters, eaves troughs and conductor pipes should be constructed of Revere Sheet Copper to insure maximum protection against weather.

Soft Copper (Roofing Temper)

Soft or (Roofing Temper) Copper should be used for roofing purposes and all flashings regardless of type. This type of copper is particularly suitable for these uses inasmuch as it is easily worked and shaped and stands up well under temperature stresses. There is no place in flashing—or counter flashing—where soft sheets will not serve better than hard copper. The latter does not lend itself so readily to shaping on the job.

Hard Copper (Cornice Temper)

The material of all shaped gutters, eaves troughs, drips, waterbars, leaders, cornices, etc., should be hard (cornice temper) copper. Its stiffness is necessary to maintain the shape, especially against ice and snow loads. As most shapes are of mill manufacture, the process is such that the chance of fracture at the bends is minimized. All manufacturers of gutters, leaders, etc., make them of hard (cornice temper) copper because experiment and experience have proved the practicability of this.

Parallel Edge Strip Copper

Revere Parallel Edge Strip Copper is recommended particularly for conductor pipes of all kinds including gutters, leaders, etc. This product, free from waves and wrinkles and correctly tempered, with edges parallel, is furnished in lengths of 10 feet and in widths over 6 to 19½ inches inclusive, which makes for economy in forming. Each strip of the 16 ounce material is stamped "Revere—Standard 16 oz."

Decorative Copper Work

Practically any design in relief can be executed in copper. For examples of its use, see the illustrations of ornamental lead-coated copper on the following pages on Leadtex.

Gutter Linings and Cornice Ornaments

Gutter linings and cornice ornaments are exceptions to the above rule concerning the use of soft and hard temper copper. They should be made of soft (roofing temper) copper.

Gutter linings in any length are peculiarly subject to temperature stresses. The continual warping to which the sheets are subjected is likely to cause failure by fatigue at the bends when hard copper is used. Soft copper overcomes this cause of failure.

For ornaments that are stamped from dies, soft copper is superior to hard copper, for the former works more easily and is less liable to fracture.

Specifications

Copper for flashing and roofing shall be Revere standard 16 oz. (20 oz. or other weights) soft (roofing temper) copper and shall be rolled from cakes complying with the A. S. T. M. requirements for Electrolytic copper.

Copper for cornice work, gutters, eaves troughs, downspouts (leaders), shall be Revere Standard 16 oz. (20 oz. or other weights) Hard (Cornice Temper) copper.

Sources of Supply

Revere Sheet Copper is readily and quickly obtained through authorized distributors in all parts of the country.

Literature

We will be pleased to mail you a copy of "Sheet Copper," a handbook, prepared especially for architects and roofing contractors, covering the application of this product in the construction of buildings.

Samples

Samples of sheet copper in any of the following finishes will be gladly sent to architects upon request—plain soft or hard, nickel plated one side, chromium plated, tinned one side, Leadtex (lead-coated copper).

REVERE LEADTEX

(Lead-Coated Copper)

In Which Are Combined the Workability, Light Weight, Permanence and Economy of Sheet Copper with the Mellow Color, Decorative Range and Protecting Finish of Lead

Leadtex and Its Place in Architecture

For hundreds of years lead has been used successfully for architectural purposes, due to its easy workability and high resistance to weathering. Freshly worked or cut lead has a lustrous metallic cast which turns into a soft gray tone when exposed to the atmosphere, harmonizing with practically all materials of construction.

The value of lead in regard to protection and appearance does not depend on its thickness. However, lead possesses very little strength, and in employing it for a building material it is necessary as a rule to use relatively thick lead sheet to give sufficient rigidity to the construction.

Since lead has a high density, the possibility of obtaining a lighter construction material possessing the advantages of lead is welcomed by the building trade. Revere's "Leadtex" combines the attractive and protective finish of lead with the strength and wearing qualities of copper.

"Leadtex" is produced by applying a relatively thin coating of lead to one or both sides of sheet copper and it is manufactured in various grades and types to fulfill particular requirements.

The Special Advantages of Leadtex

The advantages of Leadtex may be summarized as follows:

The Finish—Is similar to lead as far as weathering and lasting qualities are concerned.

Stiffness—On account of the additional strength and stiffness given by the copper, Leadtex can be used in the same manner and for the same purposes that copper has always been used.

Because of its lightness as compared to sheet lead, the construction weight of roofs, domes, spandrels, ornamental motifs and the like, may be greatly reduced.

This is an important consideration in modern building construction. The use of Leadtex for spandrels is very well illustrated in the photographs of spandrel panels on this and following page.

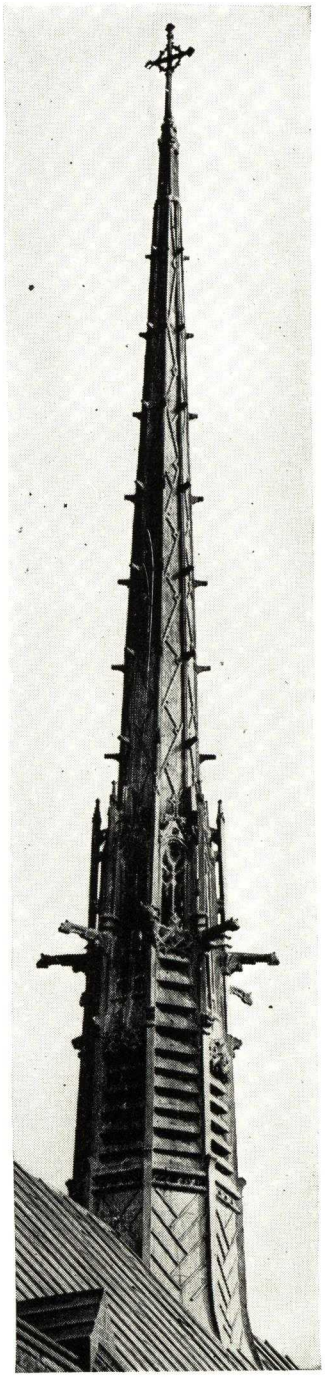
Non-staining—The lead coating prevents the staining of other adjacent building materials through the action of the elements, which on exposed copper sometimes causes a green stain. This is likely to occur particularly when the material is in the proximity of salt water or where it is exposed to the action of sulphur fumes from smoke. Under such conditions it is recommended that Leadtex be used as flashing, if in contact with stone, marble, stucco, or cement work.

Relief and Ornament—The depth of relief as well as delicacy of detail possible with Leadtex is readily appreciated in the accompanying illustrations. Leadtex can be formed or stamped in the same manner as copper without breaking the lead coating. The lead coating acts as a lubricant with the result that stamping is even more easily accomplished with Leadtex than with plain copper sheets.

Where, because of design, it is essential to anneal the sheet between stamping operations, uncoated copper should be used and the lead coating applied following completion of the stamping.

Cost—Of real importance to the architect is the fact that Leadtex costs but little more than plain sheet copper.

Leadtex Spandrel, Hunter-Dulin Building, San Francisco, California
SHULTZE & WEAVER, Architects, New York
Stampings and Installation by
FORDERER CORNICE WORKS,
San Francisco, Cal.



Ornamental Fleche and Batten Seam Roof of Leadtex Metropolitan M.E. Church, Washington, D. C.
SUNDT & WENNER, Architects
STOFFLET and TILLOTSON,
General Building Contractor
CHEW-BITTEL COMPANY,
Sheet Metal Contractor
All of Philadelphia, Pa.

Leadtex Spandrel, Hunter-Dulin Building, San Francisco, California
SHULTZE & WEAVER, Architects, New York
Stampings and Installation by
FORDERER CORNICE WORKS,
San Francisco. Cal.

Suggested Uses of Leadtex

Leadtex can be used in practically any type of building regardless of architectural style. It insures permanence and quality of construction for:

Roofing
Flashings
Gutters
Leaders
Leader heads
Cornices
Spandrels
Store fronts
Balustrades
Dormers
Ornamental motifs
Domes
Turrets
Skylights
Crestings
Marquises
Revecon System
Panels
Curved surfaces

Color of Leadtex

The natural color of Leadtex is a soft, neutral tone which harmonizes well with almost any material and color scheme. It ages beautifully, weathering to a dark antique gray. Where it is desired to have the dark tone from the first, it may be produced by chemical treatment.

Leadtex Leaders and Leader Heads, St. Pascal's Church, Chicago

B. J. Hotton, Architect; Raymond Gregori, Associate Architect; Sheet Metal Work by Wagner Bros. Cornice Co.; Stampings by Friedley-Voshardt Co., all of Chicago, Ill.

Ornamental Frieze of Revere Leadtex, Pellissier Building, Los Angeles, California

Morgan, Walls and Clements, Architect; William Simpson Company, General Contractor; National Cornice Works, Sheet Metal Contractor; Los Angeles Cornice and Stamping Works, Stamping, all of Los Angeles, Cal.

WEIGHTS, FINISHES AND TEXTURES OF LEADTEX

New Types of Leadtex

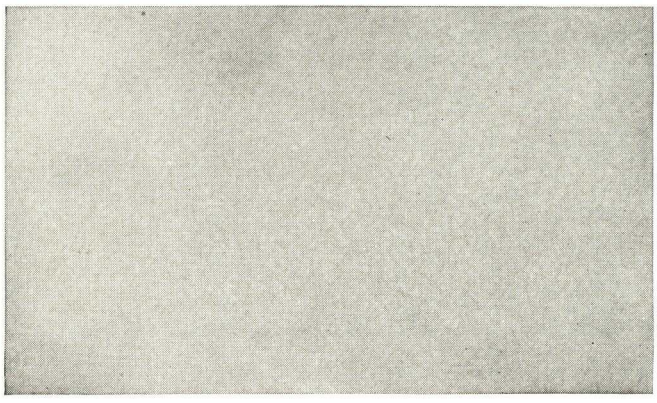
Revere, which has been a pioneer in the production of lead-coated copper now offers for sale two new types known as Leadtex "15" and Leadtex "25" which are decided improvements in quality over all previous types of lead-coated copper regardless of manufacture.

The quality of lead-coated copper depends almost exclusively upon the uniformity of the lead coating and the bonding of the lead to the copper.

In Revere's new Leadtex, the lead is applied uniformly to the copper sheet and a perfect bond is obtained. Extensive laboratory tests and accelerated corrosion tests indicate the marked superiority of Leadtex "15" and Leadtex "25" for both architectural and industrial uses.

Leadtex "15"

Leadtex "25"



Leadtex AAA (uniformly smooth finish)

Description of Leadtex Finishes

Leadtex "15"—This has quite a smooth surface yet there is sufficient texture to make it architecturally attractive. It can also be painted perfectly without special cleaning or priming coats which cuts painting costs. It replaces the former Leadtex Standard. For weights of coating see table below.

Leadtex "25"—This has a rougher surface than the Leadtex "15" but the finish is unusually smooth and uniform considering the thickness of the coating. It replaces Leadtex Heavy and Leadtex Extra Heavy. Weights of coating are shown in table below.

Leadtex AAA—In addition to Leadtex "15" and "25" Revere offers Leadtex AAA which is coated with pure lead and has a perfectly smooth finish. Leadtex AAA is recommended for industrial applications, such as the building of flues, ventilating ducts, hoods, etc. Table below gives weights of coatings.

Weights of Coatings

APPROXIMATE WEIGHT OF COATING
POUNDS PER 100 SQ. FT.

Name	Both sides	Per side	Finish
Leadtex "15" Leadtex "25"	15 lbs. 25 lbs.	7½ 12½	Smooth Textured
Leadtex AAA (Electro-Deposited)	Any of above weights of coating		Smooth

Leadtex "15" and "25" are coated both sides only.

Leadtex AAA is coated one side only unless otherwise specified.

Copper Base—Made in 16, 18, 20 oz., soft or hard temper.

Suggested Weights of Leadtex to Specify

Specify Leadtex in the same weights and temper ordinarily used for copper, denoting the weight of lead coating according to the table above.

All.....shall be 16 oz. (or other weights) hard (or soft) copper base, Revere Leadtex "15" or "25" or AAA.

Method of Application

In general, the method of applying Leadtex for roofing and other sheet metal work is the same as for plain sheet copper. However, certain precautions should be taken in connection with handling and soldering.

Handling and Soldering

In actual use lead-coated copper sheets should be handled with care. Lead being a soft material scratches and cuts easily and careful handling is necessary to prevent deep scratches or cuts that might possibly become the focal points of corrosive attacks.

Particular care must also be exercised in soldering. Neutral fluxes of the zinc chloride types are recommended. Either liquid or paste fluxes may be used. As

a general rule, the paste flux is preferable, because it may be carefully applied with a brush and the tendency to swab on excessive amounts, which is always present when liquid fluxes are employed, is eliminated.

In the actual soldering operation, it is essential that the solder seams are well covered with the coating metal or with solder. A non-acid solder should be used.

Leadtex Spandrels

Spandrels vary in size and method of construction, as well as in the gauge of Leadtex used, depending on the nature of the work in hand. There is also a wide latitude in practice as to method of framing and connecting unit parts, as well as anchoring or securing them in place. Because of the variety of design of spandrels, etc., specifications will depend on the conditions of each installation.

Leadtex with Revecon System

Leadtex is suited for the Revecon System of construction, either where formed-edge panels or flat sheets are used.

Leadtex Readily Obtainable by the Sheet Metal Trade

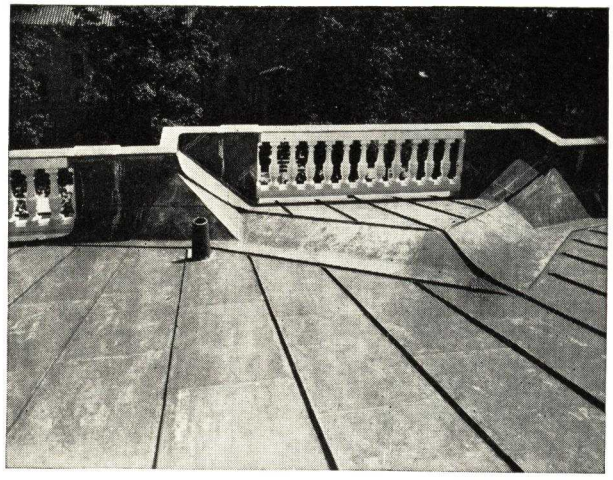
Leadtex is distributed throughout the country and is readily and quickly obtained by the sheet metal trade through authorized distributors of Revere products.

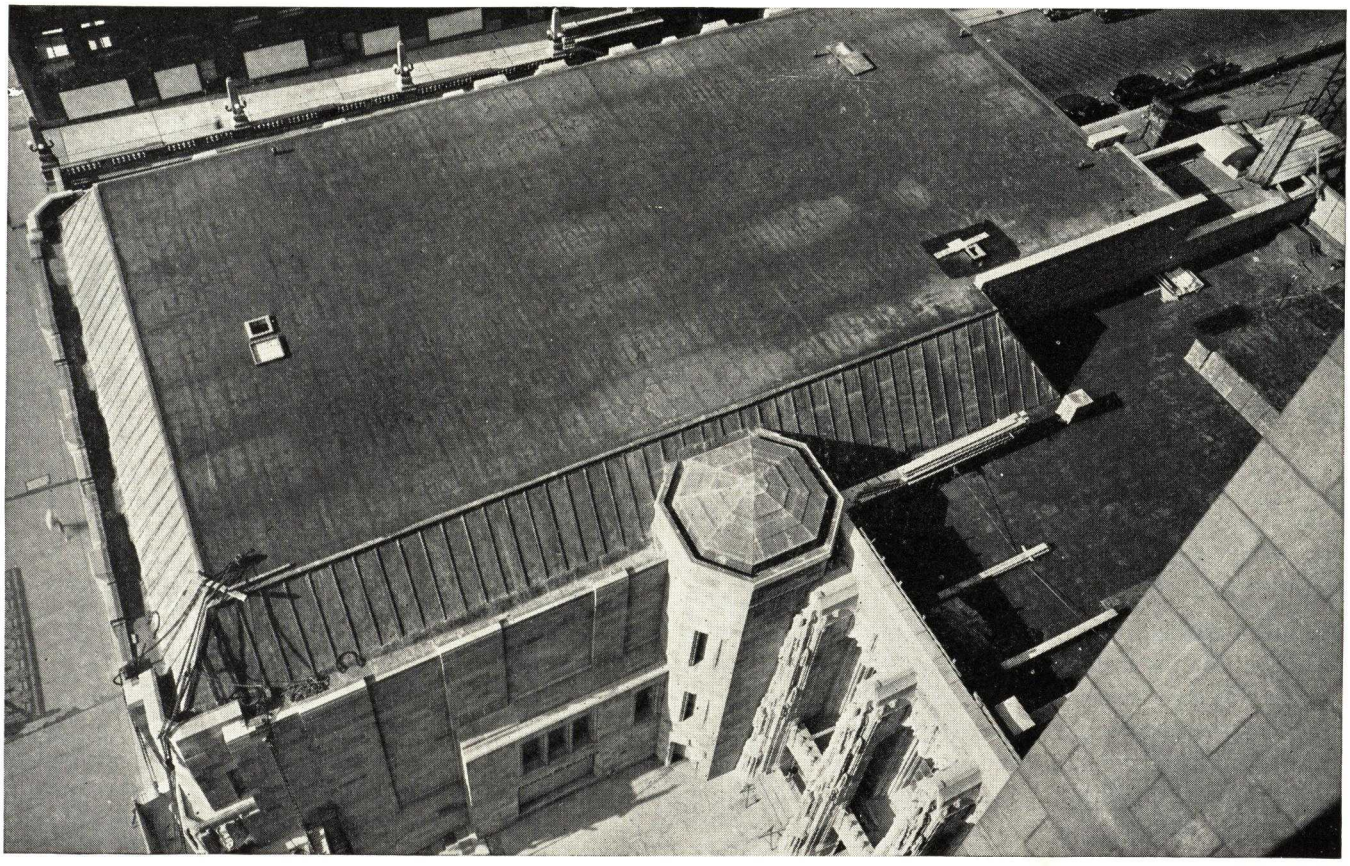
Samples and Architectural Service

Samples of Leadtex in its various finishes will be sent gladly to any architect.

We will also assist architects with all problems they may have regarding special details or applications of Leadtex. Our nearest office will answer any communications concerning this or other Revere products.

An Interesting Roof Detail of Lead Coated Copper. Standing Seam Construction Throughout.





WGN Broadcasting Studio, Chicago, Ill.

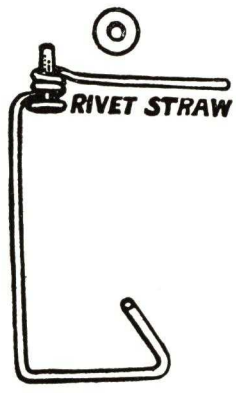
16 oz. Leadtex was used for mansard roof, gutters and turret. John M. Howells, Hood & Fouilhoux, New York City, Architect; L. J. Weissenborn, Chicago, Associate Architect; R. C. Weiboldt Company, Chicago, General Contractor; L. H. Sohn Company, Chicago, Sheet Metal Contractor.

ACE METAL PRODUCTS COMPANY

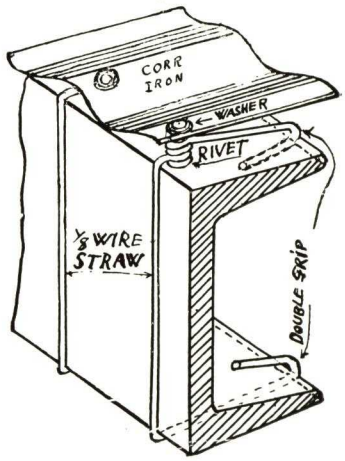
Manufacturers of Widman Double-Grip Corrugated Iron Fasteners

5702 South Broadway

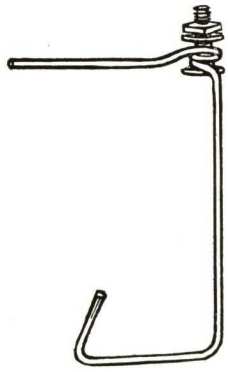
LOS ANGELES, CALIF.



Widman Double-grip Fastener
Rivet Type



Widman Double-grip Corrugated Iron
Fastener Attached to Iron and
Channel Bar



Widman Double-grip
Fastener, Bolt Type

IMPROVED FEATURES OF WIDMAN DOUBLE-GRIP FASTENER

The Widman double-grip fastener is a 100 per cent improvement over the old straw nail or strap, which required an underslung scaffold when applying corrugated iron for roofing purposes, and side scaffold on both sides when applying corrugated iron sidings.

With the Widman double-grip fasteners fastened around the channel or angles from above before the sheets are laid, the sheets are then held over the rivets and given a light blow with a rubber hammer or with the Ace 2-in-1 hammer. The rivet or bolt will then punch its own hole upward through the sheet; the rivet, being slightly tapered, turns the metal upward around the rivet or bolt. At this point, a washer is placed over the rivet or bolt and the rivet head set with a hammer or, in the case of the nut, tightened down with a wrench.

The Widman double-grip fastener when so used makes a watertight job, because the wire twisted around the rivet or bolt forms a shoulder for the sheet to lay against, preventing the sheeting from sagging or spreading as a result of walking over the roof during construction.

Note on illustration how the Widman double-grip fastener grips both legs of channel or angles, making an exceptionally strong job, thoroughly resistant to regular and unusual wind stresses.

ADVANTAGES

No underslung scaffolding is required during erection when Widman double-grip corrugated iron fasteners are specified and used.

Widman double-grip corrugated iron fasteners provide a shoulder for the iron to rest against and whether the rivet or bolt type fastener is used it will hold the sheet tightly together, providing a watertight and exceptionally rigid and strong structure, standing greater strains than corrugated iron buildings fastened with the old type straw nail or strap.

SOME PROMINENT USERS

The Austin Company of California
U. S. Gypsum Company, Southgate Plant
Federated Metal Corporation, Los Angeles, Calif.
United Concrete Pipe Company, Monrovia, Calif.
Bethlehem Steel Company, Los Angeles, Calif.
Atlas Scraper and Engineering, Los Angeles, Calif.
Consolidated Steel Corporation, Los Angeles, Calif.
E. S. McKittrick Company, Huntington Park, Calif.

It is generally acknowledged by users of Widman double-grip corrugated iron fasteners that they render extremely satisfactory service because they provide a stronger and better structure with large savings in the cost of labor, and because of the ease and economy with which erection is accomplished.

CHASE BRASS & COPPER CO.

—INCORPORATED—

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

WATERBURY, CONN.

CHASE WAREHOUSES

NEW YORK, N. Y.
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ST. LOUIS, MO.
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HOUSTON, TEX.
LOS ANGELES, CAL.
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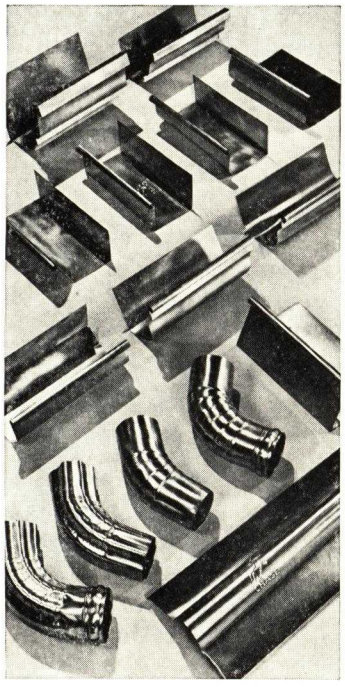
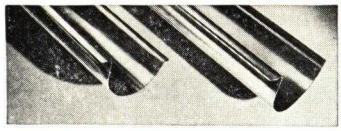
SEATTLE, WASH.

For Other Chase Pages, see File Index

CHASE COPPER ROOFING MATERIALS





CHASE

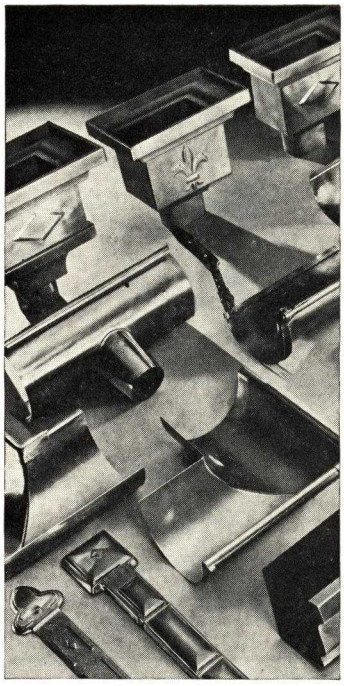
Thickness of Copper for Exposed Work

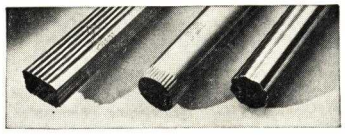
For exposed sheet metal work, 16 oz. to the square foot is the lightest weight copper that will give satisfactory service. Based on this premise which has been carefully checked by eminent authorities over long periods of time and under varying conditions of actual service, Chase Copper Roofing Accessories are made of full 16-oz. copper sheet. Heavier weights can be furnished to special order but we do not advocate nor make anything *lighter* than 16 oz.

As our guarantee of full weight and also to make it easy for architects to check the materials of a completed installation, we indelibly die-stamp every length of our downspouts and gutters, "Chase 16 Oz. Copper."

Stock Downspouts

There are three types and five sizes of Chase Copper Downspouts available for immediate shipment from our warehouse stocks: plain round, corrugated round and corrugated square. All of these types, except corrugated square which runs only to 5 in., are carried in 2, 3, 4, 5 and 6-in. diameters, in 10-ft. exact lengths.





Stock Gutters

(1) Single bead, lap joint, half-round gutters in 16 oz., 10-ft. lengths, and in 4, 5, and 6-in. diameters.

(2) Type K box gutter in 10 and 12-in. girth.

Double bead and slip joint types, also "OG" and other special patterns can be furnished promptly to order.

Chase Copper Accessories

Copper elbows, shoes, gutter miters, end caps, wire strainers, downspout straps, gutter hangers, ridge roll, flashings, snow guards, nails, etc., are also carried in our warehouse stocks ready for immediate shipment.

Lead Coated Sheets and Accessories

All Chase Copper Roofing Materials and Sheet Copper can be furnished lead coated. This is particularly desirable when a neutral gray coloring is required.

Stock Downspout Heads

Where strict economy must be practiced, any of the following stock patterns of Chase Copper Downspout Heads are acceptable for the average building. Quantity production permits very reasonable prices on these stock patterns, all of which are available for immediate shipment from our warehouse stocks.

All of the heads listed below are available with either round or square outlets. Any of these stock patterns can also be supplied lead coated within a few days.

Order No.	Pattern	Dimensions, in.			
		Outlet	Face	Depth	Height
1A	Large diamond	2x3	10	6	9
1B	Large diamond	3x4	11	6½	9
2A	Small diamond	2x3	9	5½	7½
2B	Small diamond	3x4	10	6	7½
3A	Fleur-de-lis	2x3	9	5½	7½
3B	Fleur-de-lis	3x4	10	6	7½

BERGER BROTHERS COMPANY

Gutter Hangers and Conductor Pipe Fasteners

229-237 Arch Street, PHILADELPHIA, PA.

Products

GUTTER HANGERS and CONDUCTOR PIPE FASTENERS, of malleable iron, wrought iron, cast "tuf-bronze" and copper channel.

Also a general line of Sheet Metal Workers' Requirements; Quaker City Conductor Pipe and Quaker City Eaves Trough; "Quaker City" lines of Mitres, Ends, Caps and Outlets.

Manufacturers of Octagon and Polygon Conductor Pipe; "Rival" Eaves Trough Strap Hanger.

The Mark of Quality Which Protects the Purchaser

We are the originators, designers and manufacturers of, we believe, the best grade of gutter hangers and conductor pipe fasteners on the market.

TRADE -B B- MARK

Our registered trade-mark appears on all products manufactured by us. This mark represents dependability, durability and strength and protects the purchaser against inferior imitations.

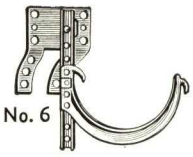
When specifying, full protection is assured by insisting that our trade-mark appear on every piece.

How Furnished—Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), cast "tuf-bronze" and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks.

Free samples on request.

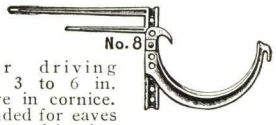
B. B. Gutter Hangers

Clamped direct to metal roof, requiring only one bolt through the iron. Especially suitable for awnings and corrugated roofs

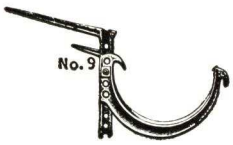


For nailing against O. G. mouldings. The two stays are made to fit in the cove and can be bent to suit variation

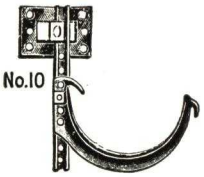
For driving from 3 to 4 in. square in cornice. Lower prong forms a brace for the upper and makes it strong and firm



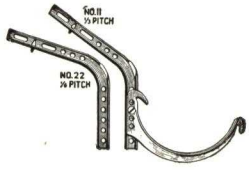
For driving from 3 to 6 in. square in cornice. Intended for eaves where shingles project over the cornice



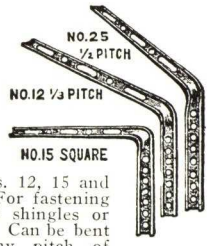
For driving with pitch of roof. Suitable for narrow moulded cornice



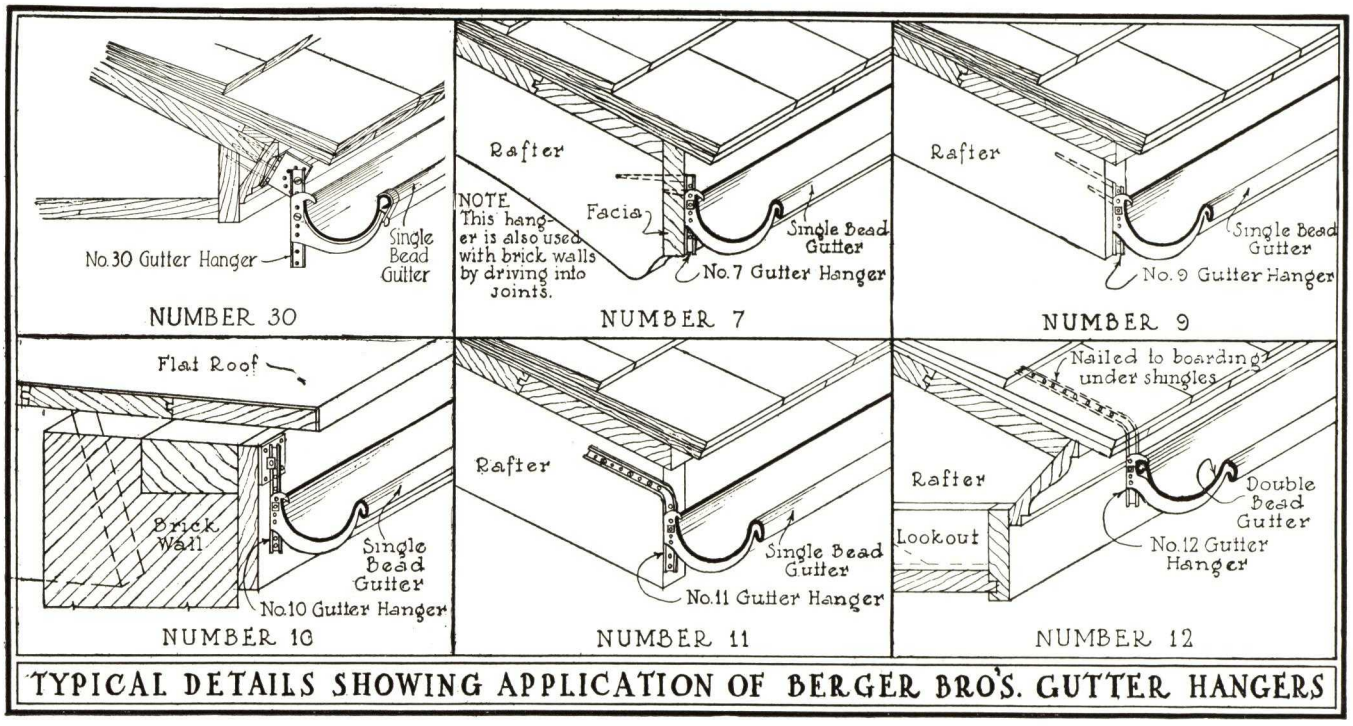
For nailing against square box cornice



For nailing against side rafters



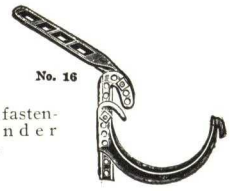
Nos. 12, 15 and 25. For fastening under shingles or slate. Can be bent to any pitch of roof without weakening or breaking



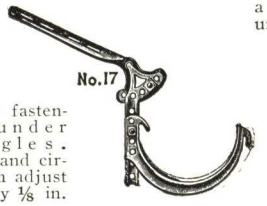
TYPICAL DETAILS SHOWING APPLICATION OF BERGER BRO'S. GUTTER HANGERS

B. B. Gutter Hangers

Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), solid cast bronze and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks. Free samples on request.



For fastening under shingles.

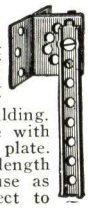


For fastening under shingles. Hinge and circle both adjust to every ⅛ in.

For nailing or screwing to shaped mouldings at any angle desired. Hinged for any pitch of roof

Right:

No. 30 Utility Shank



Twelve different and distinct adjustments. Takes the place of Nos. 1, 5, 6 and 20 shanks and in many instances No. 10. For use with all types of O. G. moulding. Roof overhang does not interfere with nailing due to proper angle of plate. Circle adjustment permitted full length of shank stem. Invaluable for use as a brace where shanks are subject to unusual strain

Gem Gutter Circle

For single bead gutters. Sizes, 3½, 3¾, 4, 4½, 5, 6, 7 and 8 in.

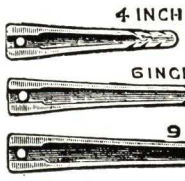
Penn Gutter Circle

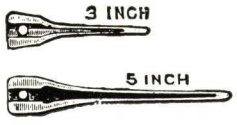
For double bead gutters. Sizes, 3½, 4, 4½, 5, 6, 7 and 8 in.

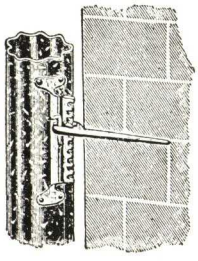
Circles are applicable to any B. B. hanger

Clasp Pipe Hooks

For fastening conductor pipe to wood, brick or stone any distance from wall. Length drives: 3 and 5 in. for wood; 4, 6 and 9 in. for brick and stone.







B. B. Conductor Pipe Fasteners

For fastening all kinds of conductor pipes any distance from wall. Used in any position and allow enough variation to let pipe slip together until tight in the joints. Needs no close measuring on wall to find a joint for the drive.

Plain Sickle Pipe Hooks

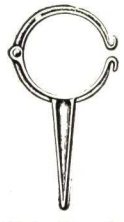
With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.

Corrugated Sickle Pipe Hooks

With wood and brick drive. Sizes, 2, 3 and 4 in.

Round Corrugated Hinged Pipe Hook

With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.



Plain Round Hinged Pipe Hook

With brick drive in 2, 3, and 4 in., and wood drive in 2, 3 and 4-in. sizes.

Left:

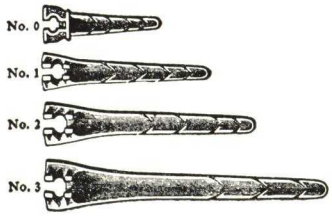
Square Wired Pipe Hook

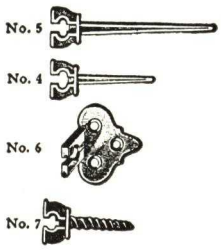
With wood and brick drive. Sizes, 3, 4, 5 and 6 in.

Right:

Round Wired Pipe Hook

With wood drive. Sizes, 3 and 4 in.



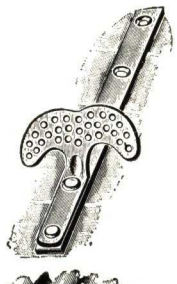


No. 0, for brick, 3 in.
No. 1, for brick or stone, 4½ in.
No. 2, for stone, 6 in.
No. 3, for stone, 9 in.

No. 4, for wood, 3 in.
No. 5, for wood, 5 in.
No. 6, to nail on wood
No. 7, to screw in wood

Standing-Seam Roof Snow Irons

Designed to dispense with snow rails or gutters formed on the roof to prevent snow sliding. Clamp fast to roof by clinching lugs through the standing seam. Made of the best malleable iron.

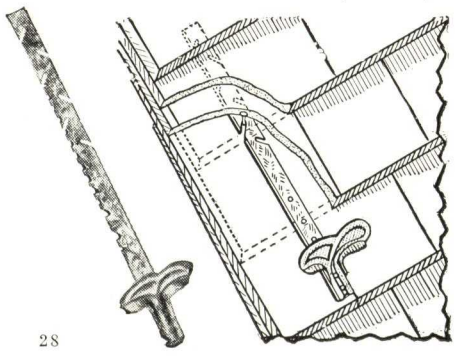


Slate Roof Snow Iron

No. 2 is riveted on ⅛ x 1 in. iron plates, 12 in. long, to go 8 in. under the slate. It is very ornamental on a roof and must be seen to be fully appreciated.

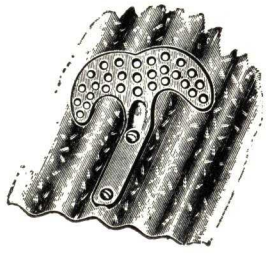
No. 100 Snow Guard

(Patented)



Designed especially for old roofs, No. 100 has eliminated necessity of removing slate, with possibility of breakage, in order to apply it. Insert slotted plate under slate or shingle; engage a nail with the convenient, scientifically placed slots and draw downward to secure full benefit of the slot. At base of guard there are two sharp points which tend to keep guard in alignment. Five to ten of these guards can be installed in the time it takes to install one of the old style.

Made of heavy stamped steel, hot galvanized after forming, and stamped copper, its deep flanges and embossments give it maximum strength.



Corrugated Roof Snow Irons

No. 20 iron for corrugated roofing fits either 1¼ or 2½ in. corrugation. It is applied either by riveting to roof or by nailing through the roof to sheathing. It fits on top of the corrugation, as illustrated, and will not leak.

LEDKOTE PRODUCTS COMPANY

Manufacturers of Cast-Lead and Lead-Coated Sheet Copper Products

INCLUDING ALL LEAD WORK FORMERLY MADE BY HENRY HOPE & SONS, INC.

35-01 Vernon Boulevard
LONG ISLAND CITY, NEW YORK

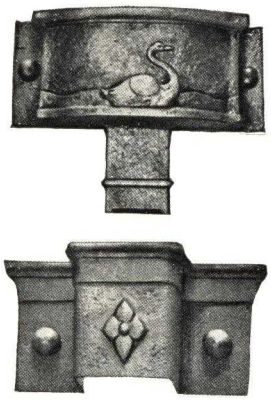
128 Spring Street
EVERETT, MASS.

PRODUCTS

Cast Lead Leader Heads
Cast Lead Leader Straps
Ledkote Ornamental Gutters
Ledkote Ornamental Leaders
Ledkote Plain Gutters
Ledkote Plain Leaders
Re-Expan Leaders
Re-Expan Leader Heads
Ledkote Sheet Valleys
Ledkote Sheet Flashings
Ledkote Sheet Roofings
Ledkote Sheet Gutter Linings

Cast Lead and Lead Coated Products formerly made by HENRY HOPE & SONS, INC.

LEDKOTE CAST-LEAD LEADER HEADS AND STRAPS



Cast Lead Head and Strap

Design

Cast lead is the preferable material to use for leader heads and straps. When they are made of this material they have a decided appearance of solidity and do not show mitered joints, solder marks and the raw edges such as are found when leader heads and straps are made of thin metals.

Any of these leader heads can be supplied with round, rectangular, or square outlets of size to fit leader. Straps are always made to conform in size and scale with the dimensions of leader specified.

Ledkote cast-lead leader heads and straps are securely fastened to masonry construction by means of lead expansion plugs and lead-headed nails. In frame construction lead-coated bronze lag screws are used. These fastening devices are furnished with each order at no extra charge.

The LEDKOTE PRODUCTS COMPANY has in stock a great many styles and types of designs. Catalog on request.

Specification Data

Leaders heads shall be Ledkote Cast-Lead Leader Head No.

Leaders shall be Ledkote Leader No.— and shall be 16-oz. cold rolled copper Ledkote-Tagged 50 U. T. securely fastened to the walls as per manufacturer's directions.

Gutters shall be Ledkote Gutter No.— and shall be 16-oz. cold rolled copper Ledkote-Tagged 50 U. T. All material to be furnished by LEDKOTE PRODUCTS COMPANY and each piece shall bear the Ledkote Blue Tag when delivered at the building site.

Combination Set

LEAD-COATED COPPER

Lead-coated sheet copper is being universally specified by architects because they are fully informed relative to the ravages of water laden atmosphere as well as acid laden air on plain copper. Lead coating also assures protection against copper staining of the building, and it blends beautifully with exterior wall finishes and roofing. You seek—*Permanence* also—*Tone and Texture.*

The surface of the copper is uniformly coated, and the lead is thoroughly integrated with the copper by the hot dip process, forming a perfect and permanent bond. The life of the product is only obtained by the amount of lead coating applied. A definite and given quantity of lead *must* be applied.

By the simple process of *tagging* every piece of lead coated sheet copper you are assured that the weight of copper, as well as the desired and proper and most essential of all, amount of lead coating has been applied.

Ledkote-Tagged lead-coated products provide that highly desirable imperishable quality. It assures even tone and textures. When assembled it matches—piece for piece.

Ledkote-Tagged lead-coated products possess a surface superior in merit because the surface is entirley free of copper spots and white acid blotches. Ledkote-Tagged is *really* lead coated.

LEDKOTE
25-30
U. T.

For Flat Work

Every Piece of Ledkote Is Tagged—
Look for The Blue Tag.

LEDKOTE
50
U. T.

For Leaders and Gutters

Specifications for Lead Coated Copper

Flat Work—All valleys, flashings, gutter linings and roof coverings where indicated shall be 16-oz. Ledkote-Tagged 25-30 U. T.

Each piece shall bear the Ledkote blue tag when delivered at the building site.

Formed Work—All gutter, leaders, leader heads (or Cast Lead Leader Heads No. .. and straps) where indicated shall be of sizes shown and shall be 16-oz. Ledkote-Tagged 50 U. T. Each piece shall bear the Ledkote blue tag when delivered at the building site.

Prices are now from 40% to 60% of their former level on Cast-Lead and Lead-Coated Copper Products.

LEDKOTE RE-EXPAN LEADER

Advantages

The leader, by means of its concealed mechanical device, has liberal provision for expansion when water freezes within it, but—unlike all other leaders—when the ice melts, powerful and durable phosphor bronze coil springs contract the leader to its natural shape, and it is ready for subsequent freezings.

The leader is a machine made product and costs only a few cents more per foot than ordinary downspouts. The replacement of one frozen leader will cost more than the difference in cost between Re-Expan and ordinary leaders for an entire installation.

To invest in leaders of corrosion-resisting metal and yet fail to protect them from frost splitting, when such protection is available at negligible extra cost, is to invite unnecessary maintenance worry and expense.

Leaders are so made that one length fits inside the other, the same as ordinary leader, forming a perfect joint. The erection cost is the same.

Ordinary bends, heads, etc., can be used with Re-Expan leaders, but Re-Expan accessories are preferable, since they provide a re-expansible installation from top to bottom, and are obtainable at similarly slight extra cost.

The Product

The leader (refer to Detail Drawing) is formed of a single sheet of metal in such a manner that there is created an arc-shaped expansible member (A) on one face (which is set next to the wall) and the lock seam (B) occurs in the center of this member. At intervals of 2 ft. coil springs (C) are hooked into perforations stamped in the double edge (D).

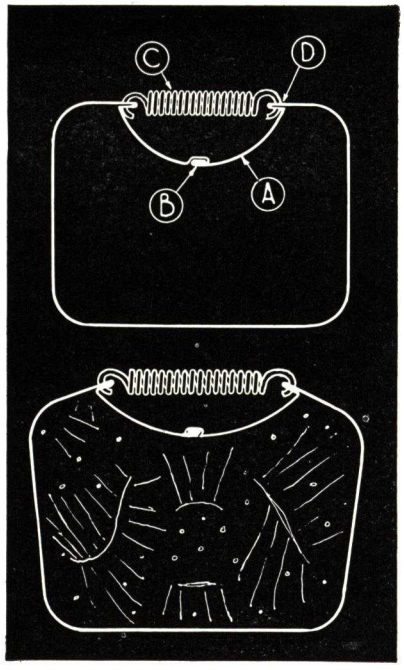
The provision for expansion in the Re-Expan leader is concealed from view and the architect is at liberty to make the visible portions of the downspout plain or ornamental, as desired.

The bursting of ordinary leaders often results from failure of the lock seam. In the design of the RE-EXPAN leader the lock seam is so situated that it is always protected from stress by the extra metal in the arc (A) and the resistance of the coil spring (C).

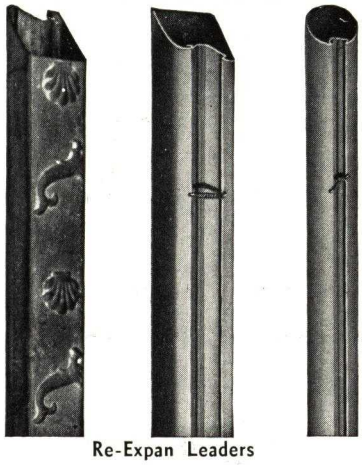
The Re-Expan leader eliminates the one common cause of failure of corrosion-resisting metals that are used for rain water pipes today—that of bursting as the result of freezing.

Re-Expan Leaders

Are made in any size and shape and in plain 16-oz. copper as well as lead-coated copper. Leader is furnished in 8 ft. lengths.



Detail of Leader Cross Section in Normal and Frozen Condition



Re-Expan Leaders

Re-Expan Elbows

Are of a superior type, free of crinkles of any kind. The elbow is a very important part of a leader installation and many ordinary elbows have to be replaced. After considerable research we have succeeded in making a smooth surfaced elbow which (by means of the Re-Expan arc) has liberal provision for expansion. Re-Expan elbows are made for both round and rectangular leaders.

Re-Expan Leader Heads

Can be furnished in copper, lead-coated copper or cast lead. Any head can be made with round or rectangular outlet and all are provided with backs. These leader boxes are very low in price and architects can feel free to use them on work of modest character.

Re-Expan Leader Straps

Are for decorative effect and are soldered to the leader and left free at the wall so as to permit greatest freedom in expansion. They are made in copper, lead-coated copper and cast lead, and their price compares favorably with that of ordinary and less desirable stock straps. Any designs can be furnished for either round or rectangular leaders.

Re-Expan Concealed Hangers

The construction of the leader makes possible the use of a convenient concealed hanger by means of which the installation of the leader is a simple matter. The hinged portion of the hanger fastens into the doubled edged metal of the leader and permits the leader parts to spread when freezing occurs, although it rigidly holds the leader in place. The hook shaped piece can be bent if necessary to conform to wood siding, etc., and is screwed to the wall. Should the leader ever need to be removed it is simply snapped out of the hook. One hanger occurs at the upper end of each length of leader, when they are specified.

Specification Data

In specifying leaders it is simply necessary to state the size and the metal of which they are to be made, as follows:

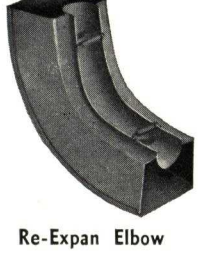
"Leaders, elbows and bends shall be (2x3 in.) (3x4 in.) (4x5 in.) (3 in. dia.) (4 in. dia.) (copper) (lead-coated copper) and shall be made by LEDKOTE PRODUCTS COMPANY, 35-01 Vernon Blvd., Long Island City, N. Y.

Leaders shall be hung with concealed copper hangers. Leader heads shall be design No. ....., and leader bands shall be design No. ....."

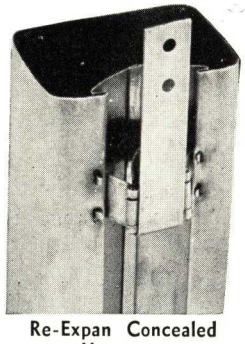
Note: Consult specification on preceding page under "Formed work" for suggested specification for lead-coated Re-Expan leaders. Always insist on Ledkote-Tagged.

It Works in the Winter

Leader Head
Rear view showing expansion features



Re-Expan Elbow



Re-Expan Concealed Hanger

Re-Expan Elbow

Leader Head
Width over ears, 1 in.; height, 9⅛ in.; depth, 4 in.

THE AMERICAN BRASS COMPANY

GENERAL OFFICES
WATERBURY, CONNECTICUT

MANUFACTURING PLANTS

ANSONIA, CONNECTICUT
BUFFALO, NEW YORK
TORRINGTON, CONNECTICUT
DETROIT, MICHIGAN
WATERBURY, CONNECTICUT
KENOSHA, WISCONSIN

OFFICES AND AGENCIES IN PRINCIPAL CITIES

IN CANADA: Anaconda American Brass Limited, NEW TORONTO, ONT.

For Other Pages, see File Index

ANACONDA THROUGH-WALL FLASHINGS

(Patented May 2, 1936—Pat. No. 1,906,674)

ANACONDA Through-Wall Flashing is efficient, positive, durable, yet relatively inexpensive. It is readily adaptable to practically every masonry condition. The principal feature of its design consists of a series of zig-zag ridges 7/32 in. high intersected at one end by a 7/32-in. longitudinal ridge which acts as a dam, causing any accumulation of water to flow to the opposite face of the wall.

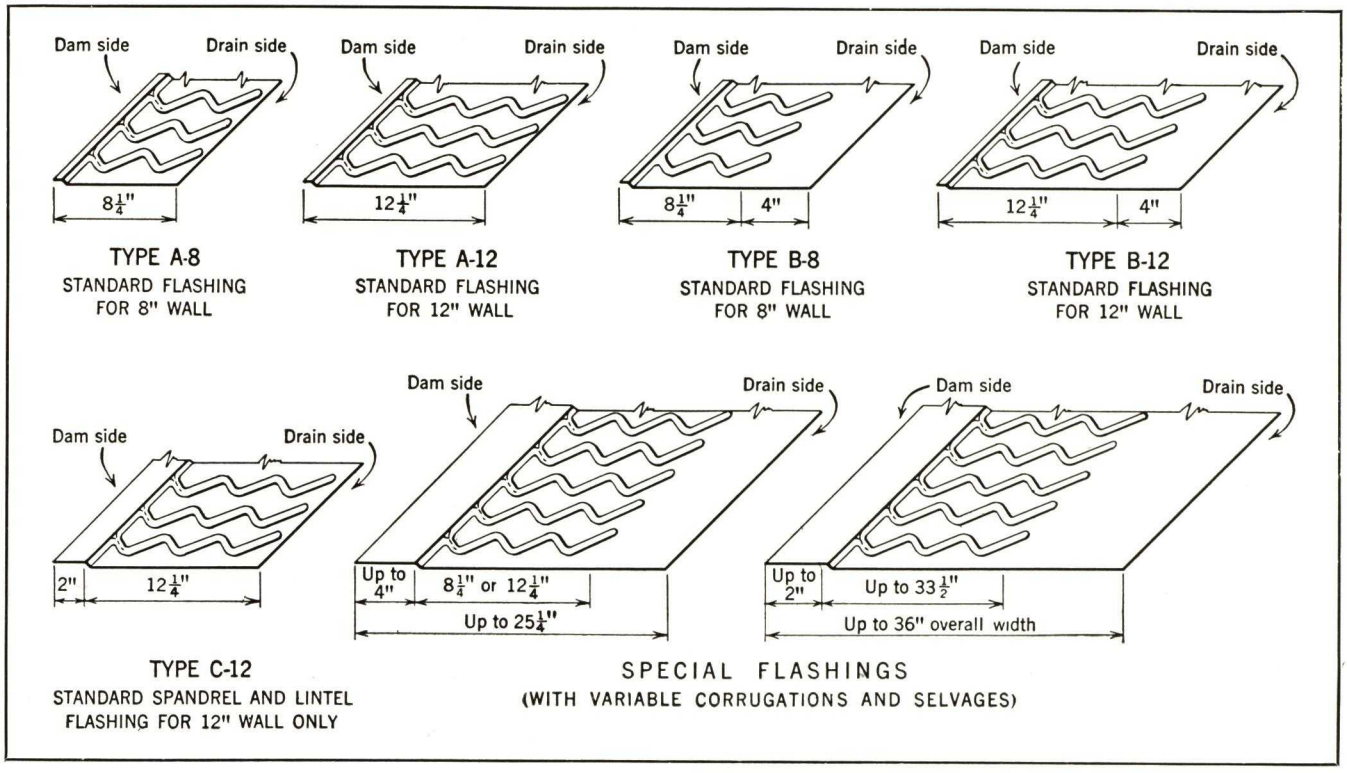
The zig-zag ridges prevent lateral movement in any direction. The possibility of vertical movement may be disregarded, as a properly designed masonry wall has its mass and weight so proportioned in relation to wind and other forces that uplift does not occur under any normal conditions, except as a result of heaving by frost, which, if of sufficient force to cause vertical movement of the wall or coping, would be sufficient to break the bond between masonry, mortar and flashing of any design. Actually, the Anaconda Through-Wall Flashing assures minimum risk of heaving by frost as it is so designed that it will drain itself dry on a level bed.

The design of the dam is such that the edge of the flashing can be placed within ¼ in. of the face of the wall and still provide sufficient bed for the pointing of the mortar joint so that it will not chip out. Thus, the ANACONDA Flashing protects more of the wet portion of the wall than is possible with the usual types of turned back dams.

This flashing, available in a variety of types and sizes, as shown in the sketches below and on the following page, is made of ANACONDA 16-oz. Copper, either plain or lead coated.

ANACONDA Through-Wall Flashing for 8-in. and 12-in. walls is stocked in 5-ft. and 8-ft. lengths. Special ANACONDA Through-Wall Flashing is available on order in all widths up to and including 36 in. with the corrugated area any width up to and including 33½ in. and the flat selvage on the dam side any width up to 2 in. When the corrugated area is exactly 8¼ in. or 12¼ in. wide, and the over-all width not more than 25¼ in., special flashing is also available with a flat selvage on the dam side any width up to and including 4 in.

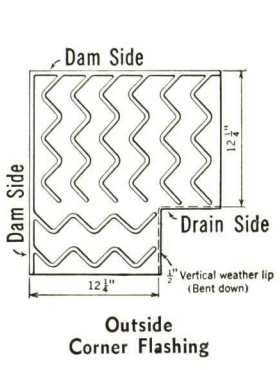
Because it can be bent and cut to fit on the job, ANACONDA Through-Wall Flashing can be installed easily and quickly, with a minimum of delay to bricklayers and masons. Tight end joints can be made by overlapping one or two corrugations. When specified, solder is easily applied to the flat ends.



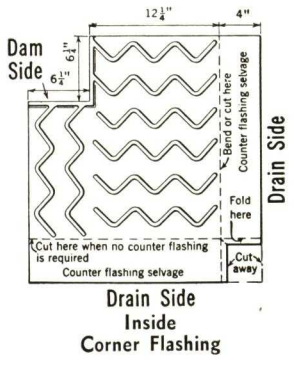
CORNER FLASHING

One-piece inside and outside corner flashings are now available for both 8-in. and 12-in. walls. Both types are illustrated below. They are so designed that the corrugations will interlock with those of adjoining straight flashings, thus providing the same thorough flashing at the corners of the building that straight ANACONDA Through-Wall Flashing provides in the main part of the wall. These corners eliminate soldered mitre joints or bulky laps.

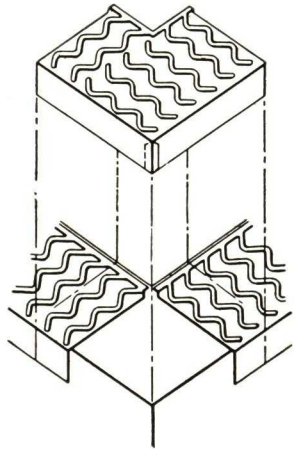
Simplicity of Installation — A corner is flashed by first assembling the three flashing pieces, then marking their exact position on the masonry. The pieces are then removed and a thin bed of mortar spread on the wall after which the straight flashings are laid and settled into the mortar, causing it to work up into the corrugations. The corner flashing is put on last, lapping the straight flashings by two corrugations. The vertical corner is made watertight by cutting and bending the counter flashing as shown in illustration. On outside corners, the selvage for counter flashing is provided on the straight flashing; for inside corners, it is on the corner unit. Note that each outside corner unit has a ½-in. weather lip which laps over the counter flashing and covers the pinhole at the very corner.



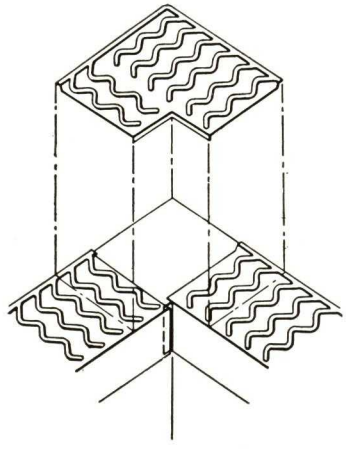
Outside
Corner Flashing



Drain Side
Inside
Corner Flashing



Inside Corner



Outside Corner

Right:
Anaconda Corner Flashings Shown in Raised Positions to Indicate Methods of Assembly

SUGGESTED SPECIFICATION — ANACONDA THROUGH-WALL FLASHING

Provide and install Through-Wall Flashing under all parapet copings, and for through flashings and counter-flashing at roof and elsewhere as shown or called for on the drawings. Installation and material shall be in accordance with detail drawings and these specifications.

The flashing shall be of 16-oz. soft (roofing temper) copper and shall be ANACONDA Through-Wall Flashing as furnished by THE AMERICAN BRASS COMPANY. The portion of the flashing to be in the wall shall be embossed at 3-in. intervals with a series of zig-zag corrugations 7/32 in. high which will key with the mortar so as to resist lateral movement by subjecting the mortar to shearing stress. One entire edge of the flashing shall be so shaped in manufacture as to provide a continuous dam 7/32 in. high to which one end of each corrugation is joined at full height, thereby creating a series of flat bottomed drainage channels with one open end to divert in the desired direction all water intercepted by the flashing. The shape of the dam shall be such that a ¾-in. seat is provided for the pointing mortar when the edge of the flashing dam is set in ¼ in. from the face of the wall. The flashing shall also provide flat selvages, as called for, to provide additional turnup on the dam site, or for counter flashing or locks to adjacent sheet metal on the drain side. etc., as may be required.

Flashing may be supplied in sheets of any standard length. The end joints are to be made by overlapping one or more corrugations. The flashings at these joints shall nest together so that there will be no bunching of the metal and the flashing will be watertight against a head of water at least 3/16 in. high without the use of solder. Flashing at the corners of either 8 in. or 12 in. walls shall be done with approved ANACONDA one-piece corner flashings.

For walls wider than 12 in., flashing at the corners shall be done by overlapping the sheets sufficiently to insure the complete interception and discharge of water.

(Where the extra protection of soldering is desired, add the following)—All joints are to be soldered with half and half solder.

Additional advantages of ANACONDA *Through-Wall Flashings are described in* ANACONDA *Publication AC-28. Will be mailed upon request.*

CHASE BRASS & COPPER CO.

—INCORPORATED—

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

WATERBURY, CONN.

For Other Chase Pages, see File Index

CHASE THRU-WALL COPPER FLASHINGS

Chase Thru-Wall Flashing is a flashing installed entirely through masonry walls. It is made of 16-ounce copper with embossed ridges, which are designed to direct the flow of water to the face of the wall. This prevents leaks, plaster stains, peeling paint, efflorescence and expensive rebuilding of parapet walls due to breaking down of mortar joints.

Thru-Wall flashing should be ordered lead coated when flashing is exposed on outside face of the wall directly in contact with marble, limestone or any light colored stone.

Lead coating is also used when a neutral gray color is desired.

All Chase Flashing can be furnished plain or lead coated.

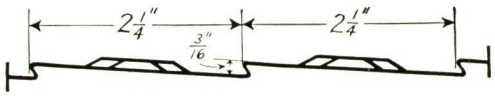
Threplex

Bonds in Every Direction

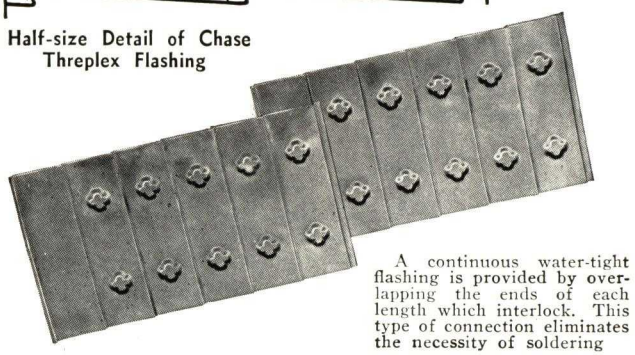
Chase Threplex Thru-Wall Flashing will meet specifications calling for flashings that will bond in all directions in the mortar bed. It resists all lateral and vertical movement. Chase Threplex flashing consists of a series of "Z" bends which provide perfect drainage, as each "Z" bend forms a weep hole. It also provides for adequate expansion and contraction at each "Z" bend.

Specifications

All flashings through masonry walls shall be Chase Threplex Thru-Wall Flashing as manufactured by the CHASE BRASS & COPPER CO. Flashings shall be of 16 ounce soft copper formed into a series of ribs shaped to a sawtoothed design at intervals of not more than 2½ in. with a row of embossings between ribs to provide a mechanical key bond in all directions—longitudinally, transversely and vertically. End joints shall be interlocking and overlap at least 3 in. so that a watertight joint is made without soldering.



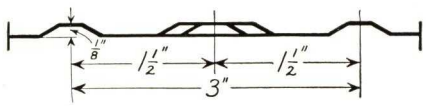
Half-size Detail of Chase Threplex Flashing



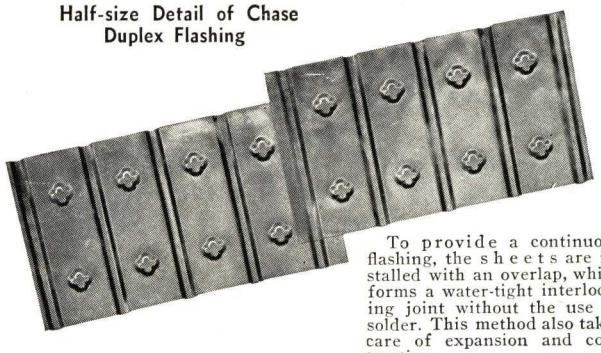
A continuous water-tight flashing is provided by overlapping the ends of each length which interlock. This type of connection eliminates the necessity of soldering

Duplex

Bonds in All Lateral Directions



Half-size Detail of Chase Duplex Flashing



To provide a continuous flashing, the sheets are installed with an overlap, which forms a water-tight interlocking joint without the use of solder. This method also takes care of expansion and contraction

When installed, the general design of the Chase Duplex Thru-Wall Flashing provides a bond in all lateral directions. The raised ridges, to prevent right or left movement, are 3 in. apart and run the full width of the sheet. The row of embossings to prevent forward or backward movement are 4 in. apart. The ridges running the full width of the sheet provide a second advantage, for when a counter flashing is formed, the face, due to the ridges, offers a much greater resistance to being blown up by the wind than plain copper. The pattern or design of Chase Duplex Flashing is formed to prevent the thinning or hardening of the metal at the ridges.

Specifications

All flashings installed through masonry walls shall be Chase Duplex Thru-Wall Flashing as manufactured by the CHASE BRASS & COPPER CO. Flashings shall be of 16-ounce copper formed at intervals of not more than 3 in. by a series of ribs and raised projections 3/16 in. high with ribs extending the full width of the flashing. End joints shall be interlocking and overlapping at least 2 in. so that a watertight joint is made without soldering. The flashings shall be formed so as not to cause any accumulation of water on the horizontal surfaces and the transverse bonding ribs shall not be drawn or stretched.

THE CHENEY COMPANY

Cheney Flashing

Architects Building, PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y., 75 E. 45th Street — CHICAGO, ILL., 2200 Natchez Avenue

FACTORY: 24 North Front Street, NEW BEDFORD, MASS.

Products

CHENEY FLASHING; REVERE THRU-WALL FLASHING; CHENEY SHOWER PAN; CHENEY VERTICAL RIBBED SIDING; COPPERKOTE WATERPROOFING.

CHENEY

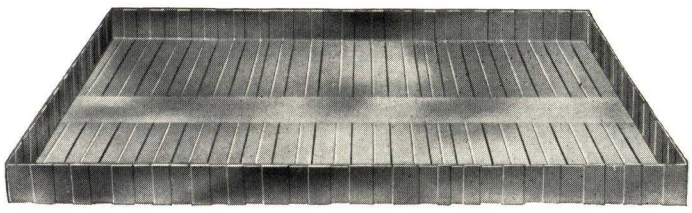
Service

THE CHENEY COMPANY has made a serious study of all kinds of seepage and flashing problems, and the services of our factory and field engineers are always available to architects, and opportunities for being of service are welcomed.

CHENEY MECHANICALLY KEYED THRUWALL FLASHING

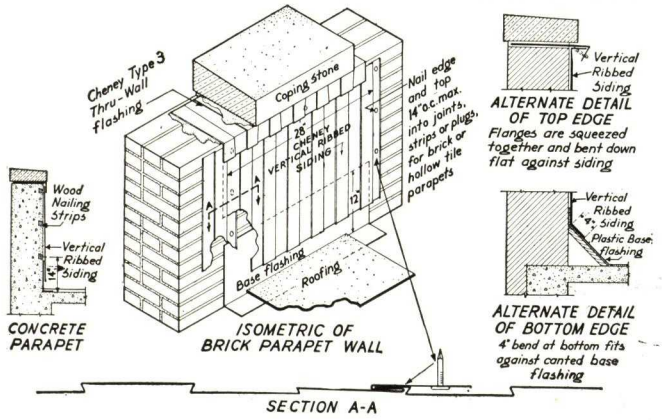
THE CHENEY COMPANY manufactures Cheney Flashing which is sold exclusively through Revere Copper & Brass Inc., and their authorized distributors throughout the United States. (See Revere Copper and Brass Inc., on following pages for complete details on Cheney Flashing.) THE CHENEY COMPANY maintains engineers at their different offices and will co-operate with architects as they have in the past with personal assistance on their flashing problems.

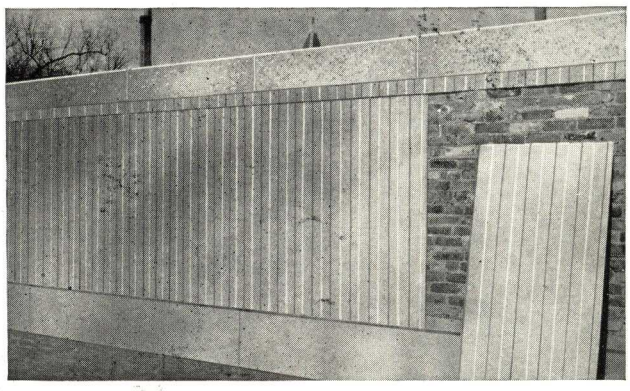
CHENEY SHOWER PANS



Made of Cheney Flashing and strongly constructed of 16 oz. copper with reinforced locked and sweated corners. Keys absorb expansion and contraction strains and form a perfect bond with the mortar. Made at the factory to exact detail and shipped ready to install. Far superior and less expensive than the usual 6 lb. lead pan which corrodes so quickly and punctures so easily.

CHENEY VERTICAL RIBBED SIDING





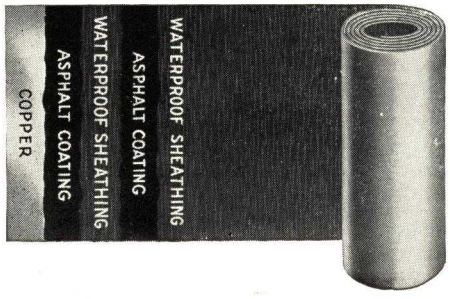
Very attractive in appearance and provided with a watertight expansion joint. Extremely rigid, quickly installed and usually requires about one-tenth the labor necessary to install standing seam copper. Made of 16-oz. copper. Used for lining inside of high parapets, on sidewalls of monitors, penthouses, etc.

COPPERKOTE WATERPROOFING

A very inexpensive copper waterproofing. Made in 1, 2 and 3-oz. weights.

The 1-oz. consists of a continuous layer of 1-oz. copper, one layer of asphalt, and one layer of 45-lb. sheathing thoroughly saturated with asphalt. The 2-oz. CopperKote consists of 2-oz. copper and 2 layers asphalt and 2 layers of saturated sheathing. The 3-oz. CopperKote consists of a layer of 3-oz. copper; 3 layers asphalt and 3 layers of saturated sheathing.

CopperKote comes in rolls 20, 24, 30, 36, and 60 ins. wide and 120 ft. long.



MAJESTIC FLASHING COMPANY

Manufacturers of Majestic Three-Way Super-Bond Flashing

Reisterstown Road at Elgin Avenue
BALTIMORE, MD.

Strength of Bond

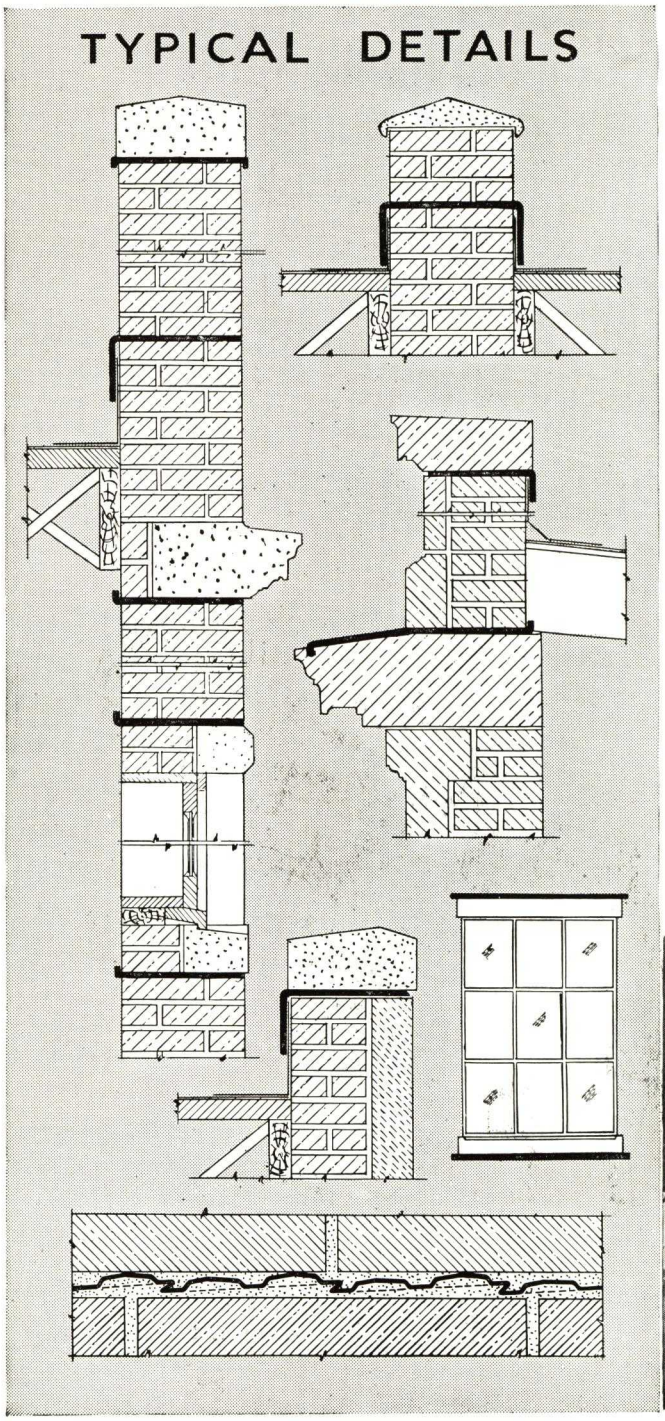
Any flashing will, to a certain extent, stop seepage. But the bond between flashing and mortar can be strong only if the flashing is properly keyed. Flashing is not worth the investment unless it bonds in every direction.

The keyed surfaces of Majestic Flashing, bonded securely to the mortar, are an impenetrable barrier and your assurance against seeping moisture, disintegration and future expense.

MAJESTIC
REG. U.S. PAT. OFF.

Bonds in Every Direction

The cut-back feature of Majestic 3-Way Super-Bond Flashing not only provides all the bonding quality of ordinary keyed flashing, but it drains seepage, directing weeping from the masonry surface into gutters where it belongs. Actual tests prove Majestic 3-Way Super-Bond Flashing resists stress and strain in every direction—forms a perfectly rigid bond between flashing and mortar. Majestic 3-Way Super-Bond Flashing is interlocking—quickly, easily, securely made a part of the masonry. No danger of mashing the keys while setting large blocks—all keys are designed to bear part of the weight, preventing mashed cut-backs. Handling is facilitated by a wide range of standard sizes and shapes in the Majestic line, as shown in typical details illustrated on this page. Majestic 3-Way Super-Bond Flashing is made of Anaconda copper, of uniform quality and proof against corrosion by moisture.



Specifications

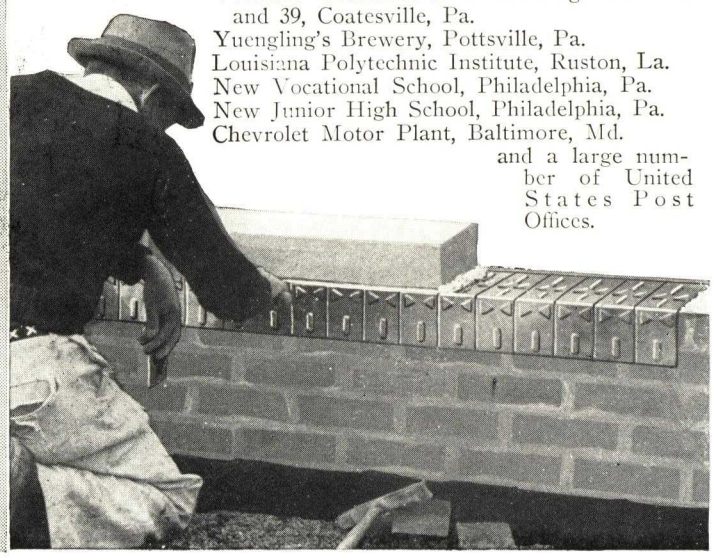
All through-wall and counterflashing shall be Super-Bond Interlocking type as manufactured by MAJESTIC FLASHING COMPANY, Baltimore, Md., and installed in strict accordance with the manufacturer's specifications with mortar below and on top so that a perfect mechanical bond is obtained.

Distributors

Majestic 3-Way Super-Bond Though-Wall Flashing is sold nationally by Anaconda distributors of the American Brass Co. Write for further details and the name of your nearest distributor.

A Few Typical Installations

Federal Reserve Building, Washington, D. C.
Amanda E. Stout Grade School, Reading, Pa.
Pennsylvania R.R. Pier, Baltimore, Md.
Huey P. Long Bridge, New Orleans, La.
Northeast Junior High School, Philadelphia, Pa.
Archives Building, Washington, D. C.
Addition to Library of Congress, Washington, D. C.
Alexandria High School, Alexandria, Va.
Woodville County Home, Pittsburgh, Pa.
Hagerstown Hospital, Hagerstown, Md.
Villa-Maria Academy, Green Tree, Pa.
Marine Barracks, Quantico, Va.
Bureau of Engraving and Bureau of Economics, Washington, D. C.
Veterans' Administration Buildings Nos. 38 and 39, Coatesville, Pa.
Yuengling's Brewery, Pottsville, Pa.
Louisiana Polytechnic Institute, Ruston, La.
New Vocational School, Philadelphia, Pa.
New Junior High School, Philadelphia, Pa.
Chevrolet Motor Plant, Baltimore, Md.
and a large number of United States Post Offices.



REVERE COPPER AND BRASS INCORPORATED

EXECUTIVE OFFICES AND GENERAL SALES DEPARTMENT

230 Park Avenue, NEW YORK, N. Y.

For Division Offices, Mills and District Sales Offices, see our Catalogue on Sheet Copper and Leadtex
For Other Revere Products, see File Index

Products

CHENEY FLASHING; manufactured by the CHENEY COMPANY with factory at 24 North Front Street, New Bedford, Mass., and headquarters in the Architects Building, Philadelphia, Pa., is distributed on a nation-wide basis through the warehouses and distributors of Revere Copper and Brass Incorporated.

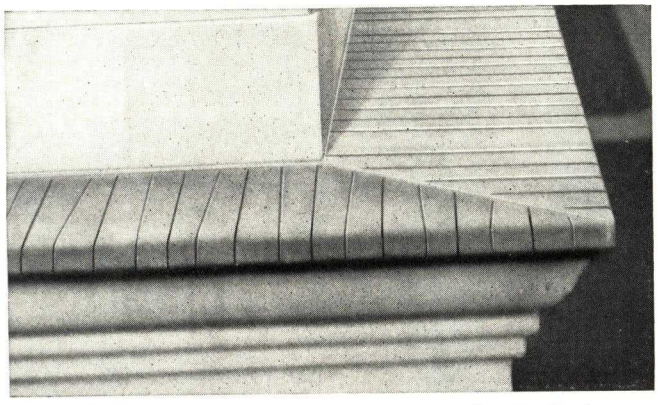
CHENEY

Service

The CHENEY COMPANY has made a serious study of all kinds of seepage and flashing problems, and the services of their factory and field engineers are always available to architects, and opportunities for being of service are welcomed. Address The CHENEY COMPANY, Architects Building, Philadelphia, Pa., or any Revere office.

CHENEY FLASHING

Cheney Flashing Is Laid Quickly and Easily as the Masonry Progresses. The Ends of the Flashing Interlock to Form a Watertight Joint without Solder



Cheney Flashing Installed on Cornice, Massachusetts Institute Technology

After five years' exposure the flashing remains in perfect condition

Laying Coping Stone, 86th Story, Empire State Building, N. Y.

Note absence of dowels. Cheney Flashing permits such installations on parapets and copings. It is the safe flashing to use

Briefly stated Cheney Flashing scientifically solves leak, seepage and drainage problems in masonry walls. It positively prevents leaks and seepage as well as streaks, stains and efflorescence which disfigure a building and many times destroy its Architectural beauty. It also prevents the rusting of spandrels and lintels and in general permanently protects buildings from the destructive effects of water penetration.

The positive efficiency of Cheney Flashing and its superiority of design is recognized without question by all authorities.

Basic Requirements for Really Efficient Flashing

Fundamentally—any Thru-wall Flashing should function in a very definite manner:

1st It should form a positive mechanical Key-bond in every direction within the mortar bed—vertically as well as laterally.

2nd It should provide perfect drainage so that if moisture should penetrate a wall it will drain quickly.

3rd It should provide adequately for expansion and contraction.

4th It should have a watertight, interlocking lap that requires no soldering.

5th It should have a stiff counterflashing face that hugs the wall tightly after the base flashing has been installed.

All of these features were given careful study and intensive testing, and their positive functionings were thoroughly proved before a single foot of Cheney Flashing was marketed.

Hazards of Improper Bond

The hazard of falling copings and parapets, caused by insufficient bonding, and the legal entanglements that ensue when walls fall from this cause, are too great to "take a chance"—and there have been many such failures in this country during the past few years.

It is highly improbable that the designers of the Empire State Building, New York, would have installed Cheney Flashing under the coping stones of the parapet at the 86th story, and without dowels, had they not been certain that Cheney Flashing formed a positive unbreakable key-bond—vertically as well as laterally with the masonry, and would retain this bond for the life of the building.

The Cheney "Factor of Safety"

Previous to the introduction of Cheney Flashing, architects and engineers had known for years that plain copper, laid between courses of masonry, would prevent water from penetrating building walls.

But, it also was known that such plain metal flashings would break the bond between the courses of masonry and seriously weaken the walls, hence little protection of this sort was ever used.

The invention of Cheney Flashing, however, solved the problem, and its widespread use has been responsible for the production of many new flashings of more or less value. Today however, as in the beginning, Cheney Flashing stands without equal or counterpart in the field. "It does not break the bond."

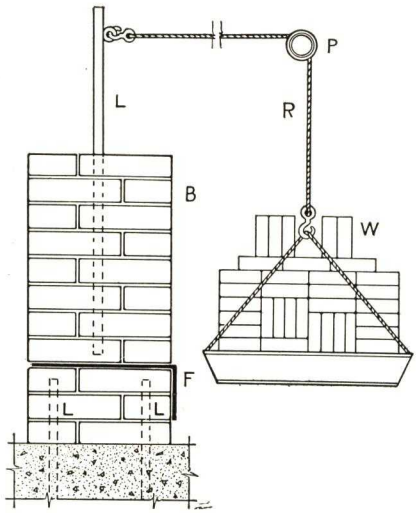
The Keybond construction of Cheney Flashing provides a "Factor of Safety," which includes two exclusive features that cannot be equalled by ordinary flashings; it bonds the masonry both laterally and vertically in every direction, and in addition, its exclusive design provides numerous weep-holes that drain the walls quickly. The design of the flashing also takes care of expansion and contraction.

These Keybond and drainage features are of the utmost importance in proper building construction.

The key bonding is especially important in the construction of high buildings where severe storms, high winds and the natural swaying of the buildings tend to loosen coping stones and parapets and hurl them below with a consequent loss of life or serious damage to people and property.

Flashings that bond only laterally, therefore, should not be specified or used for copings, parapets, cornices or other exposed areas with any confidence that they will provide safe or permanent protection.

Masonry Bond Test



Resistance to Rupture is the real test for any wall flashing. Tests made by Prof. Frederick O. Anderegg prove conclusively that Cheney Flashing does make a positive mechanical bond.

Explanation of Test Diagram

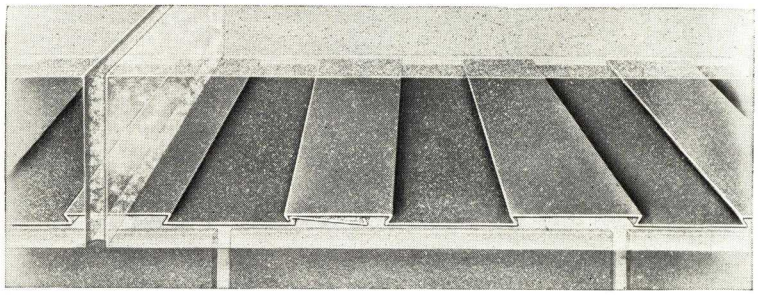
B—12x36x42 in. panel. F—Cheney Flashing. L—Steel angle irons. P—Pulley. R—Rope. W—Weights.

Two tests were conducted, one with Cheney Flashing, one with plain copper. After panel had been exposed to weather for 28 days, weights were added until wall fractured. Test with Cheney Flashing showed wall had a Modulus of Rupture of 27 lbs. per sq. in. compared to 9 lbs. per sq. in. for copper having no vertical bond. Before wall could be pulled over, mortar in Cheney keys had to be sheared off, proving an effective mechanical anchorage.

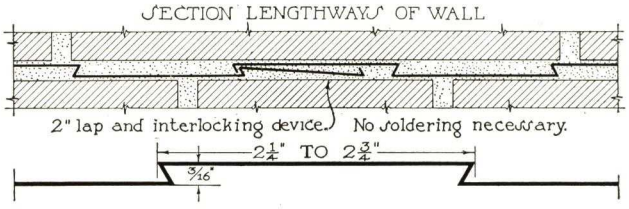
The force required to pull the panel over was equivalent to a wind velocity of 264 miles per hour, the full pressure of which was directly against the wall. Calculated in the same way, the *Cheney Flashing would withstand a wind velocity of 1490 miles per hour* under a six inch coping stone.

These figures are conservative. Bear in mind this panel was only 42 inches long and lacked the stiffening of adjacent sections of the wall and of cross walls at the ends.

The self-draining feature is also particularly valuable, especially in cold weather when it is absolutely essential that water should drain from the walls quickly—before freezing. If permitted, alternate freezing and thawing soon breaks up the mortar joints, sometimes even the stonework itself, thus greatly weakening the wall.



Thru-Wall Phantom View of Cheney Flashing Installed

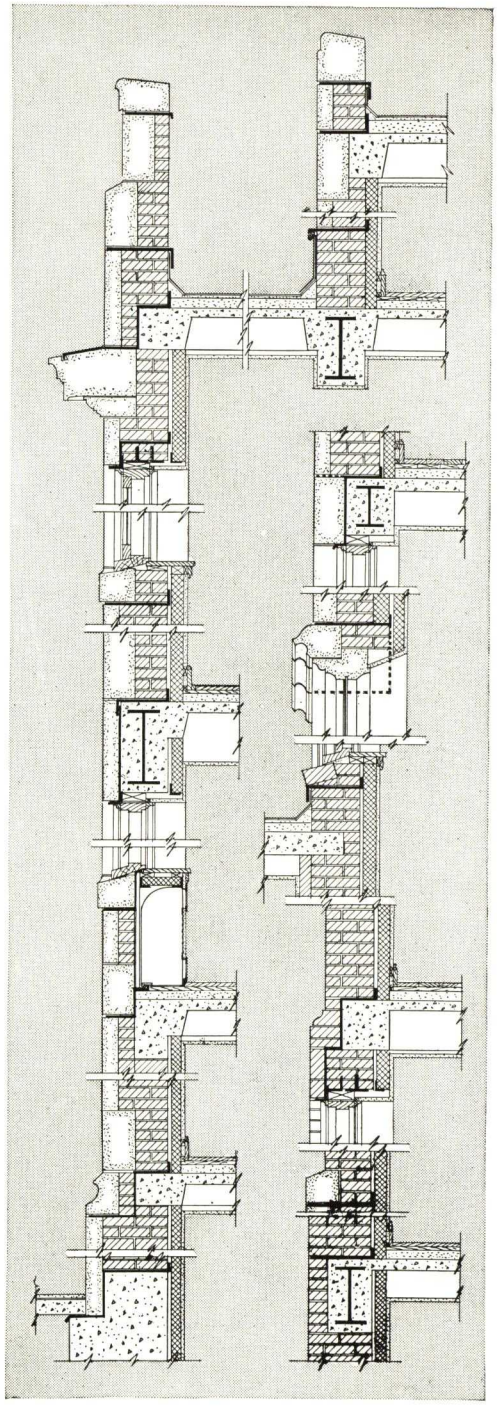


Cheney Flashing Specification

All counterflashing, thru-wall flashing, and flashing carried through masonry walls shall be Cheney Flashing and shall be placed in the wall with mortar below and on top so that a mechanical bond is obtained in every direction within the mortar bed. Flashing shall be installed in accordance with the standard specifications of THE CHENEY COMPANY, Philadelphia, Pa.

Finish

Cheney Flashing is made of copper and of Leadtex, lead-coated copper. When plans call for flashing to be exposed on the outside face of the wall directly in contact with limestone, marble or any other light-colored stone, it should be lead-coated. This gives a very nice neutral gray appearance.



Where Cheney Flashing Should Be Used

Cheney Thru-Wall Flashing Corners

Special factory-built inside and outside corner pieces for all types of Cheney counterflashings can be furnished upon request. This flashing is made of 16 oz. soft copper.

We have added this new item to our line, not only because the demand has increased, but also because both the Veterans' Bureau and the Department of Highways of the State of Pennsylvania are now requiring that special corner pieces be made by the manufacturer of Thru-Wall Flashings.

Endorsed by Roofing Manufacturers

Cheney Flashing is endorsed and recommended by most manufacturers of built-up roofing materials and in most cases they will furnish surety bond guarantees on their roofs and built-up base flashings if Cheney Flashing is used.

REVERE THRU-WALL FLASHING

A Reasonably Priced Copper Flashing

Materials and Identification

The flashing is made of Revere 16 ounce soft copper or Revere Leadtex, lead-coated copper. Both products are noted for their durability and workability. Each flashing is stamped "Revere Flashing Pat. No. 1,928,589."

Design and Structural Advantages

The design of the Revere Flashing is such that water will weep out of the wall and lateral movement of the wall in all directions is prevented, due to the unusual mechanical bond between mortar and flashing. A water-tight interlocking joint is made between the flashing sheets without the use of solder to form a continuous flashing and to take care of expansion and contraction. This over-lap is 2 in., which meets Government specifications.

In the design of the flashing there are raised ribs $\frac{3}{16}$ in. high., spaced 3 in. apart. These are rolled into the sheet rather than stamped. The ribs run all the way across the flashing. This provides a distinct advantage because when the flashing sheet is bent to form a 4-in. counterflashing face, it is much stiffer than plain copper which tends to be wavy when it has been bent up and down. There is also a series of embossings, $\frac{3}{16}$ in. high and approximately ½ in. wide and 1 in. long, which prevent "in and out" movement.

Sizes

Revere Flashing is furnished only in sheet form in widths of 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34 and 36 in. and overall length of 74 in. which when laid up with the lap measures 72 in. The above sizes will meet practically every flashing need. The length of Revere Flashing is such that it is easily handled. Where for any reason, other widths than those listed above are required, they can be cut to the desired size by the sheet metal contractor. Revere Flashing is packed in containers of twenty-five pieces, or enough to cover 150 lineal feet of wall.

Adaptability

One of the principal advantages of Revere Flashing is its adaptability. All styles and sizes of Flashing can be cut, bent and formed from this sheet by the sheet metal contractor.

Price

Revere Flashing is very reasonably priced. Due to its interlocking feature which makes a water-tight joint without the use of solder, it can be installed for less than plain sheet metal flashing with soldered joints.

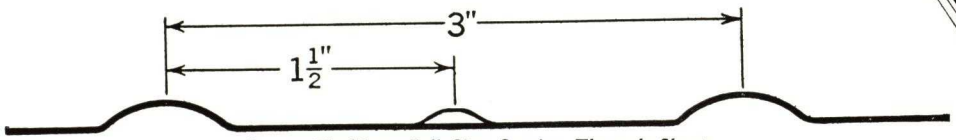
Availability

Revere Flashing is readily available in every section of the United States through Revere Sheet Metal Distributors. This, plus the fact that all types of flashing can be cut and bent by the sheet metal contractor from Revere Flashing, practically eliminates special orders, delays in shipment and other costly delays.

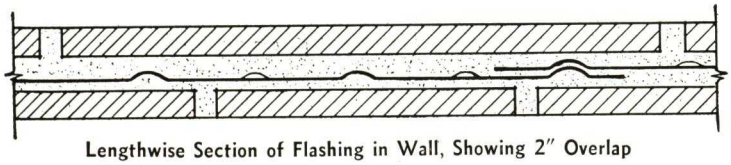
Specification

Thru-wall flashing shall be provided below the parapet coping, for counterflashing in masonry parapets and where low roofs abut the superstructure and elsewhere as indicated on drawings. That portion in the wall shall be bonded horizontally at intervals of not more than 3 in. by a series of ribs and raised projections $\frac{3}{16}$ in. high, with ribs extending the full width of the wall. End joints shall be interlocking and over-lapping at least 2 in. so that a water-tight joint is made without soldering. The flashing shall be Revere Flashing (Revere Copper and Brass Incorporated) and shall be formed so as not to cause any accumulation of water on the horizontal surfaces and the transverse bonding ribs shall not be drawn or stretched.

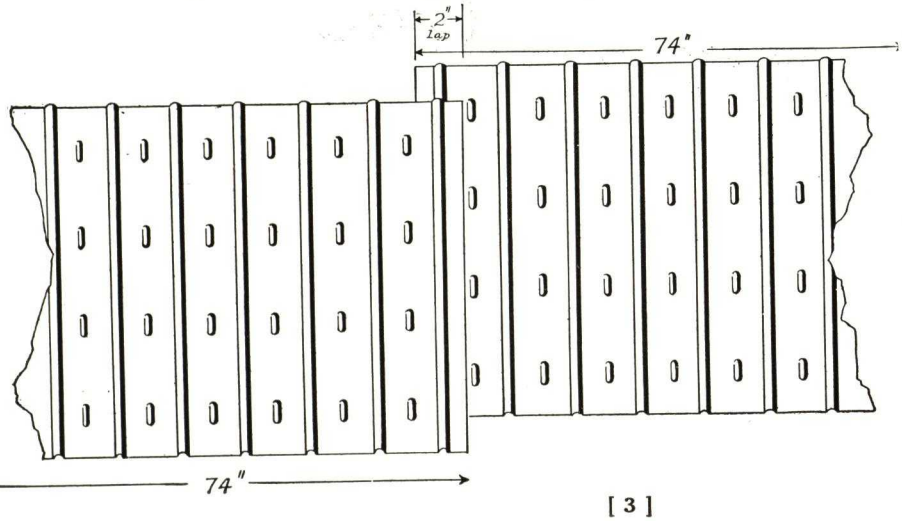
ONE TYPE COVERS ALL CONDITIONS

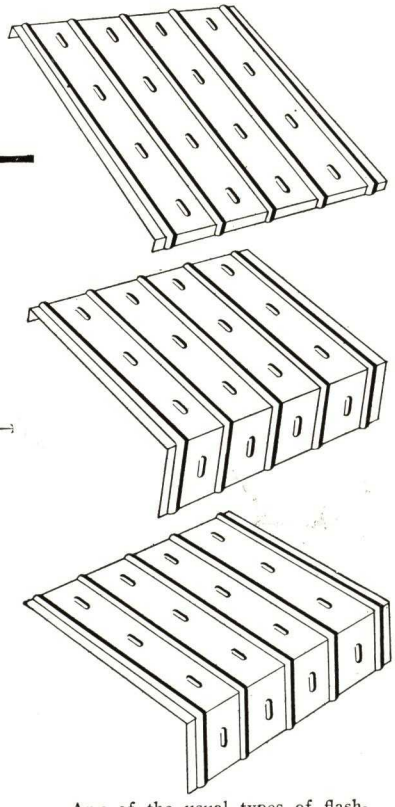


Revere Flashing—Full Size Section Through Sheet



Lengthwise Section of Flashing in Wall, Showing 2" Overlap





Any of the usual types of flashing can be bent and formed by the sheet metal contractor from Revere flashing furnished in sheet form

THRUBOND FLASHING CORPORATION

Manufacturers of Thru-Bond Corrugated Expansion Wall Flashing

(Patented)

TELEPHONE
MOtt Haven 9-3266

525 East 136th Street, New York, N. Y.

THRU-BOND CORRUGATED EXPANSION WALL FLASHING

Description

Thru-Bond Corrugated Expansion Wall Flashing is a metal wall flashing formed with alternating corrugated and flat surfaces. It provides at once the maximum security from seepage and leakage through walls and the maximum bonding value with minimum cost of labor in setting.

Advantages of Thru-Bond

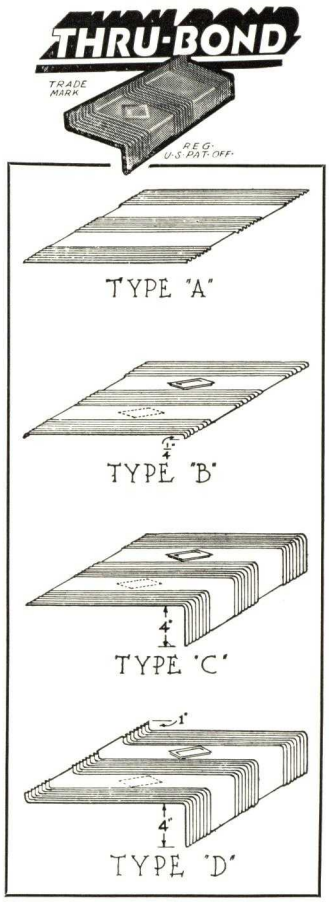
Corrugations—The corrugations in *Thru-Bond* are formed in 3-in. widths in machined rollers, thereby retaining the full strength and thickness of the metal.

The corrugations have a six-fold purpose in providing *full expansion, perfect interlock, continuous water channels, rigidity, solid bond* and *pleasing appearance.*

Expansion—The corrugations allow full expansion and contraction to follow any and all structural movements within the wall from whatever cause. Such expansion of the flashing is of particular importance at the lap seams and *it is precisely at these seams that Thru-Bond is particularly resilient.*

Interlocking Laps—Joints formed by overlapping corrugations to their full width of 3-in. provide watertight laps without soldering.

Continuous Water Channel—The corrugations of *Thru-Bond* provide continuous channels by which water readily escapes to the outside of walls.



Rigidity—The corrugations add rigidity and strength to *Thru-Bond,* enabling it to withstand the abuse to which all flashings are subjected, especially where flashing acts as a counter-flashing.

Solid Bond—Solid bond is secured by means of the corrugated sections, spaced 6-in. on centers and by locating the alternating plain sections on different levels. In addition, where the flashing is to be used in parapet walls, bond plates are provided on all plain sections, alternating top and bottom.

Appearance—*Thru-Bond* presents a neat appearance where exposed. Its regular division into corrugated and plain sections provides neatness and pleasing appearance.

Rounded Bends—All horizontal bends in *Thru-Bond* are perfectly rounded by special machinery. This avoids flattening of the corrugations, allowing full drainage and expansion.

Materials

Thru-Bond Flashing can be had in any desired metal, including copper, zinc, hard lead, lead-coated copper, galvanized iron, etc.

Types

Thru-Bond Flashing is made in four standard types briefly described as follows:

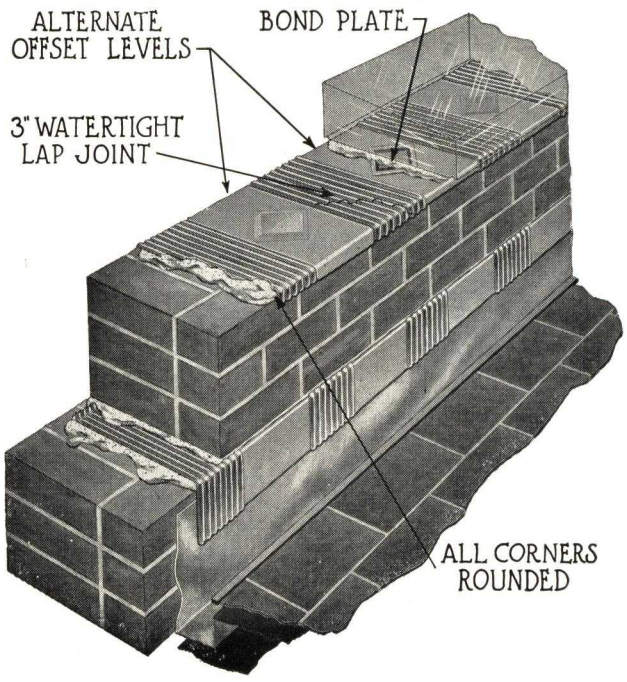
Type "A"—For use below roof line, over cornices and lintels, under sills and for spandrel flashing. This type can be bent to any angle.

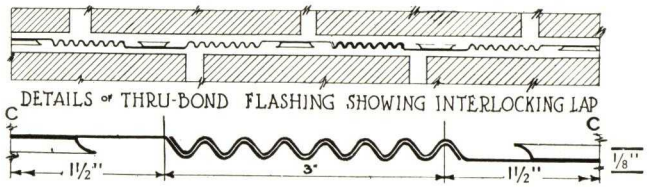
Type "B"—For use under copings, furnished with mortar bond plates on all flat surfaces, top and bottom.

Type "C"—For use in parapet walls as a through counter-flashing.

Type "D"—For use with 1-in. turn-up on inside, for all walls except parapets.

Special Types—Special shapes required to meet conditions of any particular job are turned out at the factory and shipped to the job ready for installation. No forming or other field work is necessary.





Specifications — Short Form

Insert under Sheet Metal Work:

"All wall and counter-flashing shall be Thru-Bond Corrugated Flashing as manufactured by the THRUBOND FLASHING CORPORATION, 525 East 136th Street, New York, N. Y., and installed with mortar above and below the flashing, all as shown on drawings and in accordance with written instructions of the manufacturer."

Detail specifications gladly furnished on request.

Service

The manufacturers of *Thru-Bond* have full knowledge of flashing conditions and sheet metal problems from their experience as roofing and sheet metal contractors for 25 years, performing work on outstanding buildings throughout the country. This knowledge and experience are at the service of architects and others interested.

ESTABLISHED 1860

HETZEL ROOFING PRODUCTS CO.

Manufacturers of Roofing Cements and Paints

67 Maine Street, NEWARK, N. J.

CABLE ADDRESS
"Hetzel, Newark"

Products

HETZEL'S ELASTIC ROOF CEMENT (oil base) for all roofs, glass skylights, coping stones, etc.
HETZEL'S ACOUSTICAL CEMENT, "ACOUSTIGLU."
HETZEL'S PLASTIC ROOF COMPOUND and FIBROUS KOTING, (ASPHALT BASE).
HETZEL'S ELASTIC GLAZING and CALKING COMPOUND.
HETZEL'S PIPE JOINT COMPOUND.
HETZEL'S DAMP RESISTING PAINT.
Also Hetzel's Asphalt Paints; Hetzel's "Rub-on" Roofing Paint; Hetzel's Enamel Paint for boiler fronts and steam pipes; Hetzel's Acidproof Paint for metal work, ammonia tanks and gas tanks; Hetzel's Structural Paint for exposed surfaces.

TRADE-MARK

Hetzel's Elastic Roof Cement

Hetzel's elastic roof cement, in use throughout the United States and Europe for many years, is especially valuable for covering and repairing all holes, cracked joints, breaks, or leaks in roofs of all kinds. Used also for pointing around chimneys, skylights, and dormer windows; for repairing coping stones, gutters, wood and stone work which require to be made watertight; for laying and bedding slate and tile roofs.

Asphalt shingles laid in Hetzel's cement will not curl, nor can snow or rain blow under them.

Colors—Brown, gray, black, white, green and red. It is also made to order to suit every purpose, and is the original slaters', tinners' and tile roofers' cement.

Advantages—Hetzel's elastic roof cement is equally well adapted for use on slate, tin, asbestos, glass, wood and metal roofs; is permanent; does not run or loosen from joints or cracks, is not affected by any extreme of temperature or climatic changes. It does not harden, but preserves complete elasticity even when exposed to extreme heat, cold, dryness or humidity.

Specifications—All nailholes and joints between the slates shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the HETZEL ROOFING PRODUCTS CO., Newark, N. J., in such quantities as to hold the slates in position should they break, or the nails rust away. *(Fig. 1.)*

The joints of all tiles shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the HETZEL ROOFING PRODUCTS CO., Newark, N. J. To prevent leaking, the hip and ridge rolls shall be sealed in a like manner. *(Fig. 2.)*

All cap flashings shall be carefully pointed up with Hetzel's Elastic Roof Cement as manufactured by the HETZEL ROOFING PRODUCTS CO., Newark, N. J. *(Fig. 3.)*

The joints of all copings shall be set and sealed with Hetzel's Elastic Roof Cement as manufactured by the HETZEL ROOFING PRODUCTS CO., Newark, N. J. *(Fig. 4.)*

Hetzel's Acoustical and Insulation Cement, "Acoustiglu"

For applying acoustical and insulating materials to ceilings, floors, walls, oil and gas tanks, etc. It will stick fast to any surface—plaster, glass, gypsum, brick, concrete, stone, metal or wood.

"Acoustiglu" cement is compounded from ingredients which render it proof against alkali, gas, benzine, oil, naphtha and acid fumes and, once it sets, the insulation cannot become loosened. It retains its elasticity indefinitely and is not affected by climatic conditions. Being impervious to moisture it not only acts as a damp resistant factor, but also protects the underside of the material.

Packed in 5, 10, 25-lb. and 5-gal. pails. Color ordinarily is red but other colors may be supplied at additional cost.

Method of Application—To obtain the best result the surface should be clean, dry and free from grease or oil.

For Acoustic Tile—Apply a daub of "Acoustiglu" about 3 ins. in diameter and in thickness tapering to about ½ in., near each corner of tile; then place tile about 1 in. from its permanent position and slide in place with a firm pressure. Unevenness can be built up with "Acoustiglu." 40 lbs. will take care of about 100 sq. ft. of 12x12-in. tile.

For Insulation Board—Apply a strip of "Acoustiglu" about ½ in. thick by 1½ ins. wide along edges and across the sheet every 12 ins.; then slide sheet firmly in place hammering it down with mallet. 60 to 70 lbs. will take care of 100 sq. ft. based on strips, about 12 ins. apart.

For Dampproofing—Where acting as a damp resistant factor, apply "Acoustiglu" on entire surface of insulation about ¼ in. thick; then slide sheet firmly in place and hammer down with mallet. 100 to 125 lbs. will take care of 100 sq. ft.

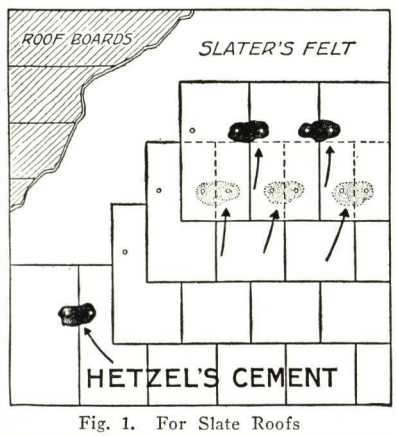


Fig. 1. For Slate Roofs

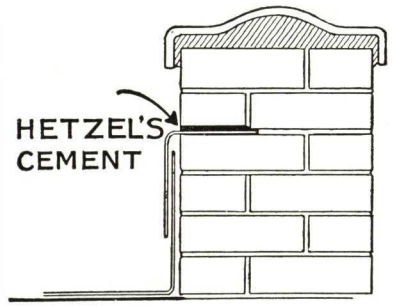


Fig. 3. For Pointing Up Cap Flashings

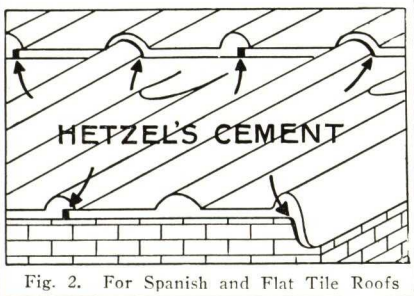


Fig. 2. For Spanish and Flat Tile Roofs

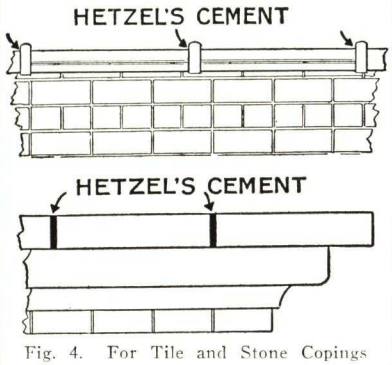


Fig. 4. For Tile and Stone Copings

APPLICATIONS OF HETZEL'S ELASTIC ROOF CEMENT

Hetzel's Plastic Roof Compound and Fibrous Koting (Liquid)

A specially prepared roofing cement made on an asphalt and asbestos base for repairing and painting old wood, tin, iron or felt roofing; for repairing leaky chimneys; for waterproofing below and above grade, etc. The compound is in paste form and the Koting in liquid form. Colors: red, black and green.

Hetzel's Elastic Glazing and Calking Compound

For pointing window frames, hothouses, steel sashes, crevices, cracks in masonry, etc. Remains elastic indefinitely. Will not crack or dry up. Far superior to lead or oakum. Does not contain asphalt or coal tar. Can be painted over with any color. Also made in special consistency for use in guns.

Colors: white, gray, green, black, red and buff.

Pipe Joint Compound (Red, Gray and White)

For joints of gas, steam, water, and air pipes. Will not harden, and prevents joints from rusting. Makes absolutely tight joints which can be disconnected at any time without injury to fittings.

Hetzel's Damp Resisting Paint

A compound black paint for dampproofing foundations and walls above and below grade. When applied to inner side of exterior walls, forms a good dampproof surface for direct application of plaster, rendering plaster stainproof, and saving cost of furring and lathing.

COLONIAL LUMBER SPECIALTIES, INC.

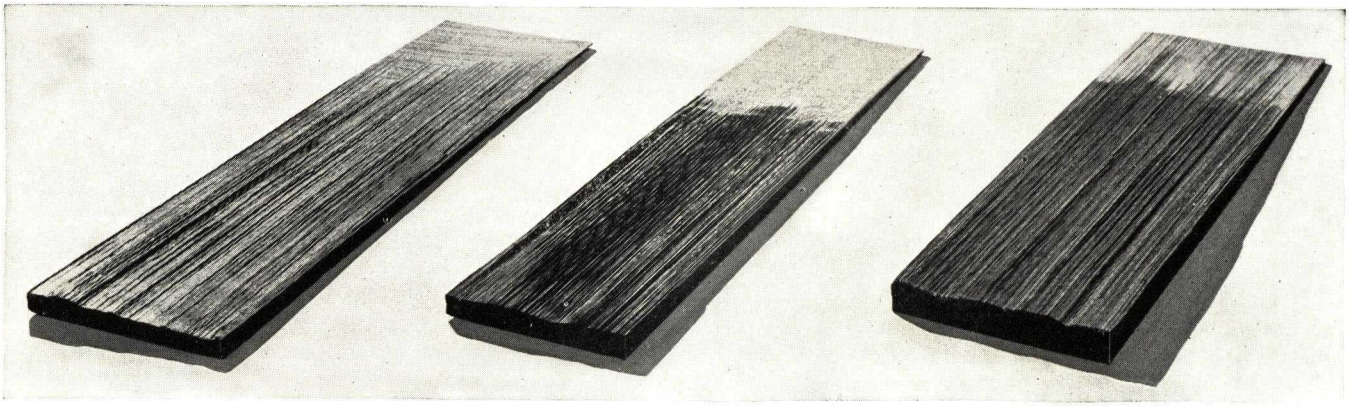
RETAIL DISTRIBUTORS OF

"Early American Brand" Hand Split Red Cedar Shingles

TELEPHONE
COrtlandt 7-5705

HOME OFFICE
30 Church Street, NEW YORK, N. Y.

Early American Brand



Juniors
Butts averaging 5/8 in. Widths random 5 in. to 12 in. Lengths 25 in. Price $2.50 per bundle delivered

Seniors
Butts averaging 7/8 in. Widths random 5 in. to 12 in. Lengths 25 in. Price $2.75 per bundle delivered

Jumbos
Butts averaging 1 1/8 in. Widths random 5 in. to 12 in. Lengths 25 in. Price $3.10 per bundle delivered

FEATURES

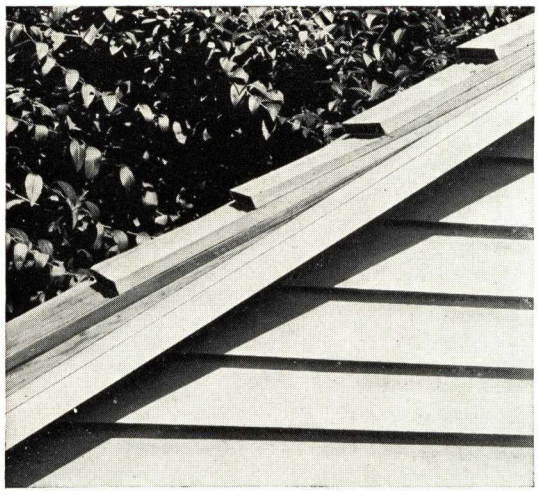
Economical. The prices compare favorably with most sidewall materials. 20-Year fire and element guarantee.

Resawn flat backs insure tight fit. Individuality. High insulation value. Rapid weathering makes staining unnecessary.

Clear all-heart edge grain, will not warp, curl or split.

DATA

Bundles packed 8/8 and/or 10/10 course. 8″ exposure recommended for roofs; 12″ or less for sidewalls. Use hot-dipt zinc-coated or copper nails. The use of copper flashing is recommended. Length, 25″ is standard. *Alternate lengths furnished upon request in any texture or butt thickness.* Write for illustrated manual containing further technical data.



Tight Fitting Roof Accomplished with Flat Sawn Backs

COVERAGE

Based on 100 sq. ft. area.

Exposure	Bundles
6″	8
7″	7
8″	6
9″	5.4
10″	5
11″	4.5
12″	4

Note Heavily Shaded Reveals and Textured Highlights for Individuality

SPECIFICATIONS

Scope—All (roofs), (sidewalls), shall be covered with "Early American Brand" (Juniors), (Seniors), (Jumbos), as furnished by COLONIAL LUMBER SPECIALTIES, INC., 30 Church Street, New York, N. Y. Expose shingles (specify exposure in inches) to the weather. Shingles shall be laid in parallel courses, doubled at eaves, using for the under course "Early American Brand" 18 No. 1 Perfection Shingles. Break all joints of Hand Split Shingles with at least a 2″ sidelap. Lay Hand Split Shingles not less than 1/8″ apart. Each 4″ in width should contain a nail. No shingle to contain less than 2 nails. A good grade of building paper shall be laid under the shingles.

NOTE: When pitch of roof exceeds 35°, greater exposures may be used for economy's sake. The foregoing is also true wherein application is over a tight matched board roof deck covered with a good grade of building paper.

Factory stained Hand Split Shingles in any color may be furnished if desired.

© Colonial Lumber Specialties, Inc.

The Character and Texture of Early American Brand, Hand Split, Red Cedar Shingles Enhance the Charm of This Attractive Colonial Residence

COST $10.00 PER SQUARE; SIDEWALLS AT 12-INCH EXPOSURE

Post and Rail Fence

We supply either Locust or Chestnut posts, both in three or four hole types. Length 7 ft. Hand hewn split Chestnut rails, 11 ft. long, pointed at both ends, thus making a 10 ft. panel.

Hurdle Fence

Hand made; rails and braces of Chestnut; posts of Chestnut or Locust, as desired. One Locust pin accompanies each panel. Panels can be either four or five bar type. Length 8 ft. 3 in. Shipped completely assembled or knocked down, with posts bored and parts fitted ready to put together.

Write our Layout Department for Suggestions

SAMUEL CABOT, INC.

Stained Shingles

141 Milk Street, BOSTON, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue — PHILADELPHIA, PA., Real Estate Trust Building — CHICAGO, ILL., 5000 Bloomingdale Avenue

AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

For Cabot's Insulating "Quilt," Stains, Collopakes (for every paint use), Waterproofing, Wood Preservatives, see File Index

CABOT'S CREOSOTE STAINED SHINGLES

We supply the highest grade red cedar shingles from the Pacific Coast, edge grain and free from defects. These are dipped in the original bundles, whirled in a centrifugal machine to make sure that each shingle is thoroughly impregnated with the Stain, and finally each shingle is individually brushed. (In certain colors of Creosote Stain, brushing is not necessary.) As a result, our Stained Shingles show no unevenness of staining, except that caused by the variation of the wood.

The stains used are Cabot's Creosote Stains, known the country over for their beautiful artistic effects and preservative value. They do not hide the texture of the wood with a heavy, "painty" coating, but instead they display the beauty of the grain at its best advantage. Their high content (over 60%) of refined creosote oil greatly increases the life of the shingles. Shingles stained with our Creosote Stains will last twice as long as unstained shingles.

Cabot's
STAINED
Shingles
Samuel Cabot Inc.

Cabot's Weathering Gray Stains

Cabot's Weathering Gray Creosote Stains produce the old-fashioned, silver gray effect characteristic of old houses on the sea shore. It takes years for nature to obtain these results, but our Weathering Gray Stains do it in six months. If you want weather-beaten, silvery, Cape Cod grays, we suggest that you have the shingles stained with one of Cabot's Weathering Grays.

Residence in Beverly Hills, Calif.
ROLLIN PIERSON, Architect
Walls, Cabot's Creosote Stained Hand Rived Cedar Shakes, roof stained with Cabot's Creosote Shingle and Wood Stains

CABOT'S HEAVY-BODIED STAINED SHINGLES

These are stained with our Heavy-Bodied Shingle Stains which differ from the Creosote Stains in that they produce more solid color effects. These stains go flat as soon as they dry, thus eliminating any shiny or "painty" appearance.

WHITE SHINGLES

We furnish shingles stained with our No. 1166 White Primer. This is not intended for a finish coat, but rather as a priming coat for shingles, to be painted over with our Old Virginia White or DOUBLE-WHITE.

For the true stain effect, we recommend Old Virginia White. This material is midway between a stain and a paint in hiding power. It reveals the texture of the shingles and produces a beautiful, lasting flat white finish. This is the nearest possible approach to a white shingle stain.

DOUBLE - WHITE should be used wherever an opaque white is required. It is our standard outside white paint, and is a very superior product. It has tremendous hiding power (two coats hide as well as three of lead and oil), and it never turns gray or yellow; it always stays *white*. It has a brilliant, soft, semi-flat finish, and for this reason is especially suitable for shingles.

Please see our pages on Stains and Collopakes for a complete description of these two Whites.

COVERING CAPACITY PER SQUARE OF CABOT'S STAINED SHINGLES BASED ON THE FOLLOWING WEATHER EXPOSURE

		4-in. exp.	4½-in. exp.	5-in. exp.	5½-in. exp.	6-in. exp.	6½-in. exp.	7-in. exp.	7½-in. exp.	8-in. exp.	8½-in. exp.	9-in. exp.	9½-in. exp.	10-in. exp.	11-in. exp.	12-in. exp.
XXXXX	1 square of 16 in. (4 bun. 20/20 pack.)	80	90	100	110	120	130	140	150	.....	.....	.....	.....	.....	.....	.....
"Perfections"	1 square of 18 in. (4 bun. 18/18 pack.)	.....	.....	.....	100	109	120	129	138	148	157	.....	.....	.....	.....	.....
"Royals"	1 square of 24 in. (3 bun. 14/14 pack.)	.....	.....	.....	.....	.....	.....	.....	75	80	85	90	95	100	110	120

Please write us for Color Cards and Samples

CREO-DIPT COMPANY, INC.

GENERAL OFFICES AND EASTERN PLANT

NORTH TONAWANDA, N. Y.

WESTERN PLANT, SEATTLE, WASH.

Originators and sole manufacturers of genuine Creo-Dipt Stained Shingles for roofs and sidewalls; also for the Thatched Roof effect and special unusual roof treatments.

CREO-DIPT STAINED SHINGLES
CREO-DIPT WEATHERPROOFED BUILDING PAPER
CREO-DIPT HAND SPLIT AND MACHINE GROOVED SHAKES
CREO-DIPT RUST PROOF ZINCLAD NAILS
CREO-DIPT WHITE (Double Strength)

Architect Gevard R. Colcord chose Creo-Dipt Congo Brown No. 233 Hand Rived Pilgrims for this attractive home. Laid at 10-inch exposure with rounded closed valleys an unusually charming effect has been secured . . . Creo-Dipt White (double strength) is especially made for wood shingles. It is also made for brick, stone and stucco, being used above on sidewalls and chimneys.

CREO-DIPT COMPANY, INC.

NATIONALLY KNOWN CREO-DIPT STAINED SHINGLES

Architect Cameron Clark of New York City chose Creo-Dipt Ambassadors for this exquisite home in Middlebury, Conn. Ambassadors used on these sidewalls were especially sawn by Creo-Dipt at the factory to give irregular butt lines.

ANOTHER PROGRESSIVE STEP BY CREO-DIPT

Twenty-five years ago the first stained shingles ever made were Creo-Dipts. Instantly they were in great demand because of their quality. Since then Creo-Dipt has been a byword among building experts—as manufacturers of the finest roof and sidewall covering.

The first wood shingles were sold on the basis of the old thousand pack. So much confusion to consumers resulted, that Creo-Dipt inaugurated the "square" pack,—an idea then so good that the whole industry adopted it. The disadvantage of the square pack was that the cost per square depended on the exposure to which shingles were laid. When applied to sidewalls the cost per square is much less than on roofs.

Creo-Dipt now adopts the new carton or bundle basis. This new basis means a fixed easy-to-figure cost.

GENERAL INFORMATION

What Are Creo-Dipt Stained Shingles?

Creo-Dipt Stained Shingles are 100% ALL CLEAR—ALL HEARTWOOD—ALL EDGEGRAIN—RED CEDAR. Stained by our patented dipping process in a heavy-bodied shingle stain. After this operation each shingle is individually brushed on both sides for equal and even distribution of color.

Creo-Dipt Shakes

Attractive and unusual effects may be had by using Creo-Dipt hand-split or machine-grooved Shakes. In addition to the sizes mentioned these hand-split Shakes are also available in 31-inch and 37-inch lengths of any desired butt thickness. Write for samples and prices. For specifications and complete instructions for laying Shakes ask for our descriptive folder.

Colors

Creo-Dipt Stained Shingles are available in all shades of green, brown, red, gray, blue, black and 207 White Primer. (Send for our assortment of colors and shades on real cedar).

Variegated Colors

Creo-Dipt Stained Shingles are also available in any number of colors mixed in the bundles or cartons to be laid by the workmen as received. Small panels showing delightful color combinations and shades on miniature cedar shingles furnished on request. Variegated colors are the same price as shades of gray.

Blended Shades

Creo-Dipt Stained Shingles are also available in blending shades of brown, red, green, and gray, blending these darkest at eaves to lightest at ridge. We will furnish laying schedule for these.

Thatched Roofs

We will furnish complete specifications and instructions for laying imitation thatched roof with Creo-Dipt Stained Shingles, together with color suggestions.

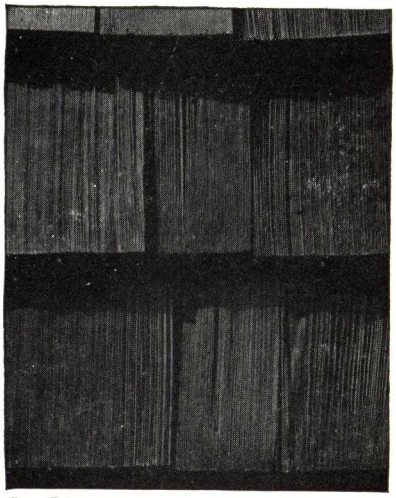
Special Roof Treatments

Unusual Creo-Dipt Antique Finish on hand split shakes. Irregular butts specially sawn at the factory, also staggered butts, accentuate unusual features of Creo-Dipt roofs.

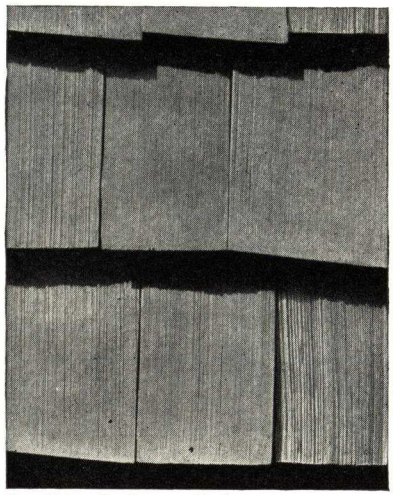
FOR ROOFS AND SIDEWALLS, FOR OLD AND NEW HOUSES

CREO-DIPT SHAKES

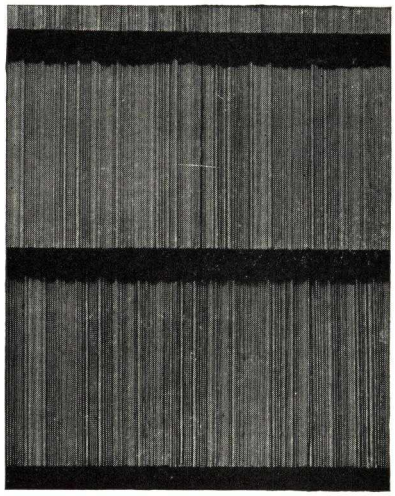
Hand Split and Machine Grooved Shingles for Roofs and Sidewalls



Creo-Dipt Pilgrims Hand Split shingles, 25-in. long, date back to early Colonial days. They are split from first growth live red cedar. Their rustic, rugged appearance reflects character and individuality. Pilgrims are hand split into random widths, then sawn smooth on one side so as to lay flat and snug against roofs and sidewalls. At the butts Pilgrims vary from ⅝ to 1¼-in. thick, producing an unusually heavy, artistic shadow line.



Creo-Dipt Yorktown Shakes, 25 and 18-in. long, are hand split and made just like Pilgrims but with more regularity of thickness. Their natural rough hewn beauty makes them extremely desirable for both roofs and sidewalls. The butt thickness of Yorktown Shakes is ½ to ⅝-in., sufficiently heavy to produce effective shadow lines. Yorktown Shakes are easy to apply and are manufactured in all Creo-Dipt regular colors.



Creo-Dipt Ambassadors, 24-in. long, ½-in. thick, are machine grooved on one side. The butts are square, the edges parallel, easy to apply. Ambassadors are made to simulate the character of the surface of hand split shingles and also have the appearance of a weathered shingle surface, showing the ribbing. If so ordered, the butts of Ambassadors will be sawn at the factory to give an irregular line of exposure when applied.

SPECIFICATIONS AND APPLICATION

Size	Type	Thickness	Exposure		Width
			Roof	Sidewall	
25″ Pilgrim	Hand Split	⅝ to 1¼″ (av. 1″)	7½″	10 to 12″	Random
25″ Yorktown Shake	Hand Split	½ to ⅝″	7½″	10 to 12″	Random
18″ Yorktown Shake	Hand Split	½ to ⅝″	5½″	8½″	Random
24″ Ambassador	Machine Grooved	½″	7½″	10 to 12″	Random

Application—Indicate size and color, note exposure above.

Roofs—Apply over closed sheathing and with a strip of Creo-Dipt Weatherproofed Building Paper, Heavy weight, 18 in. wide laid in between each course. (See Figs. No. 1 and 3.) Starting at the eaves with a double course of shingles, lay a strip of Creo-Dipt Weatherproofed Building Paper 15 in. from butts and cover paper with next course of shingles laid 7½ in. from butts of starter course, breaking all joints in at least the next two succeeding courses, with no less than a 2-in. side lap. Proceed in like manner for each course.

Hips and Ridges—*Boston style*: Shingles laid horizontally over a double thickness of Creo-Dipt Weatherproofed Paper, Heavy weight. Mitered hips shall be laid tight and mitered, flashed under each course (see Fig. No. 3) with a copper shingle 8 in. wide and long enough to give a 2-in. head lap, taking care that no nails go through flashing, except at extreme outward corners. Mitered ridges shall be laid tight and mitered. Under last course of shingles, at ridge, lay a continuous strip of copper to extend down on both sides 4 in. Nail last course close to butts, and toenail at top, no nails to go through flashing at any point.

Valleys—*Open style*: Cut shingles parallel to valley, forming gutter not to exceed 6-in. width (see Fig. No. 1). Valleys to be made from 16-oz. copper sheet 20 in. with 3-in. splash rib down center and crimp of ½ in. on outer edges (see detailed drawing). Rounded valleys shall be laid closed and rounded over small saddles built in by carpenter (see Fig. No. 2). Between each course of shingles, use a strip of copper sufficiently wide to extend at least 8 in. up on either side of valley and long enough to make at least a 2-in. head lap, nailing all valley shingles so that nails will come under lap of flashing.

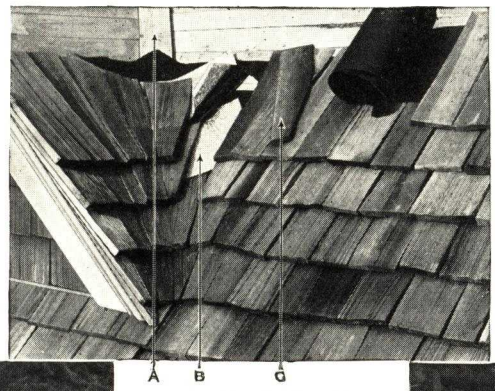


Fig. No. 2. Detail of Rounded and Closed Valley

A. Small saddle, composed of 1-inch x 6-inch, laid up center of valley.

B. Valley flashings between each course, showing a 2-inch head lap and nailing under lap.

C. Shingle removed to show method of cutting with axe to form curve of valley.

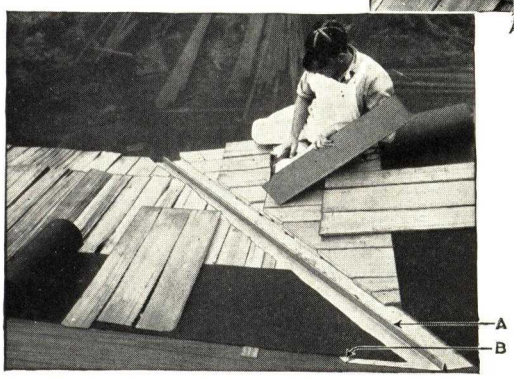


Fig. No. 1. Detail of Open Valley, Looping from Ridge to Eaves

A. The 3-in. splash rib down center of valley. (This is shown in detail in drawing above.)

B. Crimp of ½-in. on outer edge for added safety (see detailed drawing).

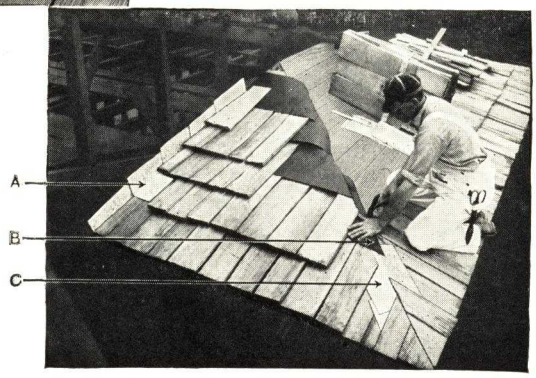


Fig. No. 3. Various Details of Pilgrim Roof Construction

A. Shingle removed showing 4-in. flanged wall flashing.

B. The first strip of paper laid over starting course 15 in. from butts.

C. Illustrating flashing when hips are mitered.

Sidewalls—Lay over solid sheathing and one layer of Creo-Dipt Weatherproofed Building Paper—Standard, Medium or Heavy weight. Starting course shall be doubled. Break all joints with at least a 2-in. side lap.

Nails—Creo-Dipt Rust Proof Zinclad Nails. Roofs—8d nails. Sidewalls—5d nails. Two nails in each shingle.

Ambassadors—Machine grooved, parallel sides, 24 in. long, ½ in. thick, to be laid at 7½-in. exposure on roofs and 11-in. exposure on sidewalls, over open or closed sheathing and one layer of Creo-Dipt Weatherproofed Paper.

Creo-Dipt Hand Split Shakes are available in 18, 25, 31 and 37-in. lengths in any thickness. They are furnished stained in any of the popular Creo-Dipt colors or may be used in their natural, unstained finish. Write for complete specification folder. We can also furnish taper tipped hand split shakes, but we do not recommend them.

SPECIFICATIONS FOR CREO-DPIPT STAINED SHINGLES

Description	Thickness at butts	Courses per carton	Weight per carton	Recommended exposure and square foot coverage per carton			
				On Roofs		On Sidewalls	
				Exposure	Coverage	Exposure	Coverage
16″ 5X	5 butts, 2″	20/20	38 lbs.	5″	25.7	7½″	38.5
18″ Eurekas	5 butts, 2″	18/18	38 lbs.	5½″	25.4	8″	37.
18″ Perfections	5 butts, 2¼″	18/18	42 lbs.	5½″	25.4	8″	37.
18″ Jumbos	⅝″	12/12	39 lbs.	5½″	16.9	8″	24.7
24″ Royals*	½″	13/14	52 lbs.	7½″	26.	11″	38.2
24″ Ambassadors	½″	13/14	52 lbs.	7½″	26.	11″	38.2
Following hand split resawn shakes:							
25″ Yorktown Shakes†	½″ approx.	10/10	45 lbs.	7½″	19.3	12″	30.8
25″ Pilgrims†	⅝″ to 1¼″	8/8	60 lbs.	7½″	15.4	12″	24.7
18″ Yorktown Shakes†	½″ to ⅝″	12/12	45 lbs.	5½″	16.9	8½″	26.2

*Royals are also available in 1 in. thick butts. (24 in. Aristocrats).
†Hand split shakes are available in 31 and 37-in. lengths. See page 3 for complete specifications.
Pilgrims, Yorktown Shakes and 18″ Jumbos are packed in bundles, only.

Number of square feet covered by one carton or bundle of Creo-Dipt Stained Shingles, according to pack and exposure

	Exposure	4½″	5″	5½″	6″	6½″	7″	7½″	8″	8½″	9″	9½″	10″	10½″	11″	11½″	12″
Courses per bundle	20/20	23.1	25.7	28.3	30.8	33.4	36.0	38.5	41.1	43.7	46.3	48.8	51.4	54.0	56.5	59.1	61.7
	18/18	20.8	23.1	25.4	27.8	30.1	32.4	34.7	37.0	39.3	41.6	43.9	46.2	48.6	50.9	53.2	55.5
Refer to Pack of Size or Grade Desired (above)	13/14	15.6	17.3	19.1	20.8	22.5	24.3	26.0	27.8	29.5	31.2	33.0	34.7	36.4	38.2	39.9	41.6
	12/12	13.9	15.4	16.9	18.5	20.5	21.6	23.1	24.7	26.2	27.8	29.3	30.8	32.4	33.9	35.5	37.0
	10/10	11.6	12.8	14.1	15.4	16.7	18.0	19.3	20.6	21.8	23.1	24.4	25.7	27.0	28.3	29.5	30.8
	8/8	9.3	10.3	11.3	12.3	13.4	14.4	15.4	16.4	17.5	18.5	19.5	20.6	21.6	22.6	23.6	24.7

CREO-DIPT ZINCLAD NAILS

(Hot-dipped in pure, molten zinc)

Creo-Dipt Nails are the only correct nails with which to apply Creo-Dipt Stained Shingles. Don't use inferior nails. A roof or sidewall is only as good as the nails that hold the shingles.

Creo-Dipt Rust Proof, Zinclad Nails double the life of a Creo-Dipt Shingle roof and sidewall. The coating on cheap nails, such as "galvanized" or "zinc coated" is so thin it cannot resist rust like Creo-Dipt Nails which are hot-dipped, in pure, molten zinc. If Creo-Dipt Zinclad Nails are used with Creo-Dipt Stained Shingles, the roof will last from thirty to forty years and the sidewalls as long as the house they cover.

Rusty nails rot wood shingles around the nail holes. Also the rusted heads break off. The nail holes enlarge and shingles are easily blown off. Just a few shingles blown off because of inferior nails can ruin a house. Genuine Creo-Dipt Zinclad Nails are rust proof. They will last a life time and are the best safeguard for a Creo-Dipt wood shingle roof and sidewall.

Pounds of Nails Required per Bundle or Carton of Shingles

Size Shingle	3d 1¼″	3½d 1⅜″	4d 1½″	5d 1¾″	6d 2″	8d 2½″
16″ 5X	¾	—	—	1¼	—	—
18″ Eurekas, 18″ Perfections	—	¾	—	1¼	—	—
24″ Royals, 24″ Ambassadors ...	—	—	1	—	2	—
25″ Pilgrims	—	—	—	1	—	1
25″ Yorktown Shakes...	—	—	¾	—	¾	—
18″ Yorktown Shakes, 18″ Jumbos	—	—	½	—	½	—
Double Coursing....	—	—	—	1¼	—	—

Creo-Dipt Zinclad Nails may be obtained through leading lumber dealers.

CREO-DIPT WEATHERPROOFED BUILDING PAPERS

(For use with Creo-Dipt Stained Shingles)

This paper has a 100% pure kraft paper base.

Special compounds are infused into the kraft fibres. It is not a coated or saturated paper. The patented process of infusion permanently seals and protects the fibres indefinitely, strengthens them and produces a long-lived, tough, flexible, non-absorbing, waterproof sheet.

It is remarkably free from the effects of temperature changes because it is infused at 350°F. It does not dry out nor crack nor break when creased, rolled or bent, even in the coldest temperatures. It will not get tacky or sticky, also will not "run" or "bleed" in extremely warm weather. It is strong, light in weight and easily handled. It is the most ideal and the safest weatherproofed building paper for use underneath Creo-Dipt Stained Shingles, sidewalls and roofs.

It is waterproof, moistureproof and practically airtight; excellent added insulation against heat and cold; proof against vermin and insects; nothing in it attracts rats or mice; cannot mildew and will not support spore-growth of any kind. It is absolutely odorless.

Furnished in rolls 36 in. wide containing 500 sq. ft., guaranteed measurement. It is also available on special orders in wider rolls. There are three weights — Standard, Medium and Heavy — to meet all requirements. Write Creo-Dipt for samples and make a few easy tests yourself.

Uses for Creo-Dipt Weatherproofed Building Paper

Underneath all Creo-Dipt Stained Shingles.

Creo-Dipt Hand Split Shakes should never be put on without Creo-Dipt Heavy Building Paper, cut and applied in accordance with directions. Use it also under hardwood floors.

Leading lumber dealers sell Creo-Dipt Weatherproofed Building Paper.

CREO-DIPT WHITE

(Double Strength)

Nature and Uses

Creo-Dipt White is recommended as giving the best results where white is to be used on wood shingles. It is a special pure white brushcoat preparation that gives the true New England Colonial flat white effect. Made expressly to be used on wood shingles, Creo-Dipt White has the soft, velvety appearance of whitewash combined with extraordinary wear-resisting qualities. It may also be used on rough surfaced lumber, brick, stone or stucco.

Quality of Creo-Dipt White

Creo-Dipt White (double strength) is a true architectural finish for wood shingles. It avoids the "painty" look. It has maximum hiding qualities. It stays white and resists the darkening effect of industrial gases.

Superiority of Creo-Dipt White

The superiority of Creo-Dipt White for wood shingles lies in its hiding qualities, ease of application, greater covering capacity, intense pure whiteness and resistance to weather.

Creo-Dipt White is unusually opaque. You can test this for yourself by brushing Creo-Dipt White and a similar product side by side over a black and white background.

Creo-Dipt White flows readily off the brush. It does not stick or drag, making it easy to do a neat, workmanlike job without lap or brush marks. Creo-Dipt White on wood shingles covers approximately 350 sq. ft. per gallon, one brushcoat, over No. 207 White Primer. For the best results our No. 207 White Primer should always be applied on the wood shingles before using Creo-Dipt White.

Creo-Dipt White is so white that white lead actually looks gray alongside it. Weathering tests show that Creo-Dipt White on wood shingles is in good condition after five years' exposure.

Creo-Dipt White on wood shingles weathers by gradual chalking which produces an ideal surface for refinishing years later and will not peel nor alligator. It will not chalk excessively. Creo-Dipt White resists ocean front climate and salt spray, which ruin ordinary whites rapidly and completely. High pigment concentration gives complete protection from the ravages of salt spray, wind, snow, rain or sleet and the ultra-violet rays of the sun so destructive to ordinary whites. It is the proper white to use on wood shingles.

Creo-Dipt White Two-Coat Application

This economical *two-coat* system for wood shingles is one coat of Creo-Dipt No. 207 White Primer and one coat of Creo-Dipt White (double strength). It is an inexpensive flat white finish for wood shingles. Change the present color of wood shingles to Creo-Dipt White with this *two-coat* application.

On wood shingles that are extremely weathered and worn, use for the first coat, instead of No. 207 Primer, a prime coat of 1 qt. of boiled linseed oil added to a gallon of Creo-Dipt White. When this has dried thoroughly, apply a second coat of Creo-Dipt White just as it comes from the can. This gives an extremely pure white house.

Creo-Dipt Stained Shingles for a white house are treated at the factories by a special process with Creo-Dipt No. 207 White Primer, and are ready for Creo-Dipt White when the shingles are put on the house.

Detailed directions for applying No. 207 Primer and Creo-Dipt White (double strength) on wood shingles are printed on the label of each can.

CREO-DIPT STAINS

In addition to Creo-Dipt White, we manufacture Creo-Dipt Stains for restoring the color and preserving old wood shingles. Creo-Dipt Stains come in the same wide variety of colors as Creo-Dipt Stained Shingles. Write to CREO-DIPT COMPANY, INC., North Tonawanda, N. Y., for complete information.

JOHN C. RUNKLE, President

THE ELHIDE COMPANY

Makers of Elhide Hand-Split Cedar Shingles

130 Sixth Street, CAMBRIDGE, MASS.

TELEPHONE: Kirkland 5100

PLANTS: HATZIC, B. C.; CAMBRIDGE, MASS.

Products

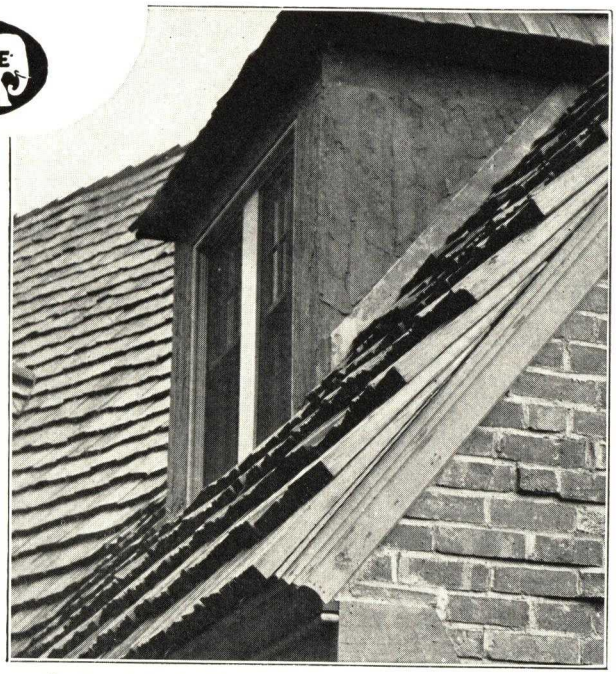
ELHIDE HAND-SPLIT CEDAR SHINGLES.
Also Elhide Monson Maine Roofing Slate.
For Elhide Woven Rustic Fencing—see File Index.

Elhide Hand-Split Cedar Shingles

These shingles are rived by hand from the giant red cedars of British Columbia, a wood famous for its non-rotting qualities. After the shakes are split by hand, each one is sawn diagonally, under our patent, into two tapered shingles, which leaves the upper or exposed surface of each shingle in its natural beauty, a rugged hand-split textured shingle, while the under-side is sawn smooth to make a level laying surface.

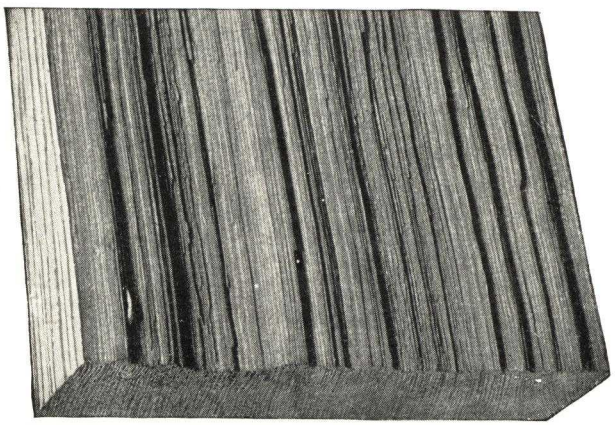
Elhide Shingles are 100% edge-grain and air dried, or equivalent. The former prevents warping, curling and splitting, while the latter retains the natural oils in the wood so essential to the long life of the shingle, and so often dissipated by excessive artificial drying.

These shingles need no staining to preserve them, and when laid unstained, weather to soft and very pleasing tones. If staining is desired, we are prepared to furnish them in white or any color. Elhide Hand-Split Cedar Shingles are made in random widths, 5 to 12 in., and in the following lengths and butt thicknesses: ½-in. butts, 26 in. long—¾ in., 1 in. and mixed butts ⅝ to 1¼ in.—26 and 32 in. long. 1¼, 1½, 1¾ and 2-in. butts, 32 in. long. Also made to order in any butt thickness and length desired. ¾-in. butts and heavier give the most satisfactory results.



Graduated Roof of Elhide Hand-Split Cedar Shingles on a Residence, Wellesley, Mass.
WALKER, WALKER & KINGSBURY, Architects, Boston, Mass.

Cottage in Darien, Conn.
DAVIS & WALLDORFF, Architects, New Haven, Conn.



Note the Beautiful Texture of This Surface Which Varies in Each Individual Shingle

Elhide Graduated Roofs

Heretofore, when laying out a graduated roof, the only available material has been slate slabs. THE ELHIDE COMPANY has now produced for this purpose massive hand-split cedar shingles up to 2 in. in thickness. With these shingles, the architect can design a graduated roof of unsurpassed massiveness and strength, and yet retain all the beauty and characteristic charm of the wooden shingle enhanced by the ruggedness and texture of the hand-split surface.

For example, a roof may be laid with 2-in. butt shingles at a 12-in. exposure at the eaves, gradually reducing both the thickness of the butts and the exposure to the weather to ½-in. butts and a 6-in. exposure at the ridge.

Upon presentation of roof plans and elevations, we shall be pleased to furnish, without charge, definite layouts for graduated roofs.

Elhide Hand-Split Cedar Shingles retain all the well-known desirable qualities that are inherent in the wooden shingle, and in addition provide a beautiful rugged textured surface. These shingles give a durability, and freedom from upkeep expense obtainable only in a shingle rived by hand, entirely edge-grain and free from excessive artificial drying.

Full information, specifications and pictures of installations furnished upon request.

A Few Installations

OWNER	ARCHITECT
George Roberts, East Hampton, N. Y.	Aymar Embury II
N. E. States Exhibition, Springfield, Mass.	Joseph Everett Chandler
P. A. Clark, Kingston, N. Y.	Edgar Salomonsky
John Hay Whitney, Manhasset, N. Y.	LaFarge, Warren & Clark
Mrs. William White, Haverford, Pa.	Willing, Sims & Talbutt
Dr. Philip G. Cole, Tarrytown, N. Y.	LaFarge, Clark & Creighton
H. P. Metcalf, Exeter, R. I.	W. T. Aldrich
Samuel Halsey, Sunapee Depot, N. H.	Prentice Sanger
Mrs. Prescott Slade, Mill Neck, N. Y.	Chester A. Patterson
Morris Brill, Mt. Kisco, N. Y.	Taylor & Levi
Mrs. J. P. Kellogg, Rumson, N. J.	Polhemus & Coffin
E. P. Swenson, Upper Saranac, N. Y.	Godwin, Thompson & Patterson
J Wilton Peters, New Canaan, Conn.	Henry Otis Chapman

JAMES LUMBER COMPANY

ESTABLISHED 1875

Makers of "Blue Jay" Hand Split Cypress Shingles

88 Broad Street, BOSTON, MASS.

THE ARCHITECTURAL APPEAL OF "BLUE JAY" SHINGLES

Much of the attractiveness possessed by many buildings of Colonial times was due to the use of hand split shingles on both sidewalls and roofs.

To architects who are desirous of reproducing the same qualities of texture and long life in their buildings, attention is called to "Blue Jay" Hand Split Heartwood Cypress Shingles.

No single generation lives long enough to renew a roof covered with genuine hand split and shaved cypress shingles.

HOW "BLUE JAY" SHINGLES DIFFER FROM SAWED SHINGLES

"Blue Jay" Shingles differ from the commercial sawed shingles in three different ways: Thickness and method of tapering, surface texture, and method of producing.

Thickness and Method of Tapering—"Blue Jay" Shingles are practically the same thickness half their length before they are tapered by shaving with a draw knife, whereas the sawed shingles have a uniform taper from butt to tip. The extra thickness prevents curl and provides extra depth for wear.

Surface Texture—The method of hand splitting with the grain gives an individual texture to each shingle and no two are alike. This gives interest and texture to the wall or roof which is impossible to produce otherwise. The flat grain preserves all the wonderful weather-resisting qualities of heartwood cypress.

Method of Producing—The same hand methods which the pioneers in South Carolina followed in making shingles as far back as 1640 are followed in producing "Blue Jay" Shingles. Today descendants of the slaves who produced the early shingles are working in the same southern swamps, felling selected trees, cutting bolts and with frow, maul and draw-shave are making "Blue-Jay" Shingles.

Splitting and Tapering—After splitting to the proper butt thickness, the upper half of the shingle is tapered to ⅛ in. thick producing a shingle very different from the sawed shingle.

Weathering and Coloring—They are then piled loosely and left to season and to weather in the sun and air. "Blue Jays" when delivered are already semi-weathered. They weather to a silver gray. They never require staining for appearance or preservative purposes, but may be whitened or colored with any paint or standard shingle stain.

Sizes—All "Blue Jay" Shingles are carefully selected, graded and fully guaranteed. They are made in the two sizes most favored in Colonial days:

24 in., with ⅝ in. butts and ⅛ in. tops.
20 in., with ½ in. butts and ⅛ in. tops.

Samples gladly supplied on request.

Laying—For roofing, the 24-in. size should be laid 7 in. to the weather, and the 20-in. size 6 in. to the weather. For sidewalls, the 24-in. shingles may be placed 9 or even 10 in. to the weather. The 20-in. size should be laid 7 or 8 in. to the weather.

Nailing—Specify copper (1¾ to 2¼ in. in length), "yellow metal" or old-fashioned dipped galvanized nails, 5d or 6d according to exposure. The less the amount of shingle exposed to the weather the longer the nail should be. On sidewalls, 4d nails may be used. Prices on nails will be quoted if desired.

Staining—"Blue Jay" Shingles never have that "new," "raw" look and never actually require staining for appearance or preservative purposes, but they may be whitened or colored with paint or any standard stain.

Prices—Gladly supplied on request. You will be surprised and pleased to learn how modest they are. Please give us the following data:

The size—that is, 20 in. and/or 24 in.

The area in square feet to be covered.

The place of delivery.

The approximate date of delivery wanted.

Shipments—Made from Boston stock or from our camps direct, as best suited to the particular order. Ample supplies always on hand.

Specifying—*To obtain the genuine article, specify as follows: "For roof and sidewalls use genuine cypress, clear all heart, hand made, split and shaved shingles, 'Blue Jay Brand,' supplied by* JAMES LUMBER COMPANY, *88 Broad Street, Boston, Mass."*

Sawed Cypress Shingles—We sell them also.

Built about 1740 — **"Reed House" Kingston, Mass.** 24-in. "Blue Jays" at 10-in. exposure — *Reconditioned 1929*

RED CEDAR SHINGLE BUREAU

Certigrade Red Cedar Shingles
4408 White Building
SEATTLE, WASH.

CERTIGRADE Red Cedar Shingles are manufactured by members of the RED CEDAR SHINGLE BUREAU, an association composed of practically 90% of the Red Cedar Shingle manufacturers of America and Canada, organized for the purpose of bettering the roofs and sidewalls of the country and stimulating the demand for Red Cedar Shingles everywhere.

CERTIGRADE Red Cedar Shingles are made under the Grading Requirements of Commercial Standard C.S.31-35, as issued by the United States Department of Commerce.

Every Shingle bearing the Certigrade Label is guaranteed to be up to these grades in every respect—your guarantee and protection.

UNRIVALLED ATTRIBUTES OF CERTIGRADE RED CEDAR SHINGLES

Beauty, comfort, economy, safety, durability and style are factors of equal importance to home builder and architect alike. CERTIGRADE Red Cedar Shingles on roof and sidewall lend themselves harmoniously to any type or style of architecture, to small cottage as well as pretentious mansion. Their infinite variety of width, no two being exactly or monotonously alike, together with the subdued play of tone and color in the super-durable heartwood, awaken responsive notes in all who really appreciate the true beauty of a well-built home.

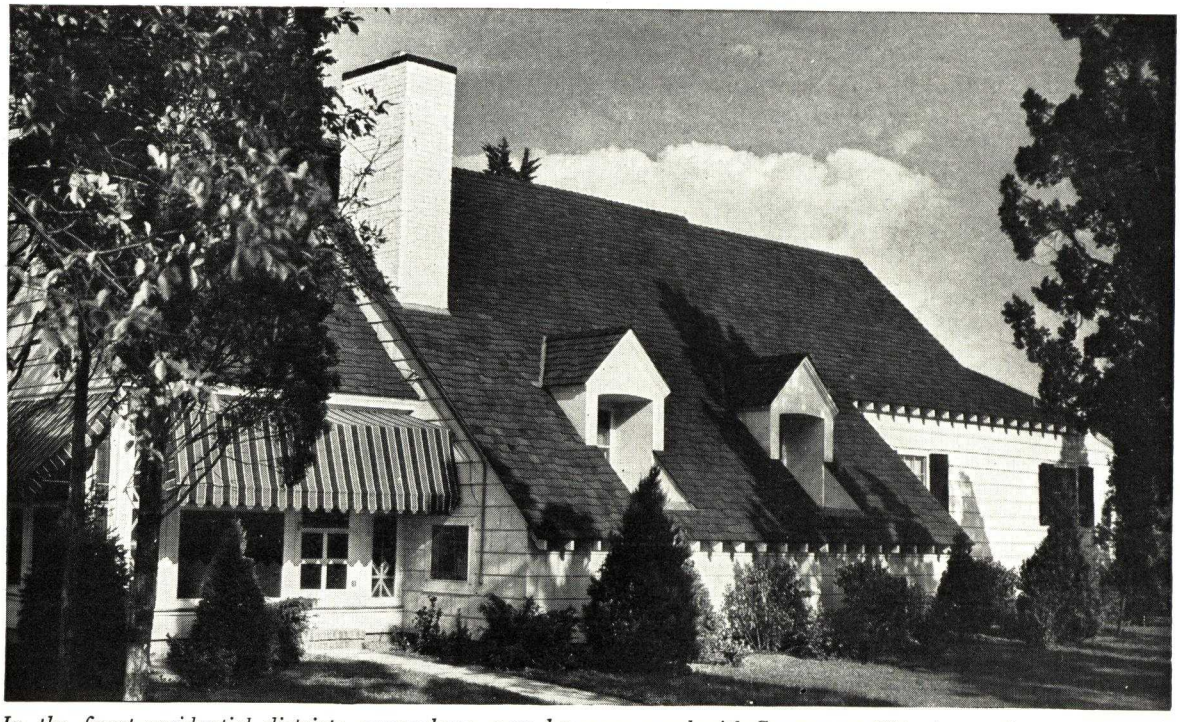
Over-Roofing with Red Cedar Shingles adds insulation, saves money, protects shrubbery and conserves fuel.

OVER-ROOFING

Re-roofing with Red Cedar Shingles over the old roof is practical, economical and efficient. Whether the old roof is of wood shingles or substitutes makes little difference in labor costs. The expense of removing the old roof is saved, there is no litter or dirt, no damage to lawn or flowers, and the double roof gives double insulation value.

The increase in thickness of the roof greatly stiffens and strengthens the structure.

Work can be done at any time because of protection of old roof.



In the finest residential districts everywhere, new homes covered with CERTIGRADE *Shingles are in great demand. This new house is illustrative of the modern concept of the ideal American home.*

CERTIGRADE LABEL

This is a miniature reproduction of the "CERTIGRADE Label." Insist that it appear on every bundle. It is for your protection and insurance that the shingles inspected by the RED CEDAR SHINGLE BUREAU are guaranteed by the manfacturer to meet all requirements of commercial standards as issued by the United States Department of commerce.

The No. 1 Grade label can only be used on Edge Grain. 100% heartwood, All Clear, Red Cedar Shingles, manufactured by licensed mills.

Labels are supplied to the shingle mills in small allotments which are delivered at specific intervals, depending upon the actual cut of the mill. If the Bureau inspectors find that the shingles manufactured fall below the requirements of the Grading Rules, the supply of labels is withheld until the trouble is corrected.

No. 2 and No. 3 grades are also inspected and appropriately labeled.

ARCHITECT'S MASTER SPECIFICATIONS

SHEATHING BOARDS: ROOFERS

(The choice of open or solid sheathing is optional when CERTIGRADE Shingles are applied. The geographical location of the building will determine the most practical procedure.)

(1) All sheathing shall be
(Use 2 for open sheathing and 3 for solid sheathing.)

(2) square edge boards cut from 1" stock not over 6" wide and shall be spaced the same distance apart on centers as the shingles are to be laid to the weather.
(Use 3 for solid sheathing.)

(3) Dressed and Matched or Shiplap cut from 1" stock not over 8" wide and shall be laid solid.
*(Use 4 for **both** open and solid sheathing.)*

(4) Each board shall be double face nailed at each end and at each bearing with two 10d nails driven about 1" from the edges of the boards.

SHEATHING PAPER

(5) The outside of all exterior sheathed walls shall be covered with one continuous unbroken layer of rosin sized sheathing paper weighing not less than 15 lbs. per roll of 500 square feet.

(If added insulation is wanted, dry or unsaturated deadening felt, or light weight "blue" wall board, may be specified. Pitch or "asphalt" saturated "dry" felt, or building papers with an "asphalt" core are not recommended.)

(6) Sheathing paper shall be laid shingle fashion without wrinkles or buckles and with all joints at least 6" and shall be carried over the studs, jambs, heads and sills of all openings, and no end laps shall occur within 18" of any internal or external corner.

SHINGLES

(7) The Contractor shall cover all roof surfaces *(Specify all other locations, as in 8.)*

(8) and all exterior side walls, sides of dormers, gable ends.

(9) with CERTIGRADE Red Cedar Shingles—bearing the Red Cedar Shingle Bureau's official grade marked label.

(Certigrade Red Cedar Shingles are manufactured in three different lengths: 16", 18" and 24". Three grades in each length—No. 1, No. 2 and No. 3—are available; the No. 1 grade being the best, and the No. 3 grade being intended for purposes where the presence of defects above the standard weather exposure will not militate against their use. No. 2 is an intermediate grade.

No. 1 Shingles in each length are strictly vertical or edge-grain, are made exclusively of decay-resistant heartwood, and are entirely "clear." They should be specified for roofs in all first-class construction.

No. 2 Shingles may be used to advantage on secondary buildings, and for undercoursing in "double-coursed" side walls.

No. 3 Shingles may also be used as undercoursing in side wall construction.

The choice of length of the shingles to be used may be determined upon the basis of the architectural effect that is wanted, and the cost that is justified. The longer shingles have thicker butts and are consequently longer lived, although the 16-in. length in the No. 1 grade will give exceedingly good service, and very long life when properly applied according to these specifications.

Please consult the Certigrade Handbook of Red Cedar Shingles, and the official grading rules of the Red Cedar Shingle Bureau for full details. Copies of each will be furnished promptly upon request.)

(10) Shingles for roofs shall be *(Specify grade and length.)*

(11) Shingles for side walls shall be *(Specify grade and length.)*

(12) Shingles for outer courses shall be *(Specify grade and length.)*

(13) Shingles for under courses shall be *(Specify grade and length.)*

(14) Roof shingles shall be laid with a weather exposure of
(Specify exposure to the weather in inches from the following table.)

(In general the lowest pitch used in the roof will govern although certain instances may permit two different weather exposures for separate parts of the same roof.)

Pitch of Roof			*Exposure of Shingles in inches*		
Pitch	*Rise (in inches)*	*Run*	*16*	*18*	*24*
1/8	3	12			
1/6	4	12	3¾	4¼	5¾
1/4	6	12			
1/3	8	12			
1/2	12	12	5	5½	7½
5/8	15	12			
3/4	18	12			

(15) Side wall shingles shall be applied with a weather exposure of *(Specify exposure to the weather in inches from the following table.)*

Length of Shingles (in inches)	*Exposure of Shingles (in inches)*	
	Single Course	*Double Course**
16	6 to 7½	8 to 12
18	6 to 8½	8 to 14
24	8 to 11	12 to 16

**Assuming exposed course is face nailed.*

(16) Shingles shall be doubled at all eaves *(Specify "tripled" where box cornices occur.)*
(Use 17 for side walls.)

(17) and at foundation line
(To insure proper spill into gutters use 18.)

(18) Butts of the shingles in the first course on roofs shall project 1½" from the first sheathing board.

(19) Roof shingles shall be spaced apart not less than ¼" nor more than ⅜".

(20) Side wall shingles shall be *(Specify spacing as in 21 or 22.)*

(21) laid with close jointed edges.

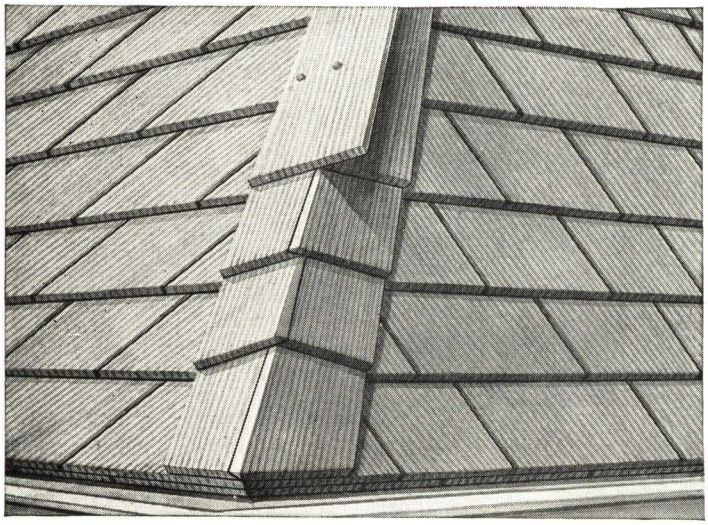
(22) spaced apart not less than ⅛" nor more than ¼".

(23) and the joints in the shingles in any one course shall be not less than 1½" away from the joints in the two courses next below.

HIPS AND RIDGES

(24) All hips and ridges shall be *(Specify type of which 25 is an example.)*

(25) the modified "Boston" type. Shingles shall be of approximately the same uniform width. The first shingle of the hip shall be sawed across the butt so that the edge of the butt will be parallel with the butts of the shingles in the first course of shingles at the eave line. It shall then be nailed in place with the lower edge extending along a line previously marked off back from the center line of the hip on that side, the nails being placed so that they will be covered by the next hip shingle applied. The edge of this shingle projecting above the center line of the hip shall be cut back flush with the face of the opposite hip or ridge shingle. The next two shingles are now applied, but in reverse order, so that the final trimmed-off edge slants in a direction opposite to that of the first exposed edge.



How a modified and recommended "Boston" hip is made

VALLEYS

(For clauses covering sheet metal flashings etc. see 43 to 54.)

(26) All valleys shall be *(Specify whether "open" or "closed" as in 27 and 28.)*

(27) open, with shingles lapping the valley flashing not less than 6" on each side.

(28) closed, with flashings under each course to a width of 9" on each side of the valley.

(29) Shingles extending into the valley shall be sawed to the proper miter.

(30) Breaking of joints in shingle courses into valley will not be permitted.

(31) Laying of shingles, with grain parallel with the center line of the valleys, will not be permitted.

NAILS AND NAILING

(Do not use bright, or blued, steel wire nails in applying CERTIGRADE *shingles.)*

(32) Each shingle shall be rigidly secured in place with not more than two full driven hot dipped heavily zinc coated *(Specify size.)*
(Use 33 with 37 for new roofing with 16" and 18" shingles.)

(33) 3d shingle nails.
(Use 34 for new roofing with 24" shingles.)

(34) 4d shingle nails.
(Use 35 for new side walls with all shingles and for over roofing with 16" and 18" shingles.)

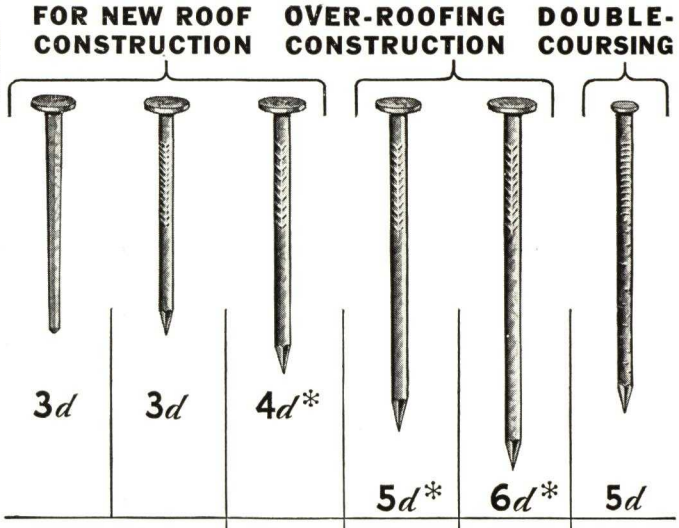
(35) 5d "box" or special 14-gauge shingle nails.
(Use 36 for over roofing with 24" shingles. For butt nailing in double-coursing use small head 5d nails.)

(36) 6d shingle nails.

(37) except that 5d shingle nails shall be used for hips and ridges.

(38) Nails shall be driven flush but not so that the head crushes the wood and shall be placed not more than ¾" from the side edges of the shingles and from ¾" to 2" above the butt line of the shingles in the next course above.
(Use 39 where double coursing occurs.)

(39) except that in butt nailing in double-coursing, the nails shall be placed from 2" to 3" above the butt line.



FOR 16" AND 18" SHINGLES		FOR 24" SHINGLES	FOR 16" & 18" SHINGLES	FOR 24" SHINGLES	FOR ALL SHINGLES
1¼" LONG	1¼" LONG #14½ GAUGE	1½" LONG #14 GAUGE	1¾" LONG #14 GAUGE	2" LONG #13 GAUGE	1¾" LONG #14 GAUGE
APPROX 376 NAILS TO LB	APPROX 515 NAILS TO LB.	APPROX 382 NAILS TO LB.	APPROX. 310 NAILS TO LB.	APPROX. 220 NAILS TO LB.	APPROX. 380 NAILS TO LB.

SQUARE CUT NAILS OF SAME LENGTH WILL ALSO GIVE SATISFACTORY SERVICE

* SO-CALLED "BOX" NAILS OF THE SIZES GIVEN WILL PROVE SATISFACTORY IF PROPERLY ZINC COATED BY THE HOT-DIPPING PROCESS.

FLASHINGS

(40) All flashings and sheet metal throughout shall be *(Specify material weights, etc.)*

(The proper choice of materials for valleys and flashings rests with the architect, and must, of course, be determined upon the basis of cost as well as probable life. 16" Certigrade Red Cedar Shingles will give good service for 25 to 50 years or longer, depending upon grade, exposure, and pitch of roof; hence much consideration should be given to the proper choice of metal for flashings.)

Lead: *Lead should be specified as "hard lead" weighing not less than 2½ lb. per sq. ft. for step flashings and not less than 3 lb. per sq. ft. elsewhere.*

Tin: *Tin should be not less than IX coated with tin and lead, containing not less than 25% tin and weighing not less than 40 lbs. per box of 112 sheets 20" x 28" in size.*

Galvanized Iron: *Galvanized Iron should be specified by gauge and coating using 24 or 26 gauge with a coating not less than 1½ ounces per square foot.*

Solder: *Solder should be specified as half and half pig lead and block tin. Flux should be rosin for tin and acid for galvanized iron.*

(41) Proper allowance shall be made in all cases for expansion and contraction and all flat and lap seams shall be made in the direction of the flow of water.

(42) The Contractor shall provide flashing and counterflashing wherever indicated on the drawings and as necessary to make weather and water tight job. Flashing shall be free from longitudinal joints.

VALLEY FLASHINGS

(Use 43 to 53 for Open Valleys and 54 for Closed Valleys.)

(43) Longitudinal joints in valleys will not be permitted.

(44) Transverse joints shall be made shingle fashion and lap not less than
(Use 45 for roofs of ½ pitch or steeper.)

(45) 6 inches
(Use 46 on roofs of ½ to ¼ pitch.)

(46) 8 inches
(Use 47 on roofs of less than ¼ pitch.)

(47) 10 inches
(Use 48 for tin.)

(48) and shall be soldered.
(Use 49 for lead.)

(49) Valley sheets shall not be longer than 8 ft. Joints between lead sheets must be loose-locked, the joint being filled with an approved non-hardening compound. Lead valley sheets shall be secured with hard lead cleats folded into the loose-locked joints; the other end of the cleat being nailed free of the lead sheet.

(50) Valley sheets shall extend outward on each side from the center line of all valleys for a distance of at least *(Specify distance.)*

(Use 51 for ½ pitch and steeper and 52 for less than ½ pitch.)

(51) 7 inches

(52) 10 inches

(53) At the ridge line, the open portion of every valley shall be at least 2" wide, increasing in width at the rate of at least ½" per 8 ft. in length as it descends. Valleys uniform in width, and not less than 4" wide shall be used where their length does not exceed 8 ft.
(Use 54 for closed valleys.)

(54) Flashings for closed valleys shall be separate pieces so that there will be a flashing between each course of shingles. Each piece shall be set so as to lap at least 3" and to be entirely concealed by the shingles; shall be fastened with nails at the top edge only; shall be sufficient length to extend 2" above the top of each shingle and shall lap the flashing sheet below 3".

MISCELLANEOUS FLASHINGS

(55) Hip and ridge flashings—if used—shall extend over the center line of the hip or ridge on each side for a distance of not less than 3".

(56) Chimney flashing shall run up not less than 6" under the shingles and if of galvanized iron shall be backed up with non-drying bituminous mastic where they come in contact with the brick. Counterflashing shall extend to within 1" of the surface of the finished roof.

(57) Apron flashings shall extend to within 1" of the surface of the finished roof.

(58) Where saddles or crickets are formed back of chimneys, curves or similar vertical surfaces, they shall be carried not less than 10" under the shingles.

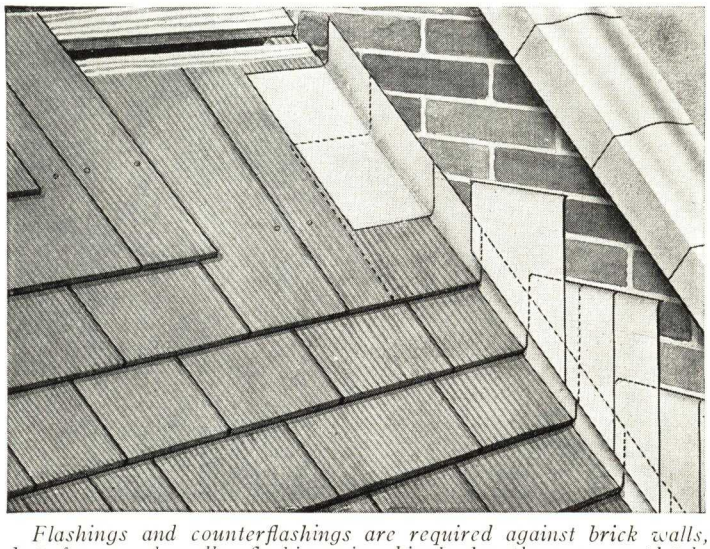
(59) Step flashing shall be used where vertical surfaces occur in connection with slopes. They shall be formed of separate pieces, shall turn up not less than 4" at any point, shall be built into the masonry, shall lap, generally 3" but in no case less than 2", shall not be soldered, shall follow the joints of masonry and shall be installed in reglets cut into these joints.

(60) Dormer flashings shall run up not less than 6" under the shingles and at least 8" up on the face and cheeks.

(61) Window caps and all other projections at points where leakage might occur must be provided with flashings, such flashings to extend up under the shingles of the side walls or other outside finish for a distance of at least 6".

(62) All pipes projecting through roofs shall be flashed and counterflashed. These flashings shall extend out on the roof, not less than 6". They shall be of sufficient length to cover the shingle course next below the pipe and to extend up under the straight course above as far as possible without being punctured by nails.

(Where plumbing vents are carried through roof surfaces, they are generally flashed by the Plumber with lead—the lead being carried up on the outside of the pipe to the top, folded over the top of the pipe and the edge fastened against the inner face of the pipe. In case this is left for sheet metal worker to install it should be done in that manner and lead should always be used.)



Flashings and counterflashings are required against brick walls, but for wood walls, flashings in shingle lengths are completely satisfactory

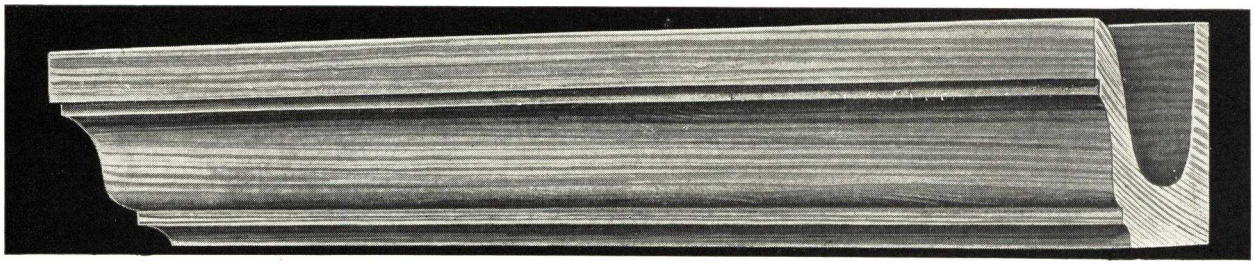
CERTIGRADE HANDBOOK

This 100-page booklet of shingle data is just off the press, and contains complete information on the subject of CERTIGRADE Red Cedar Shingles. Copy of this book will be sent free to any architect, contractor or builder who writes to this organization.

LONG FIR GUTTER COMPANY

Pioneers of "Improved" O.G. Fir Gutters

CADIZ, OHIO



The New Exclusive "Shadowline" Design of "Improved" O.G. Fir Gutters (Patented)

EXCLUSIVE FEATURES OF "SHADOWLINE" FIR GUTTERS

"Improved" O.G. FIR GUTTERS

Beauty of Design—"Shadowline" Fir Gutters are architecturally correct. Their excellent proportions and refined lines lend distinction to any cornice detail. They harmonize with any type of architecture, wall material and roofing. There are no hard angles or awkward curves to destroy a carefully designed effect. Moulded wood of correct design is always correct.

Kiln Dried—And smoothly run from selected premium logs.

Permanence, Beauty and Economy—Unlike the hanging type of gutters with their Accessary Appearance, "Shadowline" Fir Gutters with their *correct architectural design* are *built-in*. They become an integral part of the building, serving the economical purpose of crown mould and gutter combined—adding *strength, rigidity* and *distinctive beauty* to the cornice construction.

LEAKPROOF BRASS FITTINGS

Solid brass fittings are available for ends, joints and miters which positively prevent leakage at these points. For straight butt and miter joints cut a saw kerf ¼-in. deep, exactly 1 in. from each finished end to be joined. Into these cuts drive the flanged brass plates which are 2 in. wide and secure with brass screws. For closing ends secure shaped flat brass plate with brass screws or cope out and return face mould. It is very important to seal the raw ends with any good protective coating.

ARCHITECTS' SPECIFICATIONS

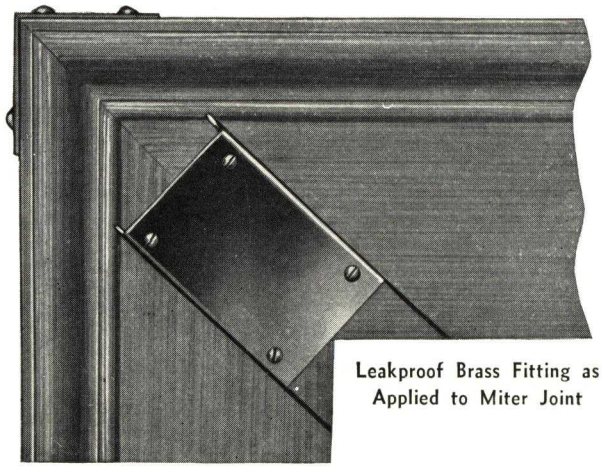
Gutters shall be "Shadowline" design O.G. Fir Gutters, thoroughly seasoned and aluminum coated as furnished by the Long Fir Gutter Company, Cadiz, Ohio, attached to the building perfectly level so that straight horizontal lines necessary to appearance and correct architecutral design may be retained. Secure gutters to building with zinc coated iron nails or coarse threaded brass screws. For making joints, miters and ends use specially designed Brass Leakproof Fittings as furnished by the Long Fir Gutter Company. Down-spout connections shall be made as shown in details.

Finish—Apply trim color of building to outside of gutter and give the inside, or trough, a thorough application of any good protective coating—preferably aluminum paint.

Aluminum Coated—"Shadowline" Fir Gutters are furnished, if desired, pressure sprayed with aluminum carried in linseed and china-wood oil. This penetrates and completely seals the pores, and forms an excellent wood preservative as well as a waterproof coating and an excellent base for finish painting.

Five Stock Sizes—Carried in stock. Dimensions given in table.

Economy—First cost is no more than an ordinary gutter. Ultimate cost is less. No roof mould is necessary. Need be painted only when the house is painted with any good paint. When properly installed they last a lifetime.



Leakproof Brass Fitting as Applied to Miter Joint

MANUFACTURE AND SHIPPING

"Shadowline" Fir Gutters are available through any retail lumber dealer anywhere in the United States. Approximately one-half million feet are stored in our Cadiz, Ohio, warehouse in assorted sizes, for prompt shipments.

L.C.L. shipments are bundled to protect them in transit and to insure arrival on the job in perfect condition.

USED BY MANY RAILROADS

Railroad structures provide a severe test for any gutter, due to disintegrating effect of smoke and gases. Probably there can be no stronger proof of the lasting qualities of "Shadowline" Fir Gutters than the fact that many Class 1 railroads are using them for stations, freight depots and all types of railway buildings with entire satisfaction. Some of these are: Pennsylvania, New York Central, Rock Island, Chicago & North Western, Atlantic Coast Line, etc.

STOCK SIZES—"SHADOWLINE" DESIGN

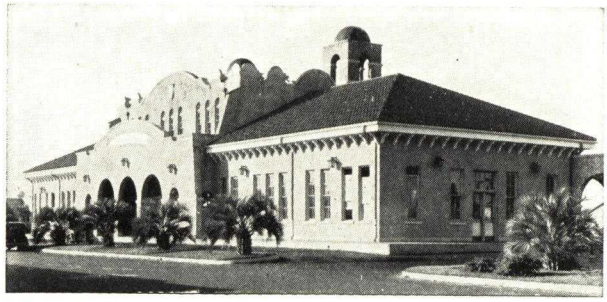
Trade size, in.	Finished size, in.	Back beveled and worked higher than front, in.
3x5	2 5/8 x 4 5/8	1/8
4x5	3 5/8 x 4 5/8	3/16
4x6	3 5/8 x 5 5/8	3/16
5x7	4 5/8 x 6 5/8	1/4
6x8	5 5/8 x 7 5/8	3/8

Reasonable allowance should be made from finished sizes for slight shrinkage in drying.

Lengths up to 40 ft. in all sizes for immediate shipment from Cadiz, Ohio.

6x8 "Shadowline" Fir Gutters on "Traditional Home of Wood," Great Lakes Exposition, Cleveland, Ohio

John Sherwood Kelley, Architect



5x7-in. "Improved" O.G. Fir Gutters on Atlantic Coast Line R.R. Station, Orlando, Fla.

B. E. Widder, Company Architect, Wilmington, N. C.

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ALUMINUM COMPANY OF AMERICA

Member of The Producers' Council, Inc.
Manufacturers of Alcoa Aluminum and Its Alloys
1844 Gulf Building
PITTSBURGH, PA.

For Sales Offices, see Metals Section
For Other Pages on Alcoa Aluminum, Its Alloys and Uses, see File Index

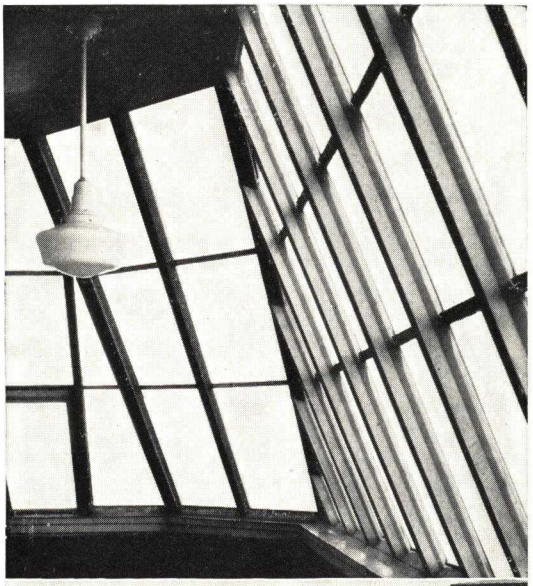
ALCOA ALUMINUM FOR SKYLIGHTS

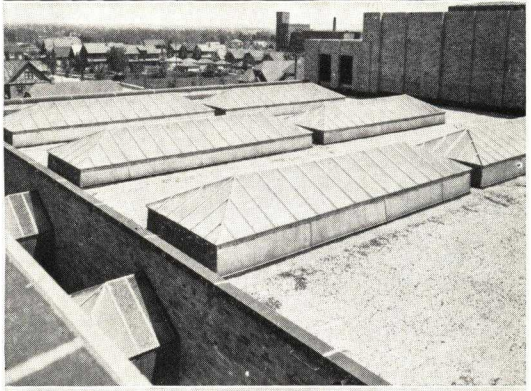
Many manufacturers are in position to furnish skylight frames made of aluminum in a wide variety of styles and construction.

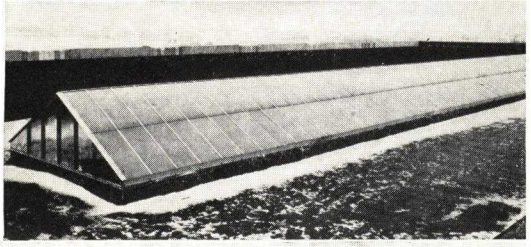
The light weight and high strength of aluminum, plus its excellent weather-resistant qualities, make the metal particularly well adapted to skylight work. In greenhouses or conservatories, where humidity is high, aluminum structural shapes, trusses, purlins, and glazing bars are fine for the support of large expanses of glass.

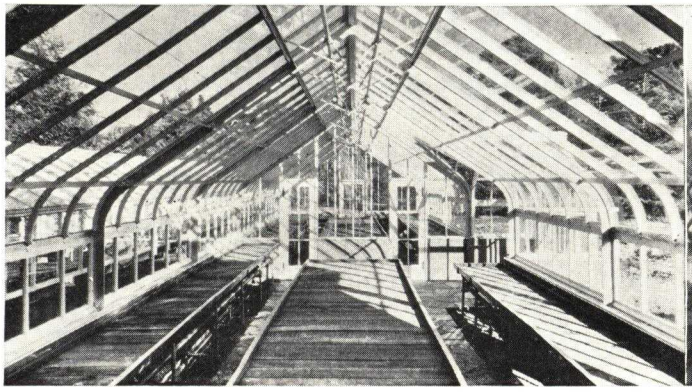
Further, with all its inherent advantages of light weight, strength, and resistance to corrosion, aluminum is easily worked. Thus installation cost is low, and aluminum has a high salvage value.

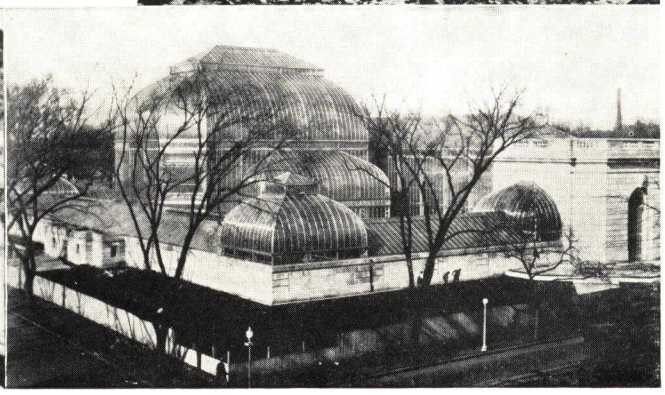
Our experienced engineers are available for consultation.











AMERICAN BAR LOCK CO. INC.

"Alglas" Glass Roof Constructions

FACTORY AND GENERAL OFFICES

LONG ISLAND CITY, N. Y.

For Local Representatives in Principal Cities Consult Telephone Book or Write Home Office for Address

PRODUCTS

American Bar Lock Co., Inc. are the pioneers in the advancement of Glass Roof Constructions, Sidewalk Lights and Insulated Daylighting.

Outstanding developments are leakproof, crushproof features, double glazing, and an increase of light area to 90% while reducing weight of construction and eliminating shipping and installation problems.

"Alglas" Single Glazed Glass Roof Construction.

"Alglas" Insulated Combination Glass Roof and Ceiling Sash—lets in the light—keeps out the heat and cold.

"Alglas" Insulated (Glass Block) Glass Roof Construction.

"Alglas" Sidewalk Lights.

"Alglas" Synthetic Rubber Base Caulking and Glazing Compounds.

For "Ablo" Waterproofing, see File Index.

INSTALLATION

Installation consists of setting completely glazed panels in place and filling expansion joints with superior long life "Alglas" caulking compounds, which can be easily, cheaply and quickly accomplished by workmen without previous experience.

GENERAL ADVANTAGES

"Alglas" Construction of all types has these general advantages:

Increases glass area to over 90%.

Increases light transmission and diffusion.

Increased strength.

Increased durability.

Over 50% less weight than concrete construction.

No concrete used to crack or leak.

Watertight, crackproof, fireproof, burglarproof and dustproof.

Easy to install under our printed directions.

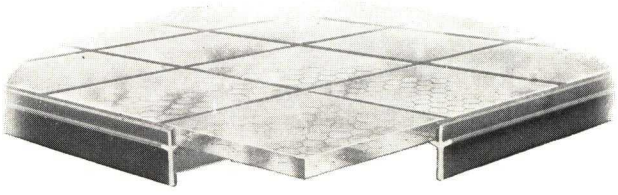
Eliminates unsightly skylines. No protecting screens are necessary.

Permanent and Automatic, concealed or controlled ventilation can be obtained when set up on curbs.

Can be used in any roof regardless of construction.

Can be walked on with perfect safety—can be used as a sun deck, for recreational or other purposes.

"ALGLAS" SINGLE GLAZED GLASS ROOF CONSTRUCTION



Specifications

Glass shall be 8¼ x 8¼ x 9/16-in. thick wired glass.

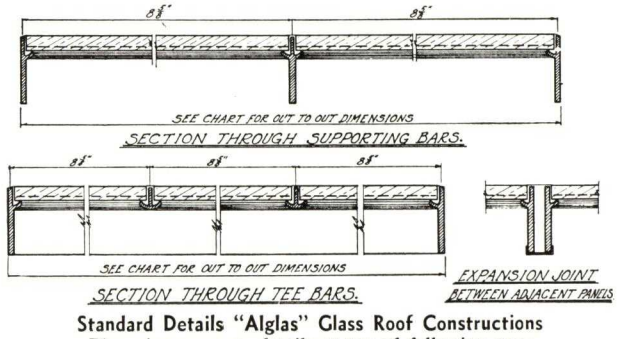
Supporting bars and tees shall be rolled steel sections, in accordance with A. S. T. M. standards, assembled, welded and a heavy coat of hot dipped galvanizing applied, sealing all joints and thoroughly covering all exposed surfaces.

Bars and tees shall be assembled on 8⅝-in. centers to afford a minimum of 90% glass area and to form a protective shield around each glass.

The space between the glass and the shield shall be glazed with superior "Alglas" glazing compounds, to form an elastic, watertight and weatherproof expansion cushion.

Panels weigh approximately 11 lbs. per sq. ft.

Live load over 50 lbs. per sq. ft. up to an 8 ft. clear span supported only on two sides.



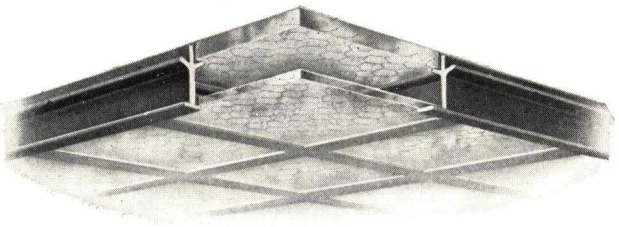
Standard Details "Alglas" Glass Roof Constructions

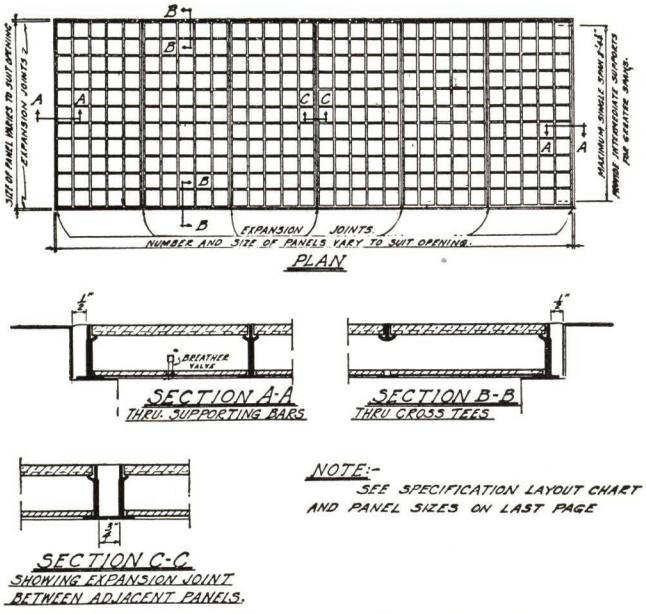
Plan view same as details at top of following page

"ALGLAS" INSULATED COMBINATION GLASS ROOF AND CEILING SASH

Keeps out heat and cold and glare from sun. A real necessity in conjunction with air conditioned buildings. Permits perfect light. Transmits and diffuses daylight.

The high resistance of this valve controlled construction to heat loss by conduction or infiltration *reduces the cost* of maintenance for air conditioning and artificial heating. It also offers protection against penetration of solar heat and extreme cold.





Standard Details "Alglas" Insulated Combination Glass Roof and Ceiling Sash

Specifications

"Alglas" panels shall be rolled steel sections in accordance with A. S. T. M. standards, fabricated, welded, and a heavy coating of hot dipped galvanizing applied, sealing all joints and thoroughly covering all surfaces. The top glass shall be $8\frac{1}{4}$x$8\frac{1}{4}$x$\frac{9}{16}$-in. thick wired glass, and the bottom or ceiling light glass shall be 8 x 8 x $\frac{1}{4}$-in. thick wired glass.

Bars and tees shall be assembled on $8\frac{5}{8}$-in. centers to form a protective shield around each glass and afford a minimum of 90% top glass area. The space between the glasses shall be glazed with "Alglas" glazing compounds to form an elastic, watertight, airtight and weatherproof expansion cushion.

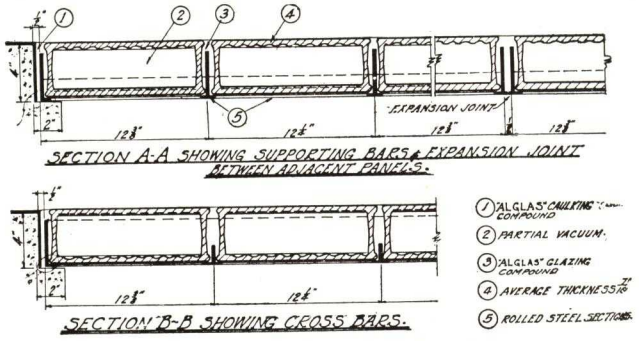
Each panel shall contain a dustproof breather valve to take care of air expansion and contraction.

Panels weigh approximately 18 lbs. per sq. ft. Live load over 50 lbs. per sq. ft. upon an 8-ft. clear span, supported only on two sides.

"ALGLAS" INSULATED (GLASS BLOCK) GLASS ROOF CONSTRUCTION

Heavier steel panel construction using $11\frac{3}{4}$ x $11\frac{3}{4}$ x 4 in. insulated partial vacuum glass blocks.

Write for details, specifications and layout charts.



Standard Details "Alglas" Insulated Partial Vacuum Glass Block Roof

"ALGLAS" SIDEWALK LIGHTS

A new improved "Alglas" Non-slip Sidewalk Light Construction with greater strength, greater glass area. Glass cannot break (except from abuse).

Write for details, specifications and layout charts.

"Ablo" waterproofing and preservative—it penetrates. See page (number in File Index) explaining waterproofing that penetrates deeply, really waterproofs and "stays put."

FREE DETAILS, LIST OF INSTALLATIONS, FOLDERS, ADVICE

Our Engineering Department is available for advice and will detail "Alglas" Constructions for any prospective work if rough pencil sketches showing plan, cross sections, approximate size, and supports are sent us.

Partial list with names of architects and engineers who have specified "Alglas" Constructions for hundreds of prominent projects will be sent upon request.

Illustrated folders on "Alglas" Constructions are available without cost. Detail drawings for each type of roof are offered (specify type of "Alglas" construction desired when writing), send for:

Details of "Alglas" Flat Roof Construction.
Curb Details for Automatic or Controlled Ventilation.
Curb Details and Flush Roof Construction, set in rabbets.
Details of Sawtooth skylights.
Details of Set Back Construction.
Details of Marquise Lights Construction.
Details of "Alglas" Sidewalk Light Construction with Carborundum non-slip finish.

AMERICAN 3 WAY-LUXFER PRISM CO.

Daylight Engineers

2139 West Fulton Street
CHICAGO, ILL.

517 West 45th Street
NEW YORK, N. Y.

For Insulated Glass Skylights and Diffusing Glass, see File Index

A COMPLETE LINE OF METAL SKYLIGHTS FOR ALL PURPOSES

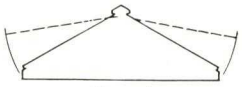
Ventilating Skylights

American Ventilating Skylights are backed by over one million square feet of installations made during the last ten years. They answer a definite need for a skylight that combines *natural and effective ventilation with daylight*. This type of skylight is furnished in puttyless and putty models. The sheet metal parts of these skylights can be furnished in galvanized copper bearing steel, aluminum or copper. Ventilating sash is carried on substantial steel trusses spaced approximately 6 ft. on centers. No truss members less than 2x1½x⅛-in. angles.

VENTILATING SKYLIGHT DATA

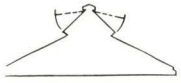
Type	Standard widths	Max. length vent section	Sq. ft. opening per lin. ft.	Materials
JR	Min. 3 ft. Max. 5 ft. 11 in.	28 ft. 22 ft.	Width x .67	18-ga. galvanized steel 20-oz. copper 14-ga. aluminum
F	6, 8, 10, 12 ft.	28 ft.	2.67	18-ga. galvanized steel 20-oz. copper 14-ga. aluminum
J	6, 8, 10, 12 ft.	30-40 ft.	Width x .25	18-ga. galvanized steel 32-oz. copper 14-ga. aluminum
JL	12, 14, 16, 18, 20 ft. Over 20 ft. special	See Type "J"	See Type "J"	18-ga. galvanized steel 32-oz. copper 14-ga. aluminum

Generally the types may be described as follows:



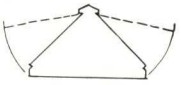
Type J

Type J—A full ventilating type, wherein the sash is hinged at the ridge and opened from the curb, thus providing a maximum vent area. Each side is controlled by a separate operator.



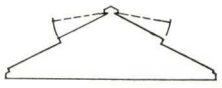
Type F

Type F—A ridge ventilating type, consisting of a pair of constant sized movable sash at the ridge and fixed sash below. Both vent sash may be operated independently or simultaneously by means of a single control. Provides maximum weather-tightness with efficient ventilation and daylighting.



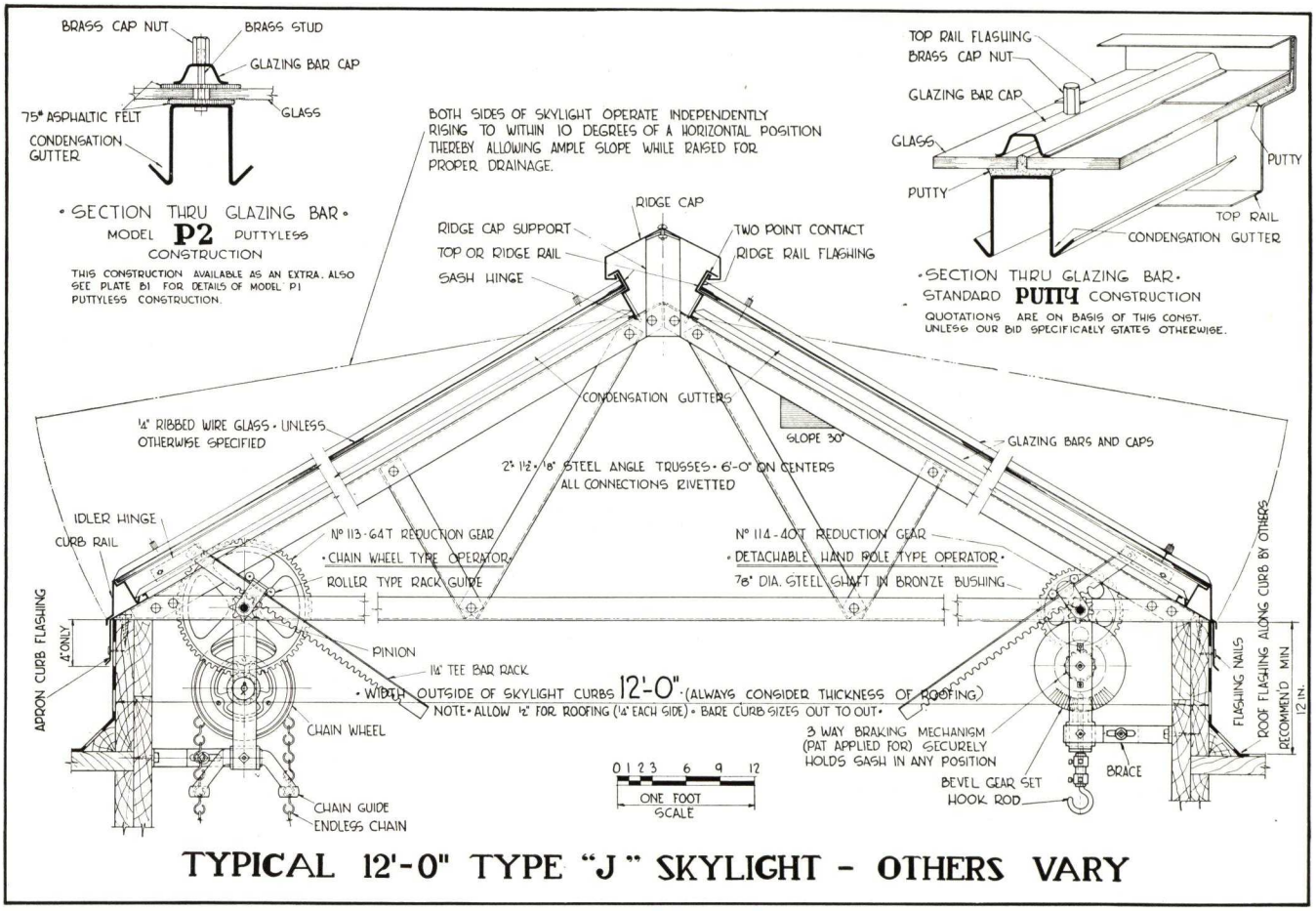
Type JR

Type JR — A full ventilating type, designed especially for use on widths under 6 ft. Also applicable as a continuous ridge ventilator for sawtooth construction.



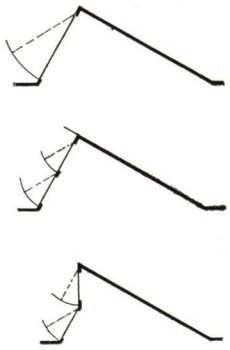
Type JL

Type JL—A ridge ventilating type, designed for spans over 12 ft. The upper or vent sash is in widths corresponding to the standard Type J widths. Thus continuous ridge openings of 6, 8, 10 and 12 ft. may be had.



TYPICAL 12'-0" TYPE "J" SKYLIGHT - OTHERS VARY

American Pressed Steel Top Hung Sash



These continuous top hung windows are formed of copper bearing galvanized steel and fabricated in sizes to conform with accepted practice.

The sash is arranged for puttyless glazing with metal caps for the glazing bars secured with studs and cap nuts.

Operators are rack and pinion or tension type adapted to manual or motor control.

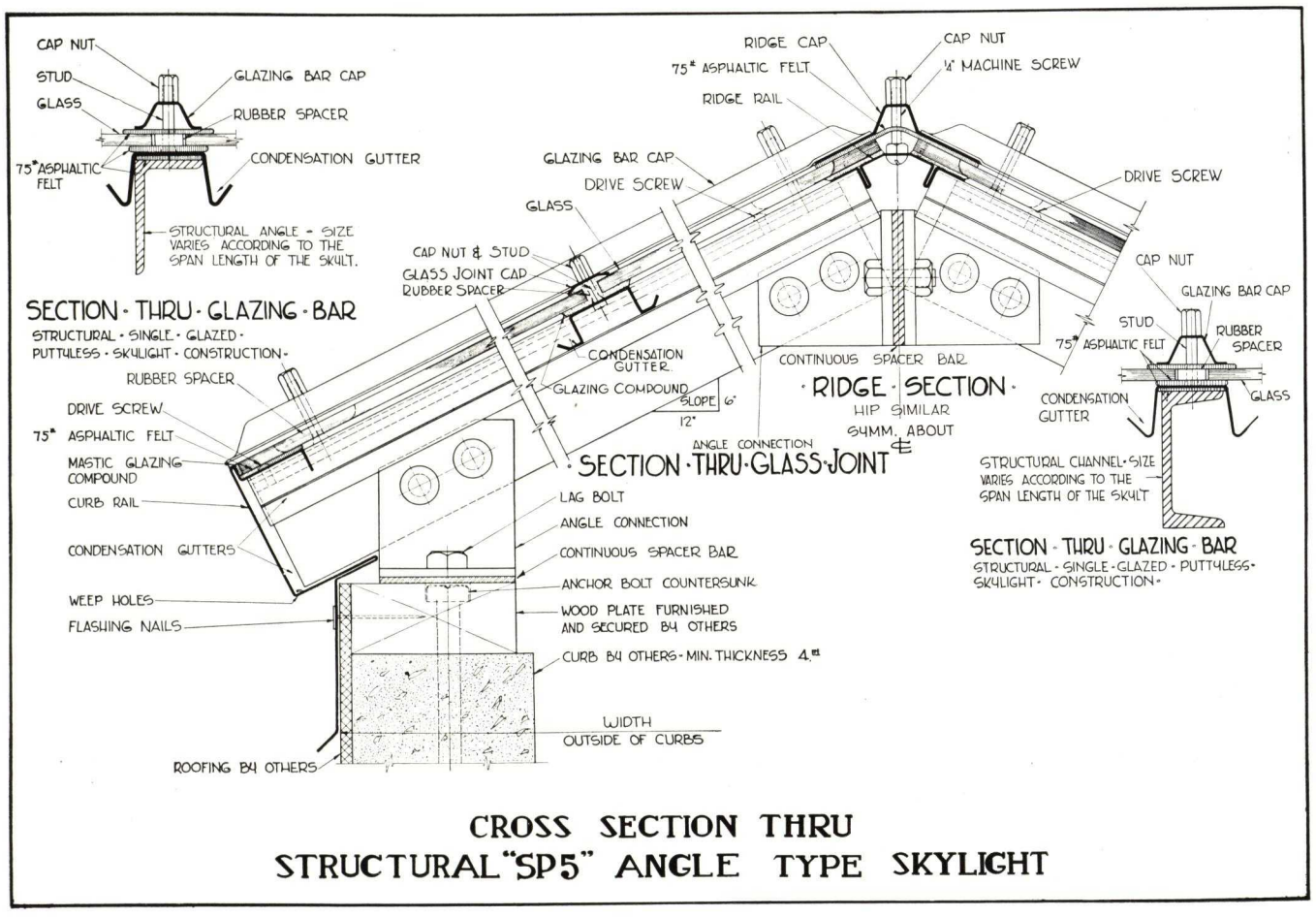
Structural Puttyless Skylights—Model SP-5

A stationary puttyless skylight designed particularly for long spans. The rafter bar or supporting member is a structural steel angle or channel section. Glass rests, glazing caps and metal trim may be galvanized copper-bearing steel, aluminum or copper.

These skylights may be equipped with syphon ventilators, ridge ventilators or heat valves, fan ventilators at ridge or in gable ends.

They may be double glazed and equipped with inside gutters.

Glass is cushioned on glazing bars with asphalt impregnated felt strips. Glass is securely held in place by metal caps using studs and cap nuts.



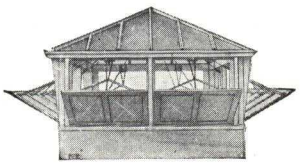
CROSS SECTION THRU
STRUCTURAL "SP5" ANGLE TYPE SKYLIGHT

THE KuPe AUTOMATIC STAGE VENTILATOR

The KuPe Automatic Stage Ventilators and skylights No. 67 are universally recognized as the standard of excellence and reliability, approved by the Board of Fire Underwriters, architects and municipal authorities for theatres, schools, auditoriums, etc.

A combined ventilator and weatherproof skylight, it consists of a metal frame with hipped metal roof and sides provided with bottom hinged metal shutters. Flexible bronze cable equipped with fusible links, passes over brass pulleys and connects the top of each shutter to a main rope, also provided with fusible links, which extends down to the stage floor. Under ordinary conditions the shutters are hand operated, but in times of emergency may be quickly opened by cutting the rope. In case of fire, operation is effected either individually or simultaneously by melting of the fusible links.

We also manufacture and install these ventilators to any dimension complete, glazed with $\frac{1}{12}$ in. sheet glass, with woven wire screen under the glass. We use standard gauges of galvanized steel (or copper) and the shutter hinge plates and pins are of brass.



"KuPe" Standard Automatic Stage Ventilator No. 67
(Patented)

AMERICAN 3 WAY-LUXFER PRISM CO.

Clad-Crete Skylight Construction.
3 Way Daylight Roofing.
3 Way Armored Sidewalk Lights.
3 Way Pressed Tile for Transom Lights.
3 Way Sheet Prism.
3 Way Ventilators, Ventilating Screens.
Magnalite Diffusing Glass.

3-WAY Daylight Products

Glass Dance Floors.
Weatherproofing Compounds.
Top Hung Sash.
Structural Double Pitch Skylights.
Ventilating Skylights.
Steelead Skylights.
Sidewalk Doors.

CLAD-CRETE CONSTRUCTION—A REVOLUTIONARY DEVELOPMENT IN ROOF-LIGHTS

Proof Against Wind, Rain, Dust, and Improper Light

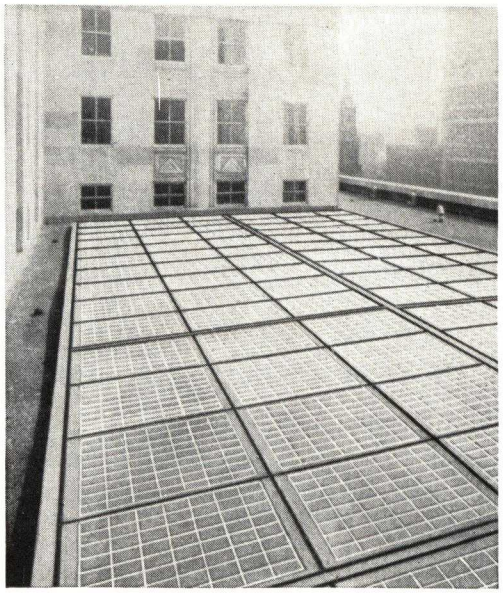
(Patent No. 2055901—Sept. 29, 1936)

WHAT MAKES A ROOF-LIGHT INSTALLATION SATISFACTORY?

The Health Factor

The fundamental purpose of any roof-light is to transmit daylight. For daylight is essential to good health. Eyes, and through them health, may be permanently impaired by the abnormal and unnatural stresses of improper light. In commercial and industrial applications, uniform distribution of light upon the working plane increases the efficiency of employees, which in turn, means greater production — greater profits.

While the health factor is fundamental, the construction features must also be given serious consideration.



Construction Features

A successful roof-light installation must be leak-proof, giving the same satisfactory service year in and year out, as long as the building lasts. It must be permanent, fireproof, and it must assure the owner a minimum of maintenance expense. From the architect's viewpoint, it must be adaptable to all types of architectural design.

With these purposes in mind, the AMERICAN 3 WAY LUXFER PRISM COMPANY developed Clad-Crete — a revolutionary roof-light construction which meets every requirement of the architect and owner.

WHAT IS CLAD-CRETE?

Clad-Crete is a flat, roof-light construction of reinforced concrete, bronze and glass. The frame supporting the square glass units is composed of concrete ribs extending in both directions across the skylight opening, and spaced so that the openings between the ribs are approximately the size of the glass units.

Embedded in the top of the concrete ribs are extruded bronze spacers into which the heavy glass units are glazed with waterproof 3 Way sulphur compound. Metal seats also inserted in the top of the ribs help support the glass. At no point is concrete exposed to the weather.

Around each skylight panel, and extending through the entire thickness of Clad-Crete construction, are expansion joints caulked with 3 Way elastic compound and securely flashed with lead-coated copper.

Thus it can be seen that Clad-Crete construction is weather-proof and trouble-proof. It is rigid, permanent, fireproof. It requires no protecting screens or guards. It can be safely walked upon. Moreover, being a flat construction, with heavy glass units and concrete ribs, Clad-Crete offers greater resistance to heat passage than hipped or metal skylights. But more important is the fact that Clad-Crete provides maximum daylight—and at a cost no greater than for ordinary types of flat, roof-light construction.

How Clad-Crete Provides the Best Assurance of Maximum Daylight

Exhaustive tests have proven that daylight from above is better transmitted and diffused through horizontal roof-lights than through any other type of skylight. Scientifically designed, Clad-Crete produces efficient uniform light intensities over large areas beneath, the same shape as the skylight opening. Horizontal Skylights transmit the strongest Zenith Light without reflection.

Also, the glass for Clad-Crete must meet an extremely high-quality standard. It is free from internal defects impairing the strength or affecting transmission, insuring a uniform installation giving maximum daylight.

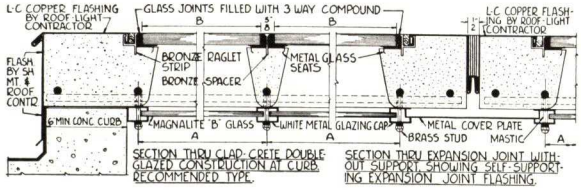
NOTE THIS PARTICULAR FEATURE

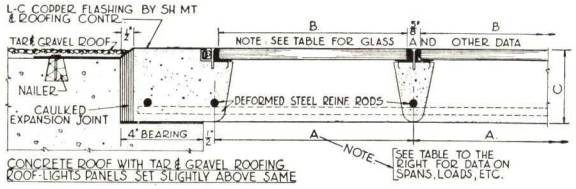
An examination of Clad-Crete will reveal that it differs materially from ordinary standards of vault light construction. One important difference is readily apparent, *Clad-Crete has no concrete surfaces exposed to the weather.*

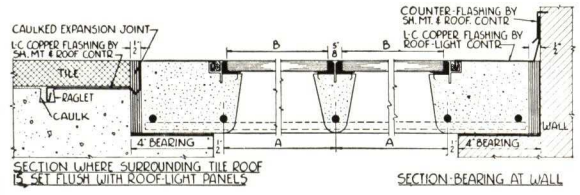
This is of tremendous importance, for by this revolutionary development, Clad-Crete eliminates a major factor that causes trouble in roof-light construction, namely, the negligence and uncertainty that enter into the preparation and finishing of concrete exposed to the weather.

Thus, in Clad-Crete construction, there can be no unequal contraction or expansion. Unlike the average exposed concrete surface, the construction is not subject to the damaging effect of the elements.

That is why Clad-Crete assures a leakproof construction, for with nothing but impervious materials exposed to the weather, neither wind, rain, or dust can penetrate.







Pre-cast panels, 25-30 sq. ft. area, glazed, furnished for setting by others.

Ventilators may be applied to Clad-Crete construction if desired.

CONSTRUCTION DATA

Type of construction	Glass (wired)		Dimension, In.			Wt. per sq. ft., lbs.	Live load sq. ft., lbs.	Max. clear span, ft.-in.
	Ribbed	Rough	A	B	C			
Std. 9⅝ in. centers. Use ½ in. thick glass.....	Ribbed	Rough	9⅝	9	3⅝	30	125	8-2
Std. 18 in. centers. Use ⅝ in. thick glass.....	Ribbed	Rough	18	17⅜	4⅝	35	100	9-1
Std. 11⅞ in. centers. Use ½ in. thick glass.....	Ribbed	Rough	11⅝	11	4⅝	35	110	11-0
Std. 9⅝ in. centers.....	Magnalite tile (not wired)		9⅝	9	3⅝	30	125	8-2

FIVE GOOD REASONS WHY ARCHITECTS SPECIFY CLAD-CRETE ROOF-LIGHTS

Leakproof—Fireproof—Burglarproof—Moisture penetration through a Clad-Crete Roof-light is impossible. With the glass units sealed in a waterproof sulphur compound, and with all expansion joints flashed with copper, Clad-Crete offers permanent resistance to water.

Moreover, neither under test nor in actual use does condensation collect—within practical ranges of temperature and humidity—on the inside surface of Clad-Crete.

Then too, an examination of the materials used in Clad-Crete indicates that the construction is fireproof. Also, the small glass units plus the rigid nature of the concrete ribs make Clad-Crete construction practically burglarproof.

Cleanliness—Clad-Crete Roof-lights have the high sanitary property that is inherent in glass—the non-porous surfaces preventing the passage of dirt or moisture. Because Clad-Crete construction is flat it is much more accessible than other types of skylights. Thus it can be kept clean, insuring maximum efficiency at all times.

Permanence—Constructed of glass, bronze, copper and reinforced concrete—all permanent materials—and with no concrete exposed to the weather, Clad-Crete offers a permanent, trouble-free roof-light.

Ease of Replacement—The simplicity of Clad-Crete construction makes removal and replacement of glass units easy. Any person, using ordinary tools, following general instructions, and using the materials which we furnish for replacing glass units, can quickly install a new glass.

Adaptability—Architects find in Clad-Crete construction the ideal skylight for modern architectural design. Flat in construction, it can be used for set-backs, interior courts, or for roofs where steeply pitched skylights would cause an undesirable break in silhouette.

Also, Clad-Crete Roof-lights provide an opportunity to introduce not only maximum daylight, but also an artistic glass ceiling design in harmony with any architectural treatment.

GLAZING—SIZES AND SELECTION

The following glass units may be obtained in Clad-Crete Roof-light construction:

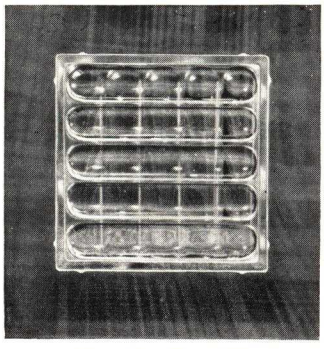
Ribbed or Hammered Wire Glass in 9x9-in. or 11x11-in. units, ½-in. thick. Greater thicknesses can be obtained where necessary.

Magnalite Tile in 9x9-in. glass units.

Magnalite Tile

Magnalite Tile is a clear, white, pressed glass with the exposed surfaces corrugated by scientifically designed cylindrical lenses—the corrugations on the upper surface being at right angles to those on the lower.

Designed for minimum light spread of 50° of white light—the best work light—and the highest transmission for this wide degree of diffusion.



Magnalite 9-in. Tile

Magnalite Tile is the ideal diffusing glass to use in skylights. Because Magnalite Tile spreads light evenly four ways, it permits reduction in the size of skylight openings. Thus it helps reduce heat loss in winter, and helps to keep out summer heat.

Magnalite Sheet Glass, Type B is recommended for use where glass ceilings are to be installed in Clad-Crete construction. Designed on the same principle as Magnalite Tile, Type B is manufactured with the cylindrical lenses ¼-in. on centers. Type B can be obtained plain or wired, ¼-in. full thickness. See File Index for Magnalite page.

Assistance and Information

We are able to give prompt and intelligent service on Clad-Crete construction whenever necessary. Our 50 years of specialization in roof-lighting, serving the leading architects and consulting engineers, has given us a wealth of knowledge and experience from which you may freely draw—without any obligation or charge.

The Clad-Crete 5-Year Guarantee

Because of its revolutionary design, Clad-Crete construction contains no parts that can possibly cause trouble. Under normal conditions. Clad-Crete will outlast the building in which it is installed. However, the glass in every Clad-Crete Roof-light carries a 5-year guarantee against ordinary wear and tear.

Estimates, Specifications, and Detailed Drawings promptly furnished on request.

3 Way Armored Sidewalk Lights

3-WAY Daylighting Products

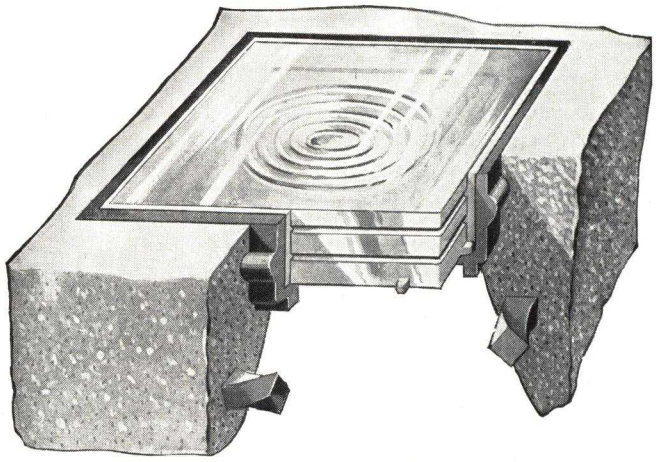
They daylight, they ventilate, they beautify, they advertise, they add distinction

Daylight in basements and vaults is more important today than ever. Sunlight and daylight make for health and efficient operations.

3 Way armored sidewalk lights accomplish this in more of a permanent way than any other light medium we know of.

Abundance of daylight. Lasting qualities in construction. And practically no maintenance cost.

Glass—Is armored by a heavy cast iron shield. Hot galvanized treated. Glass is sealed under special heat treatment with pure tar and sulphur compound in this shield, thus overcoming the detriments to glass from expansion pressure. Glass is Flintex-Lazalite quality free from internal stresses, each piece having passed polariscope test. Is made from special mixture for this purpose only.



Cut-away View of 3 Way Armored Glass, Showing Shield Embedded in Concrete

Instant Replacement of Glass—Should it become necessary to replace a glass unit, replacement can be made in a moment's time by any help about the building. No special skill required. This means sidewalk lights can be kept in perpetual good condition at practically no maintenance cost.

Five-year glass guarantee.

Specifications—Sidewalk Lights as shown on plans shall be of 3 Way Armored Glass Construction, Flintex-Lazalite Glass units sealed in galvanized cast iron shields, embedded in reinforced concrete construction.

Glass shall be No. 13-A (3½-in. square Fresnel lens in 4-in. galvanized cast iron shields spaced 5-in. centers), or No. 12 (2¾ in. round sunburst lens in 3-in. galvanized cast iron shields, spaced 4¼-in. centers). Glass for replacement to be supplied free of charge, f.o.b. factory for period of five years.

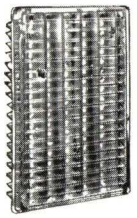
(Can be furnished in factory finished slabs or installed complete by manufacturer.)

Sidewalk Doors

3 Way Type "C" watertight sidewalk door. Channel frame, tapped for drain connection, heavy bronze hinges, flush top, quality door. Hand lift or equipped for elevator lift.

3 Way Pressed Tile

3 Way Pressed tile are made special for light diffusion or redirecting light transmitted into interiors. They are designed for use in transom lights above store fronts or for windows where interior conditions require the redirection of daylight so as to light up dark spaces back in the interior which is without window space.

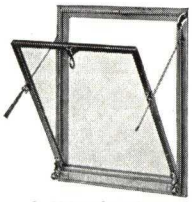


3 Way Lens Back Tile

Pressed tile can be had in the following combinations, Lux Lens with Spiro border, 3 Way Lens Back tile with Dew Drop border, Luxfer Flat Back with Geometrical border.

3 Way-Luxfer Sheet Prism

Glass cut to sizes from sheets as manufactured by Mississippi Glass Company. Ideal for industrial plants, basement windows, garages, etc. Obscure, maximum light diffusion and transmission. Furnished either plain or wired. Specify 3 Way Flat Back or Lens Back Sheet Prism.



3 Way-Luxfer Ventilator

3 Way-Luxfer Ventilators

Light weight inexpensive steel ventilators with copper, bronze or aluminum spray finish as desired. Also made in extruded shapes of aluminum or bronze. Vents are made pivoted or bottom hinged in several different types to suit any condition and are so constructed that they are adapted to any type of setting. Certain types are carried in stock sizes while other types can be furnished in sizes required. Ventilators are obtainable through your store front or glass contractor. Complete details furnished upon request.

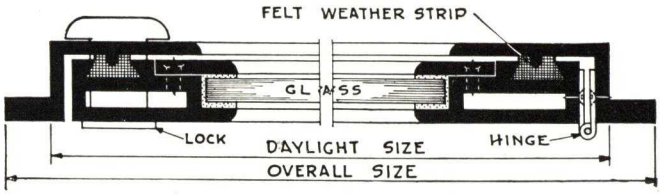
Specify 3 Way-Luxfer Ventilators.

Removable Flat Screens for Ventilators

Screens can be furnished for pivoted or bottom hinged ventilators. Unless otherwise specified screens are made of 16-mesh bronze, copper or aluminum wire cloth as the finish requires.

Show Case Doors

Show case doors are made of specially designed extruded shapes of either bronze or aluminum. A rigid outer frame welded at the joints supports the door and is adapted for setting in any type of store front construction and the weatherstripping provides an airtight and weatherproof door when closed. Furnished with cylinder locks, the doors are complete and ready for setting. Can be furnished in sizes to fit openings and details will be sent upon request.



Section Through Show Case Door

P. M. BRUNER GRANITOID CO.

ESTABLISHED 1878

710 Louderman Building
ST. LOUIS, MO.

SIDEWALK LIGHTS, FLOOR LIGHTS, SKYLIGHTS

Bruner Construction

Bruner sidewalk lights, floor lights and skylights conform to recommendations adopted by United States Department of Commerce, Division of Simplified Practice, as per bulletin No. 49.

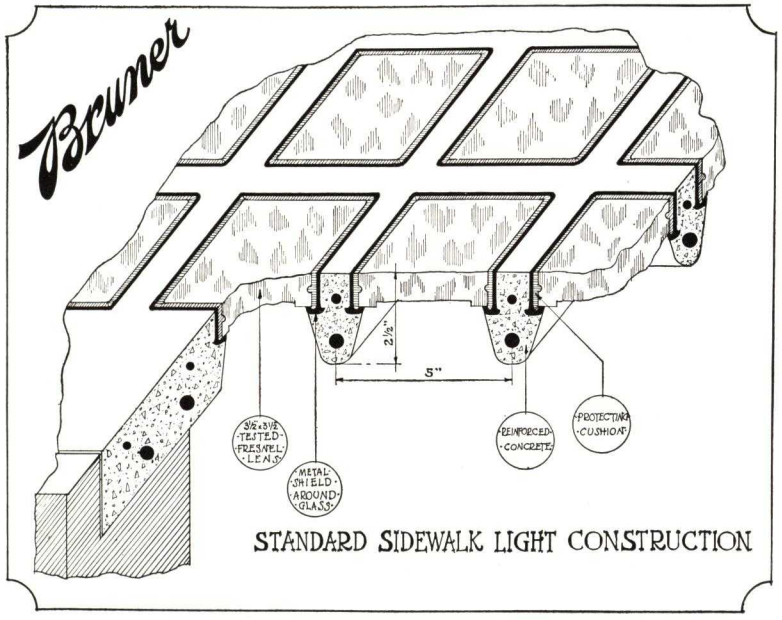
Standard Sidewalk Light Construction

In this construction there can be no leakage and no breakage of glass from structural or expansion stresses. Glass broken from accident or abuse can easily be repaired without disfiguring the construction in any way.

Specifications—The sidewalk lights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. Bruner Granitoid Co.'s Standard Sidewalk Light Bulletin, capable of carrying safe live load of 300 lb. per sq. ft. The glass to be 3½ in. square by ¾ in. thick at supporting edge, set in 4-in. square metal shields with elastic compound. The lenses shall be set 5 in. on center. The ribs shall be 2½ in. deep.

Bearing furnished for this construction should be 3 in. wide by 2¾ in. deep.

The entire construction to be guaranteed waterproof and free of defects for a period of one year. Replacement glass to be furnished free f.o.b. factory for 5 years.



STANDARD SIDEWALK LIGHT CONSTRUCTION

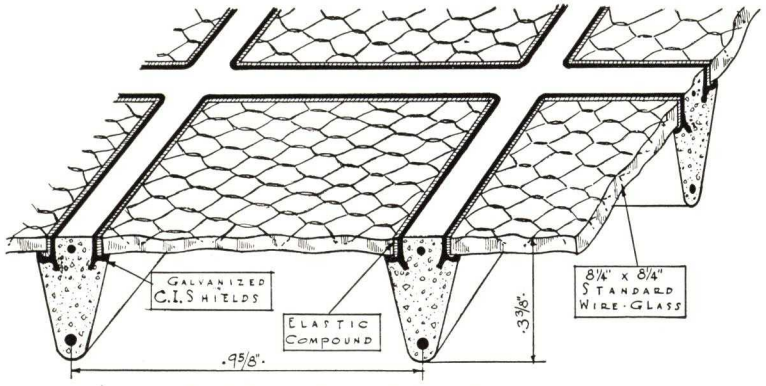
Bruner Skylight Construction (Trade Name, "Transparent Roofing")

We recommend that concrete curbs be formed as part of the reinforced concrete roof. Bruner reinforced concrete skylights being laid over these curbs and projecting beyond with drip formed on under side, a permanently mechanical watertight job is assured.

Where required, however, this skylight construction can be made flush with roof by setting same in rabbet formed in reinforced concrete and calking with our special waterproof compound.

Specifications—The skylights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. Bruner Granitoid Co.'s Skylight Bulletin. Glass to be ribbed wire 8¼ in. square, set in metal shields with elastic compound. Ribs shall be 3⅜ in. deep, set 9⅝ in. on centers both ways. The entire construction is to be guaranteed for one year, and replacement glass is to be furnished free of charge for a period of five years.

(Plans should show detail of bearing furnished.)

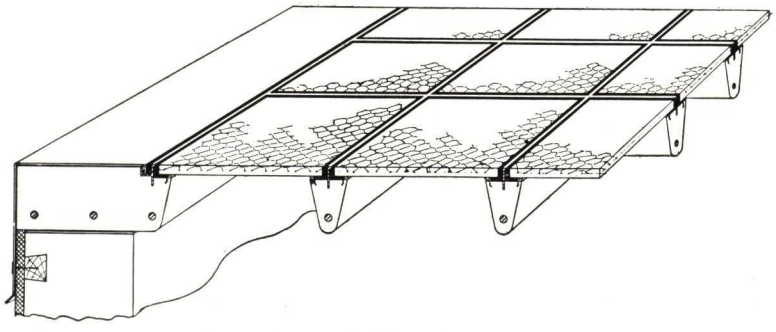


Detail Bruner System Skylight Construction

Spans up to 8 ft. can be made without intermediate beams. Standard construction ribs are on 9⅝-in. centers. Standard wire glass is 8¼x8¼ in. The metal shield and protecting cushion construction is similar to that in the Bruner sidewalk lights

Bruner Bronze-Grid Skylights

In this type reinforced concrete skylight construction, no concrete is exposed on the top surface. It gives an attractive appearance as well as being efficient and weatherproof.



Bruner Bronze-Grid Skylight Construction

THE G. DROUVÉ COMPANY

TELEPHONE
Bridgeport 5-3161 and 2

POST OFFICE ADDRESS
BRIDGEPORT, CONN.

FACTORY
Fairfield, Conn.

REPRESENTATIVES

DALLAS, TEX., R. J. DeWees, Burt Building
PHILADELPHIA, PA., Warren E. Quillman, 1411 Surrey Lane, Overbrook Hills, Montgomery County
DETROIT, MICH., Walter R. King Company, Curtis Building
ATLANTA, GA., Applewhite & Lawler Company

Products

"Anti-Pluvius" Puttyless Skylights, Type "A" and Type "B."
Drouvé Turret Sash.

DROUVÉ

"Drou-Ve-Lite" Puttyless Glass Structures, Type "C" and Type "D."
Drouvé Continuous Ridge Ventilators.

SKYLIGHTING FACTS

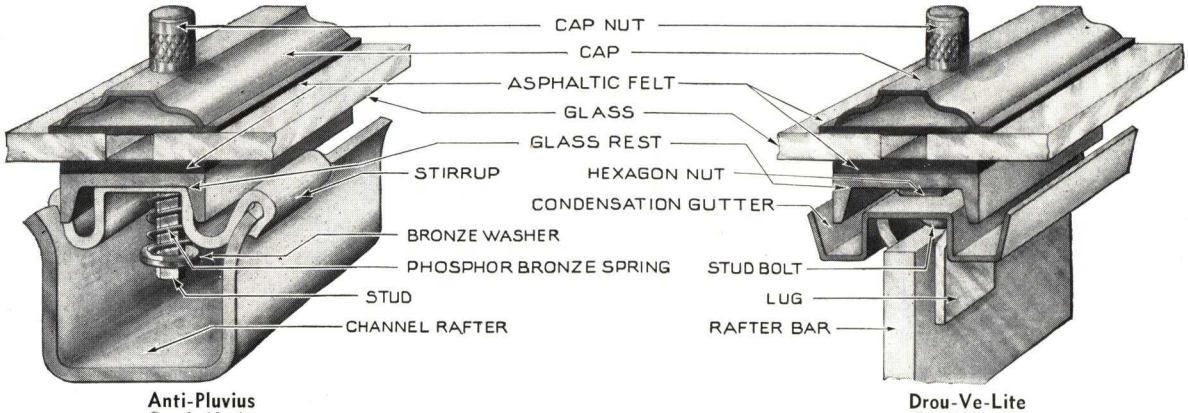
In selecting and purchasing Drouvé skylights for your requirements, you are, today, obtaining without cost, our 52 years of practical experience in the manufacturing and installing of puttyless skylights which is important.

We make the statement without fear of contradiction that at least 10 years of practical experience is required for a skylight construction before one knows very much about it; that is, as to its proper or improper functioning under actual atmospheric and climatic conditions. It is apparently simple enough to design a skylight on paper but time and experience have proven that only a very few of the numerous designs suggested in the past 40 years have actually proven satisfactory and even these have required changes in detail and construction based on experience.

Drouvé skylights are today, in their construction, based entirely on experience, the stage of theory long since having been passed. Drouvé skylights are constructed to successfully meet every atmospheric condition that re-acts against steel and glass. All of the metal members incorporated in our skylights are essential to proper skylight construction. The use of two separate members, one for the support of the skylight structure and the other for the glass rest, is one of the important features to be found in Drouvé skylights. Non-corrosive materials are used where they should be and all metals in our skylights are, as to gauge of materials, of the proper size for the work they are to do. Drouvé skylights are, in their present stage of perfection, the ideal constructions in materials, workmanship and long life.

Among other things, it is interesting to note that after 52 years, we are still using what is known as "lapped glass" rather than "butt glass" construction in our skylights. We do this, not because it makes for a cheaper construction, or, not because we cannot build a butt glass construction, but only that after exhaustive experimenting, we have definitely determined that it is not possible to butt glass in a skylight construction and have it give 100% satisfactory service. Unfortunately, the lapped glass method of construction is more expensive, in first cost, but again we remind you it is essential to good skylight construction.

In short, every Drouvé skylight built by us today is a monument to ourselves and a continuous source of satisfaction to those who own them and a credit to those architects who specify them.



Anti-Pluvius
One-half size

Drou-Ve-Lite
One-half size

DROUVÉ SKYLIGHTS

The "Anti-Pluvius" skylight shown in sketch above has our unconditional guarantee as to satisfactory service, materials and workmanship. It has, as you will note from the sketch, ten different parts in its construction aside from the glass. There are, of course, in addition to these, the curb and ridge members; all necessary to the end we have strived to achieve. All of these parts without exception are sufficiently heavy enough and strong enough for the work they are to do. This skylight is architecturally and structurally well balanced.

Above we show a sketch of our "Drou-Ve-Lite" skylight. The "Drou-Ve-Lite" skylight is our crowning achievement particularly for long span work.

We have incorporated in it the same essential features to be found in our "Anti-Pluvius" skylight, that make for proper skylight construction. This also has ten different parts in its construction aside from the glass. There are, of course, in addition to these, the curb and ridge members. Also, like our "Anti-Pluvius" construction, these parts, as to size and weight, are sufficiently heavy enough and strong enough for the work they are to do.

THE MARCO CO., INC.

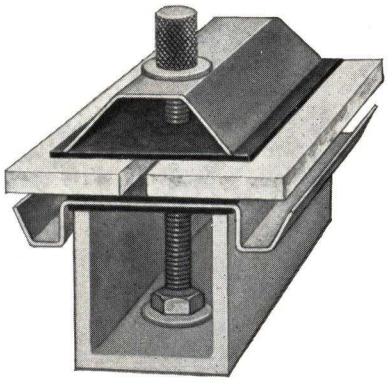
Manufacturers of Puttyless Skylights and Automatic Stage Skylights

TELEPHONE
ORange 3-4285-4286

EAST ORANGE, N. J.

MARCO PUTTYLESS SKYLIGHTS

(Reg. U. S. Pat. Off.)



The *"Marco"* Puttyless Skylights are designed to meet the requirements of a simple yet permanent type of skylight at moderate cost, involving features most desirable.

The *"Marco"* Puttyless Skylights may be used any place where a high quality and permanent installation must be made. The *"Marco"* Puttyless Skylight may be made in any type to suit any requirement.

The glass bearing members of the *"Marco"* Puttyless Skylight can be manufactured of rolled steel or aluminum shapes of proper cross section modulus governed by skylight area to insure sufficient dead and live load carrying capacity with proper safety factors. Careful design has been incorporated in the construction of the *"Marco"* Puttyless Skylight to secure maximum efficiency to prevent leakage and glass breakage in different atmospheric conditions and other defects usually encountered in skylight construction.

The *"Marco"* Puttyless Skylights are entirely self-supporting from above curb lines and do not need any supporting members. Operating ventilating sections can be incorporated in the construction to meet any requirements.

Details of construction will be forwarded on request.

MARCO AUTOMATIC STAGE SKYLIGHTS

(Reg. U. S. Pat. Off.)

The *"Marco"* Automatic Stage Skylight consists of, as described on this page, rolled steel supporting bars with standard trim, and using glass that has been approved by the National Board of Fire Underwriters.

The ventilating section consists of gravity operated sash around the perimeter of the ventilator, so constructed that they will operate either automatically or manually, controlled by individual sash door flexible steel cables to a central point, and then only a single flexible steel cable, equipped with fusible links designed for various conditions, reaching any point that may be accessible for any convenient operation and terminating with a rope, which may be severed at will, and fastened to a special cleat.

The method of construction of the gravity sash is entirely new, embodying noiseless operation, free from vibration through rigid construction; watertight under all atmospheric conditions. *The outstanding feature is the individual sash control, which allows adjustment of any one sash, independent of any other sash, eliminating partly open sash when supposedly in a closed position.*

Screens are included for use under the glass in the skylight section to prevent falling glass and, if required, the skylight section is so constructed that exterior screens may be readily installed. Glass may be omitted from the skylight section if so desired and a metal roof substituted.

The *"Marco"* Automatic Skylight is a scientifically designed and constructed stage skylight, which will meet the most rigid requirements as to quality and efficient operation under all conditions. The standard design of the *"Marco"* Automatic Skylight may be deviated from and designs may be made to suit special conditions.

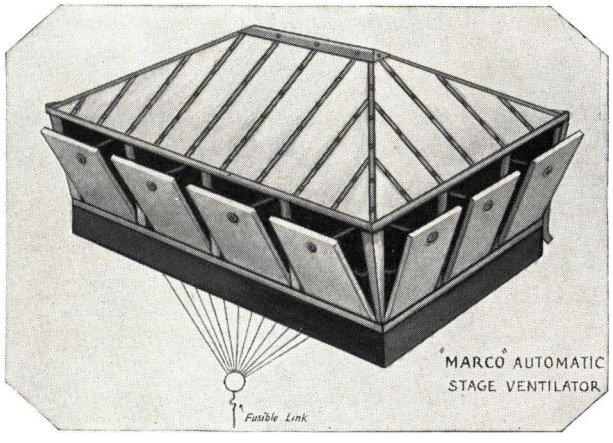
Inquiries regarding standard or special designs of a *"Marco"* Automatic Stage Skylight are solicited and details of construction will be forwarded on request.

MARCO SKYLIGHT INSTALLATIONS

L. Bamberger & Company, Newark, N. J.
Pennsylvania Railroad Co., Jersey City, N. J.
Post Office Building, Caldwell, N. J.
Post Office Building, Belmar, N. J.
Purity Bakeries Company, Newark, N. J.
Purity Bakeries Company, Brooklyn, N. Y.
Empire Theatre, Rahway, N. J.
Baker Castor Oil Co., Jersey City, N. J.
Ciba Pharmaceutical Products, Inc., Summit, N. J.
North End Jr. High School, Newburgh, N. Y.
Cudahy Packing Co., Jersey City, N. J.
Bakelite Corporation, Bloomfield, N. J.

Specifications for "Marco" Puttyless Skylight

All skylights shall be *"Marco"* Puttyless Skylights of type as shown and as manufactured by THE MARCO CO., INC., East Orange, N. J. and according to their standard details. Glass shall be as specified.



Specifications for "Marco" Automatic Stage Skylight

Furnish and install complete, with or without exterior screens, a *"Marco"* Automatic Stage Skylight of size as required to meet Fire Underwriters and Insurance Company requirements and to be of a design embodying structural steel construction with individual gravity sash control as manufactured by THE MARCO CO., INC., East Orange, N. J., and according to their standard detail.

GENERAL SHEET METAL WORKS, INC.

Manufacturers of Cibulas Puttyless Skylights, Ventilators and Turrets

BRIDGEPORT, CONN.

CIBULAS SKYLIGHTS—NON-FREEZING, PUTTYLESS

(PATENT NO. 1656044—JAN. 10, 1928)

No Water—No Ice—No Trouble

In all Cibulas Skylights the breakage of glass is reduced to a minimum through the elimination of possible collection of water and its freezing. There is no chance for capillary attraction of water due to the thin but firm bearing of the metal. The glass is free to expand and contract at all times.

The freezing of water on skylights and the inability of the glass to expand and contract is the greatest cause of glass breakage.

Special Features

The skylight bars shown below are made of heavy gauge, non-corrosive metals, 18 or 16-gauge copper, aluminum or galvanized copper bearing iron, as desired or specified.

They are designed for each job to support 35 or 40 lb. per sq. ft. to take care of snow or wind loads, the depth of the bars varying with the span.

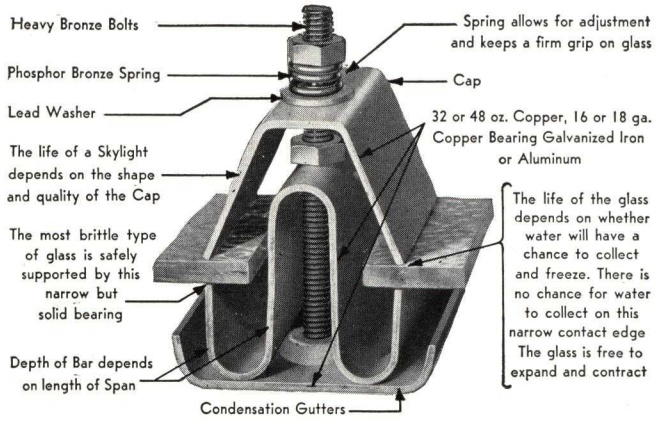
These bars are perfectly weathertight. They dispose of all condensation. Gutters are made large enough to carry off water and prevent accumulation of dust and dirt.

The Cibulas Puttyless Skylights are made in copper, aluminum and copper bearing galvanized iron. They are furnished with or without ventilation for hip, turret, sawtooth, double pitch, single pitch and marquise skylights. They are glazed with either ribbed or rough, plain or wire glass, or actinic glass.

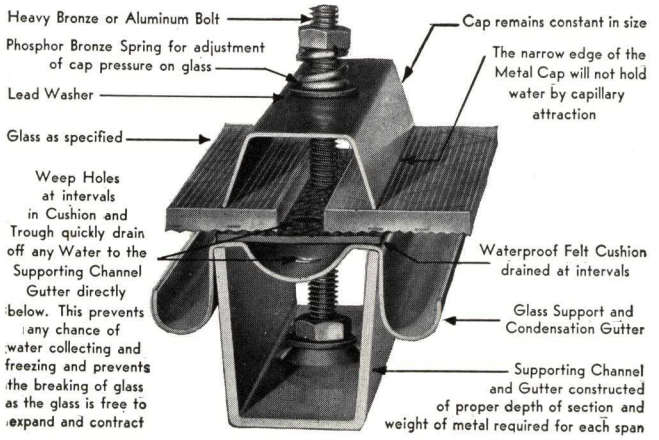
When desired, our engineers will furnish complete detail drawings and estimates without obligating the architect.

Installations

A list of installations will be gladly sent on request.



Non-Cushion Type Bar
(½ full size)



Cushion Type Bar
(½ full size)

Specifications for Cibulas Non-Cushion Type Puttyless Skylight

Galvanized Iron—Furnish and erect where shown on plans Cibulas Non-cushion Skylights as manufactured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of galvanized iron with supporting members sufficiently heavy to support the load according to the span. Skylight shall be assembled with $\frac{5}{16}$-in. bronze bolts and nuts and phosphor bronze springs. There shall be no packing of any sort. Skylight shall be provided with condensation gutters. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

Copper—Furnish and erect where shown on plans Cibulas Non-cushion Skylights as manufaltured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of copper with supporting members sufficiently heavy to support the load according to the span. Caps and condensation gutters shall be of 16-oz. copper. Skylight shall be assembled with $\frac{5}{16}$-in. bronze bolts and nuts and phosphor bronze springs. There shall be no packing of any sort. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

Aluminum—Furnish and erect where shown on plans Cibulas Non-cushion Skylights as manufactured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of aluminum with supporting members sufficiently heavy to support the load according to the span. Caps and condensation gutters shall be 24 B&S gauge aluminum. Skylight shall be assembled with $\frac{5}{16}$-in. aluminum bolts and nuts and phosphor bronze springs. There shall be no packing of any sort. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

Specifications for Cibulas Cushion Type Puttyless Skylight

Galvanized Iron—Furnish and erect where shown on plans Cibulas Cushion Skylights as manufactured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of galvanized iron with supporting member sufficiently heavy to support the load according to the span. Skylight shall be assembled with $\frac{5}{16}$-in. bronze bolts and nuts and phosphor bronze springs. Packing shall be used only as a glass rest. Skylight shall have a combined condensation gutter and trough punched at intervals with drain holes to carry off any moisture seeping in at the glass joints. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

Copper—Furnish and erect where shown on plans Cibulas Cushion Skylights, as manufactured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of copper with supporting member sufficiently heavy to support the load according to the span. Caps and condensation gutters shall be 16-oz. copper. Skylight shall be assembled with $\frac{5}{16}$-in. bronze bolts and nuts and phosphor bronze springs. Packing shall be used only as a glass rest. Skylight shall have a combined condensation gutter and trough punched at intervals with drain holes to carry off any moisture seeping in at the glass joints. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

Aluminum—Furnish and erect where shown on plans Cibulas Cushion Skylights, as manufactured by the General Sheet Metal Works, Inc., Bridgeport, Conn. To be constructed entirely of aluminum with supporting member sufficiently heavy to support the load according to the span. Caps and condensation gutters shall be 24 B&S gauge aluminum. Skylight shall be assembled with $\frac{5}{16}$-in. aluminum bolts and nuts and phosphor bronze springs. Packing shall be used only as a glass rest. Skylight shall have a combined condensation gutter and trough punched at intervals with drain holes to carry off any moisture seeping in at the glass joints. Glass shall be either ribbed or rough, plain or wire glass, or actinic glass.

CIBULAS PUTTYLESS TURRETS

(PATENT NO. 1905802—APRIL 25, 1933)

After much experimenting, the GENERAL SHEET METAL WORKS, INC. have succeeded in developing a puttyless turret which is enduring and, to all practical purposes, faultless. Here are some of the many good features of this construction:

Heavy gauge galvanized iron, aluminum or copper.

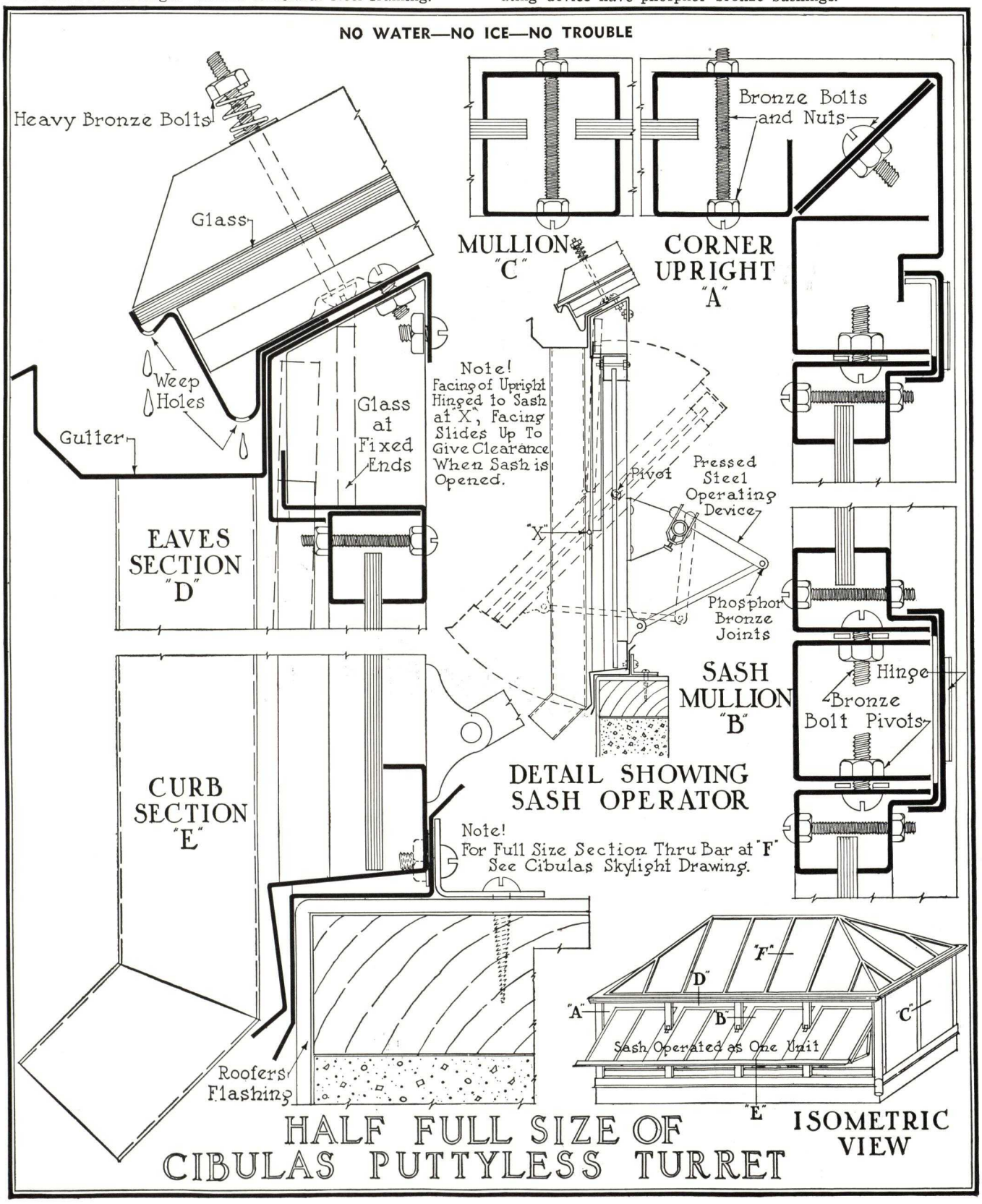
Two to three times heavier metal than ordinary construction, thus can be built larger without structural steel framing.

Rain and weather proof. No putty, packing or solder used.

Center pivoted sash, counterbalanced.

Greatest amount of ventilation.

Can be controlled from minimum to maximum ventilation. Easy in operation, opens in ten seconds. Principal parts of operating device of pressed steel. Movable joints of operating device have phosphor bronze bushings.



MILCOR STEEL COMPANY

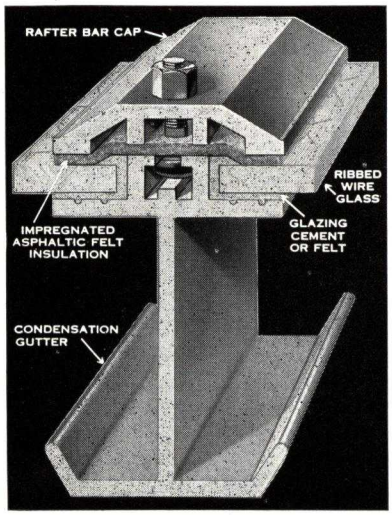
MILWAUKEE, WIS. CANTON, OHIO

CHICAGO, ILL. KANSAS CITY, MO. LA CROSSE, WIS.

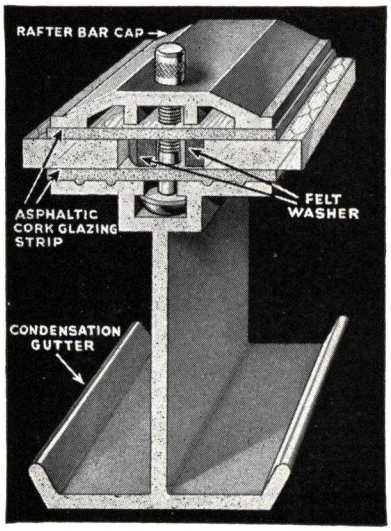
SALES OFFICES IN PRINCIPAL CITIES

For Our Catalogs on Milcor Fireproof Products, Ventilators, Access Doors and Steel Decks, see File Index

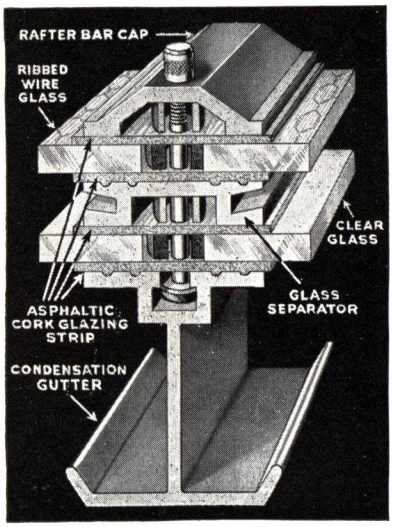
MILCOR SUPER EXTRUDED ALUMINUM SKYLIGHTS



Puttied Construction



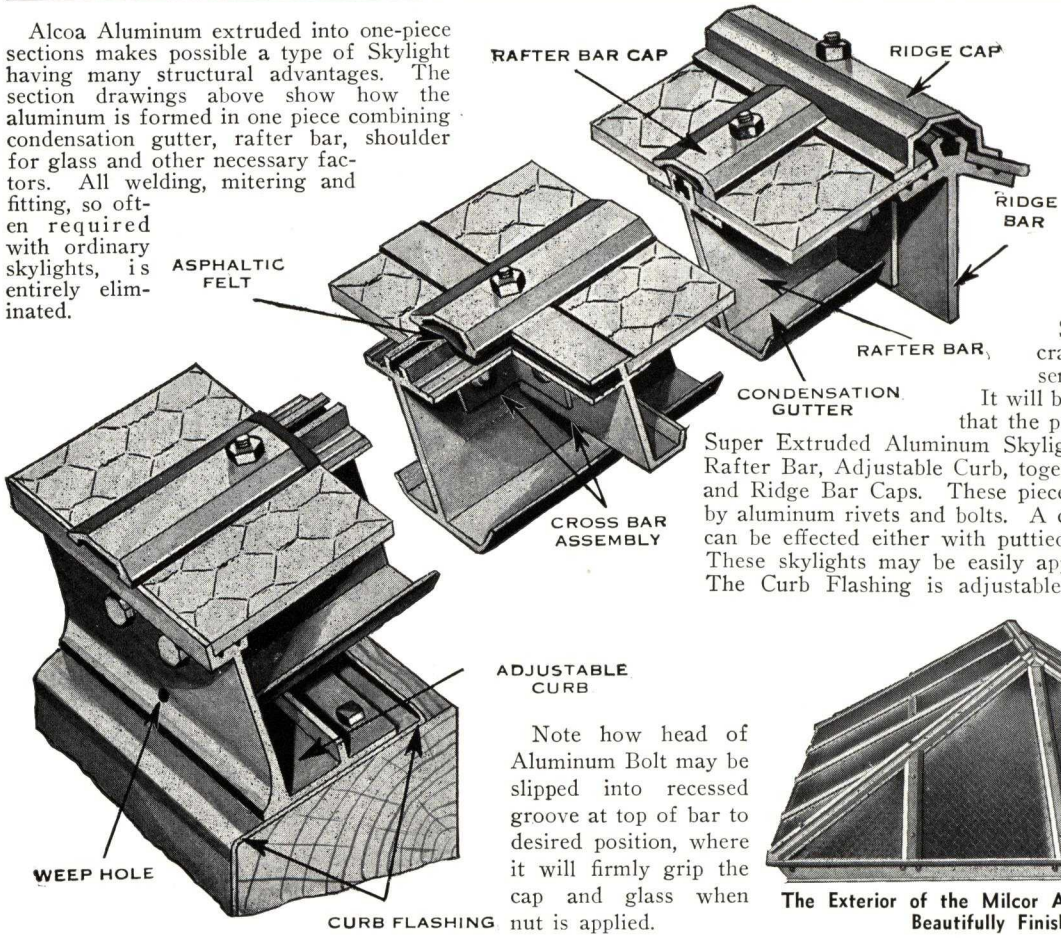
Puttyless Construction



Double Glass, Puttyless Construction

Above Illustrations not full size. Sizes available to meet all conditions

Alcoa Aluminum extruded into one-piece sections makes possible a type of Skylight having many structural advantages. The section drawings above show how the aluminum is formed in one piece combining condensation gutter, rafter bar, shoulder for glass and other necessary factors. All welding, mitering and fitting, so often required with ordinary skylights, is entirely eliminated.

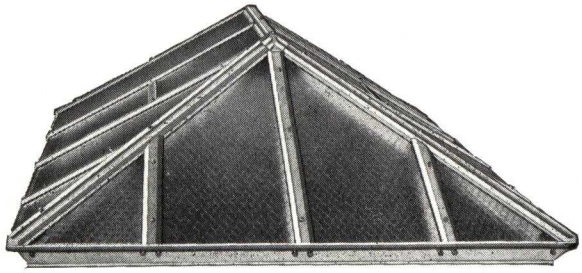


Made either from Alcoa 43S or 53St-5 Alloy Aluminum and therefore free from corrosion. This skylight need never be painted. Because of its light weight, it does not require heavy roof construction.

Shipped knocked down, crated and boxed. Easily assembled on the job.

It will be noted from sectional view that the principal construction of the Super Extruded Aluminum Skylight consists of Ridge Bar, Rafter Bar, Adjustable Curb, together with Rafter Bar Caps and Ridge Bar Caps. These pieces are held firmly together by aluminum rivets and bolts. A completely water-tight joint can be effected either with puttied or puttyless construction. These skylights may be easily applied to any kind of roof. The Curb Flashing is adjustable and made of aluminum.

Note how head of Aluminum Bolt may be slipped into recessed groove at top of bar to desired position, where it will firmly grip the cap and glass when nut is applied.



The Exterior of the Milcor Aluminum Skylight Presents a Beautifully Finished Appearance

DETAILS SHOWING APPLICATION OF MILCOR EXTRUDED ALUMINUM SKYLIGHTS ON FREQUENTLY USED TYPES OF CURB

Cross Section Diagrams show how standard single glass puttyless construction is applied to four different types of Curb:

A. Concrete Curb with wood plate.

B. Steel Curb with wood plate.

C. Wood Curb.

D. Steel Curb with steel plate.

FEATURES OF MILCOR EXTRUDED ALUMINUM SKYLIGHTS

1. Structural Advantages—Extruded aluminum bars are specially formed in one piece with grooved recesses for bolts, condensation gutters, shoulders, etc., properly shaped for strength and rigidity.

2. Free from Corrosion—Every metal part of these Skylights is made of aluminum—free from corrosion in all weather conditions.

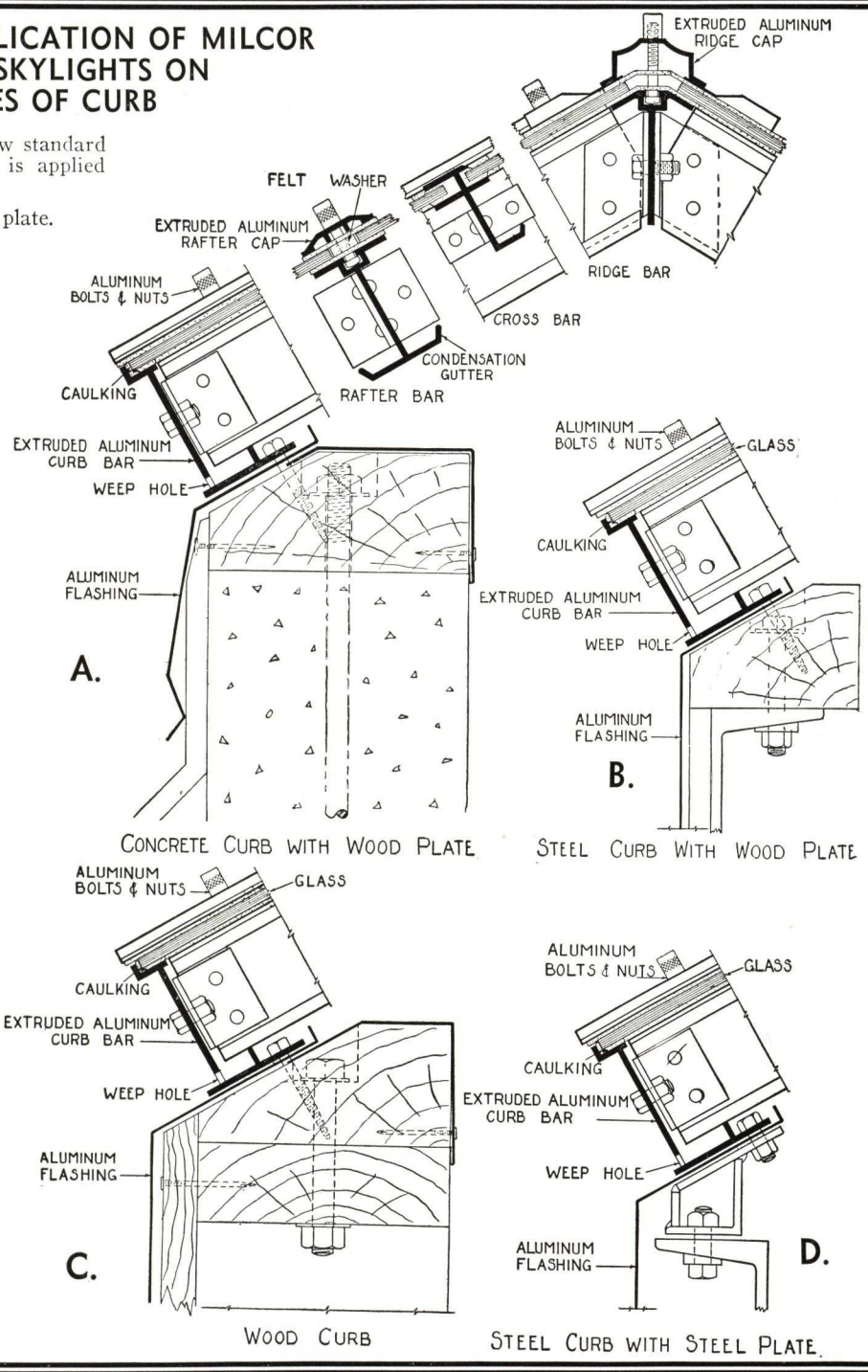
3. Simple Construction—The extruded aluminum bars provide great strength and rigidity without the use of cross trusses which impair lighting efficiency.

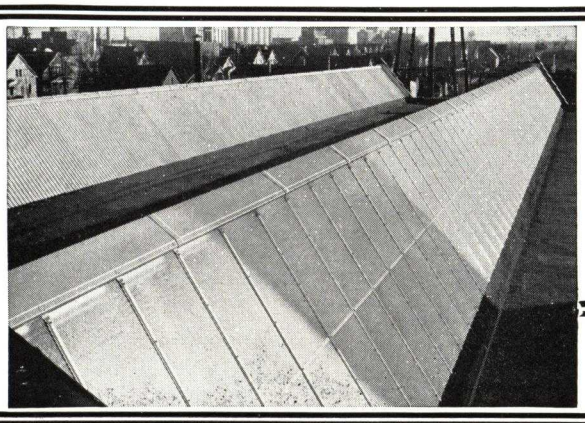
4. Clean Appearance—No Maintenance—Extruded aluminum maintains a clean, bright surface at all times regardless of weather. It is never necessary to paint the exterior or interior of the skylight.

5. Light in Weight—The light weight of the aluminum metal parts provides advantages in handling, assembling, placing and roof construction.

6. No Condensation Trouble—Condensation Gutters cannot be inefficiently assembled because they are an integral part of the skylight bar. The condensation is drained to the roof through properly placed weep holes.

7. Any Size—All Types—Furnished Complete. These skylights are furnished in any size, Single Pitch, Double Pitch, Hipped and Ventilated Types. Flashing and all fittings are furnished.





SPECIFICATION DATA

Skylights where shown on drawings shall be Milcor Super Extruded Aluminum Skylights, erected in accordance with the manufacturer's instructions on curbs shown on detail drawings.

All rafter bars shall be fastened to ridge and curb clips with not less than two rivets in each, and these clips shall be fastened to ridge and curb with two bolts each. All bolts, nuts and rivets are to be aluminum. Glass shall be (¼-in. ribbed wired) (¼-in. plain ribbed) securely set in approved glazing cement or felt with ribs down as instructed by manufacturer. After Skylight is glazed all bar and ridge caps are to be securely bolted in place. An insulating asphaltic felt is to be used between cap and glass.

Skylight flashing shall be No. 20 B & S Gauge as furnished with the skylights and wherever such flashing comes in contact with metal other than aluminum an insulating felt shall be used to prevent electrolysis.

NOTE: In illustration at left attractive appearance and simple construction of Milcor Extruded Aluminum Skylights on roof of Chain Belt Company, Milwaukee.

OVERLY MANUFACTURING COMPANY

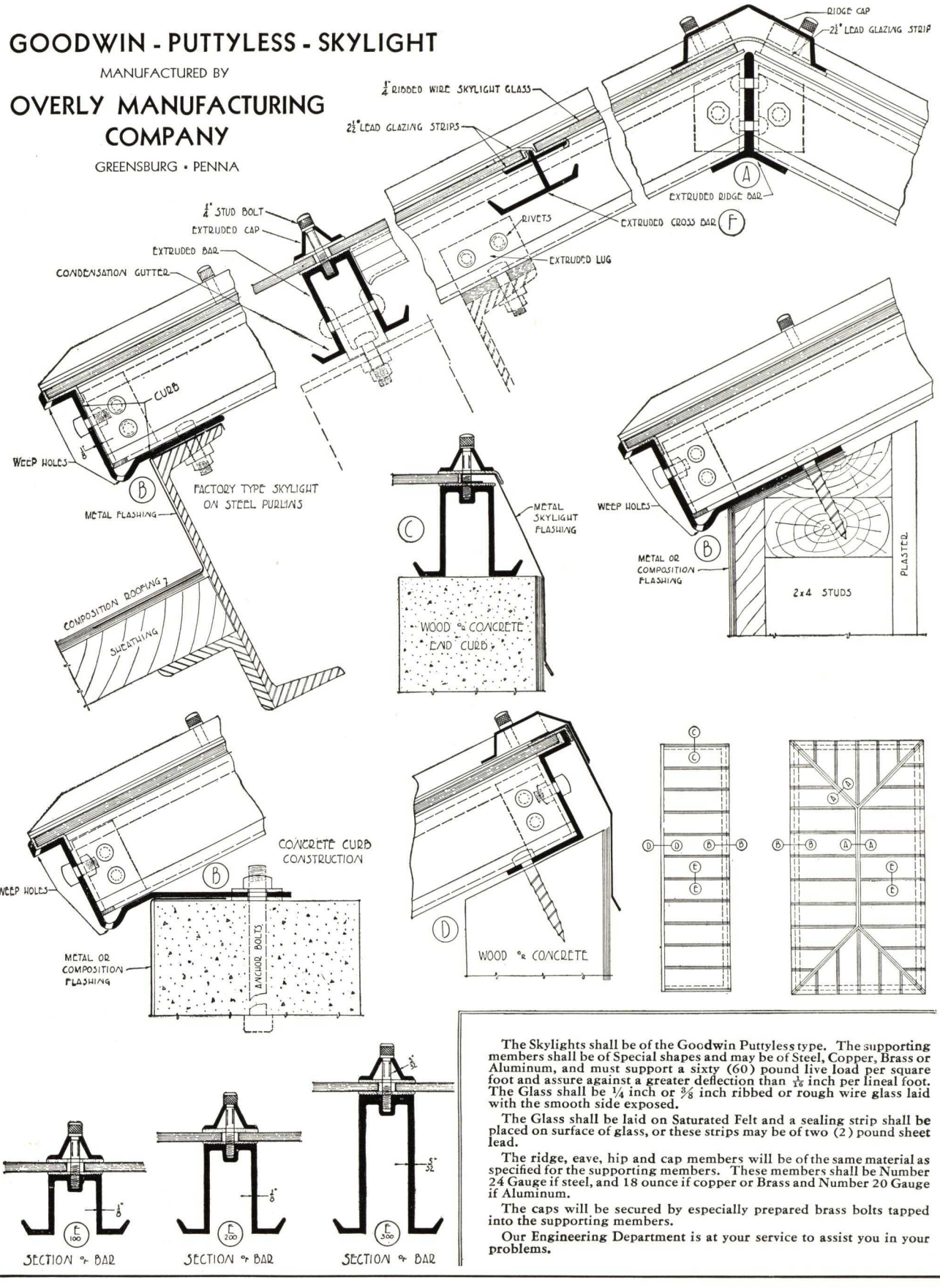
GREENSBURG, PA.

GOODWIN - PUTTYLESS - SKYLIGHT

MANUFACTURED BY

OVERLY MANUFACTURING COMPANY

GREENSBURG • PENNA



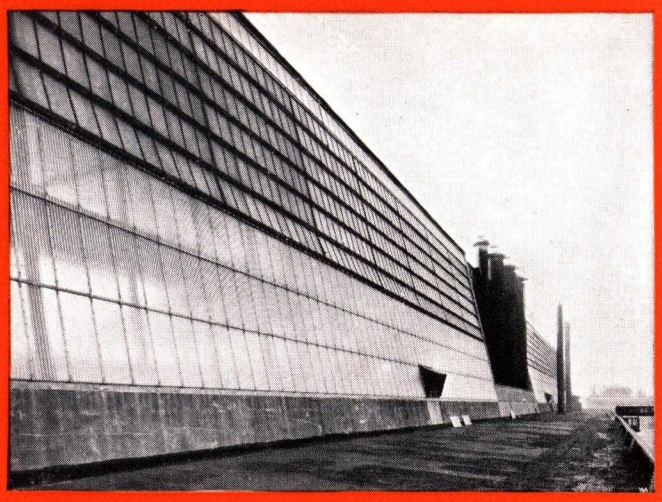
The Skylights shall be of the Goodwin Puttyless type. The supporting members shall be of Special shapes and may be of Steel, Copper, Brass or Aluminum, and must support a sixty (60) pound live load per square foot and assure against a greater deflection than $\frac{1}{16}$ inch per lineal foot. The Glass shall be $\frac{1}{4}$ inch or $\frac{3}{8}$ inch ribbed or rough wire glass laid with the smooth side exposed.

The Glass shall be laid on Saturated Felt and a sealing strip shall be placed on surface of glass, or these strips may be of two (2) pound sheet lead.

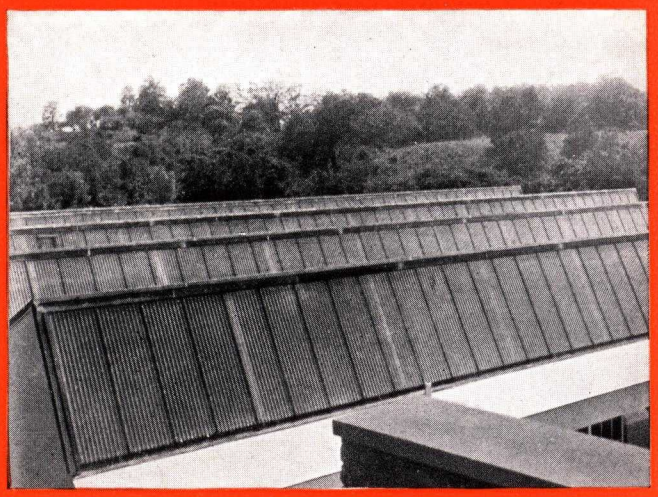
The ridge, eave, hip and cap members will be of the same material as specified for the supporting members. These members shall be Number 24 Gauge if steel, and 18 ounce if copper or Brass and Number 20 Gauge if Aluminum.

The caps will be secured by especially prepared brass bolts tapped into the supporting members.

Our Engineering Department is at your service to assist you in your problems.



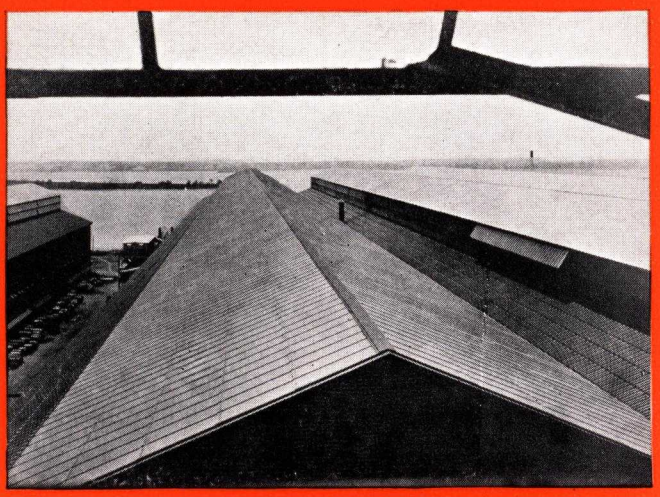
PHILADELPHIA NAVY YARD
FOUNDRY BUILDING
21,000 sq. ft. Side Wall Construction



PERFECT CIRCLE PISTON RING CO.
HAGERSTOWN, INDIANA
7,500 sq. ft. C. W. G. Sawtooth Construction

ORIGINAL SOLID
CORRUGATED WIRE GLASS
SKYLIGHTS, SAWTOOTH AND SIDE WALL CONSTRUCTION

SLUDGE BEDS
BURLINGTON, N. J.
All C. W. G. Buildings



GENERAL STEEL CASTINGS CO.
EDDYSTONE, PA.
323,000 sq. ft. Monitor Roofs

PENNSYLVANIA WIRE GLASS COMPANY
1612 MARKET STREET
PHILADELPHIA, PA.

ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS

Corrugated Wire Glass (CWG) is a corrugated sheet of glass with wire netting incorporated in it during the process of manufacture. Owing to the corrugations it has strength many times greater than any flat glass of equal thickness. To meet the demand for a strong, substantial skylight CWG was adopted to this use by the PENNSYLVANIA WIRE GLASS COMPANY which has specialized in this form of construction for many years.

CWG Skylights can be placed on a roof of any material, including corrugated iron and corrugated asbestos. CWG can be used for roofs, sidewalls, marquises, canopies and, in fact, wherever *daylight* is desired.

CWG Skylights offer many points of superiority. Low maintenance costs are an important item. There are no bars to rust or corrode. No supplementary frame is used as they are applied directly on steel or wood purlins or curbs, and concrete. They have unusual resistance to vibration and temperature changes and are completely weathertight.

Because of the corrugations, rain washes off dirt and dust, making these skylights practically self-cleaning. Being translucent they transmit diffused light with a minimum of shadows.

The Company maintains an engineering service department for consultation regarding skylighting and kindred problems for which there is no charge. Upon receipt of rough sketches or details they will be glad to offer suggestions for CWG Skylights, roofs, etc. Samples of any type of glass manufactured will gladly be mailed on request. For data on Flat Wire Glass and Actinic Glass refer to catalog in the Glass Section of Sweet's File. See File Index.

INDEX TO DETAILS

Plate No.	
P-100	Isometric Detail of Typical Lap Joint.
P-101	Gable End Skylights with Steel Framing.
P-102	Single Pitch Skylights with Steel Framing.
P-103	Concrete Curb Skylights.
P-104	Concrete Curb Skylights.
P-105	Skylights on Wood Sheathed Roof.
P-106	Wood Curb Skylights.
P-107	Skylights with Cement-tile Roofing.
P-108	Skylights with Steel-deck Roofing.
P-109	Sawtooth Skylights with Steel Framing.
P-110	Sawtooth Skylights with Steel Framing.
P-111	Sawtooth Skylights with Wood Framing.
P-112	Skylights on Back Slopes of Sawtooth Framing.
P-113	Skylights with Corrugated Sheet Metal Roofing.
P-114	Steel Framed Marquise.
P-115	Typical Sheet Metal Ventilator Details.
P-116	Methods of Draining Condensation.
P-117	Steel Framed Canopies.
P-118	Details of Sawtooth, Top-Hung, Operated Sash and Fixed Glass
P-119	Details of Windows, Pivoted Sash and Fixed Glass
*P-120	to P-124 inclusive.
2700	Typical CWG Skylights with corrugated asbestos.
2700A	Details of CWG with 2½ in. and 2⅝ in. pitch corrugated asbestos.
2700B	Details of CWG with 4.2 in. pitch corrugated asbestos.
2825A	Standard 10 ft. 0 in. wide Curb Skylight—Steel Frame.
2825B	Standard 20 ft. 0 in. wide Curb Skylight—Steel Frame.
2825C	Standard 10 ft. 0 in. and 20 ft. 0 in. wide Skylight Gable-end Details.
3551	Details of CWG Ventilating Units.
3606	Sludge Bed Details.
3606A	Sludge Bed Details.

*These sheets will be sent out as they are issued.

SPECIFICATIONS FOR THE INSTALLATION OF ORIGINAL SOLID CORRUGATED WIRE GLASS

SCOPE OF WORK

I. Work by Others—

All supporting frames, curbs, purlins, ridge-beams, tie-rods and bracing for proper construction shall be provided under another contract.

All roofing, curb and roof flashings, gutters and counter-flashings shall be provided under another contract.

II. Work Required—

The work to be done under this contract includes the furnishing of all labor, materials, equipment and services necessary for, and reasonably incidental to, the erection of (White or Actinic—specify which) Corrugated Wire Glass ⅜" thick (in Skylights, Sawteeth or Side-Wall Panels), as manufactured by the PENNSYLVANIA WIRE GLASS COMPANY with standard fittings of (specify **which**) No. 3S¾H Aluminum (.032 in. thick), 18-oz. cold rolled copper, 24-gauge galvanized steel (copper bearing) (painted with aluminum), 13-gauge zinc, 24-gauge "Lead Clad" steel, 6-lb. hard lead, as shown on the drawings and herein specified.

SHOP DRAWINGS

This Contractor shall furnish the (Architects, Engineers, Purchasers), for their approval before any of the work is executed, complete shop drawings conforming to the recommendations of the manufacturer.

CONSTRUCTION AND ERECTION

This Contractor shall erect the Corrugated Wire Glass exactly as prescribed in the approved drawings and recommendations of the PENNSYLVANIA WIRE GLASS COMPANY.

(While the specification clause above will cover the erection of Corrugated Wire Glass, under the heading of "Notes" below, there are several clauses which may be included where deemed necessary.)

NOTES

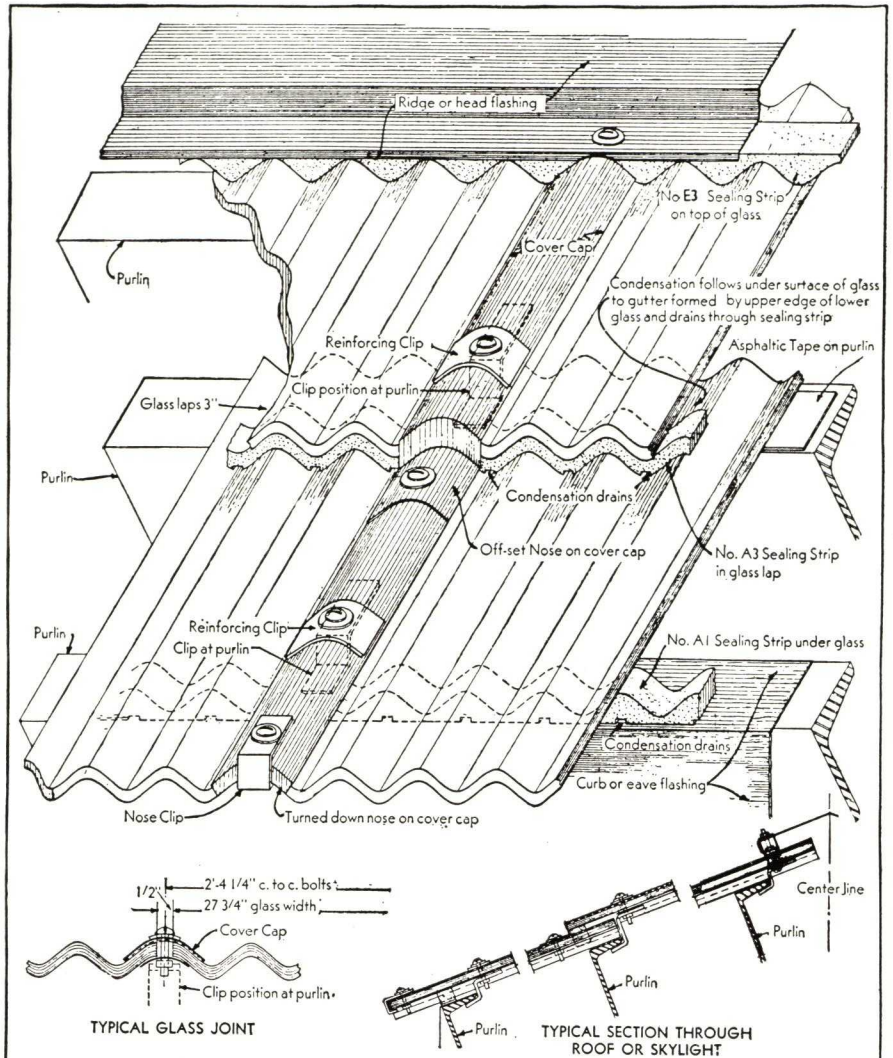
(a) No sheet of Corrugated Wire Glass shall exceed 27¾ in. in width, and, no single sheet shall span more than 60 in. clear opening (up the slope) without an intermediate support. Where glass is set at an angle of 60 degrees, or more, from the horizontal, the maximum clear span may extend to 96 in. (up the slope). Corrugated Wire Glass covering openings greater than those mentioned must have an intermediate support or arrangements must be made to use two or more lights of glass.

(b) The sheets of glass shall be laid edge to edge (not lapping) with ½-in. spaces between the sheets and the open joints so formed shall be covered with exterior metal cover caps and metal inner strips which conform to the corrugations of the glass. The exterior cover caps shall have an asphaltic lining. The caps and inner strips, to complete the joint, shall be bolted together by bolts passing through the caps and inner strips and between the sheets of glass approximately 9 in. center to center.

(c) Where structural supports occur, clips, engaged by bolts passing through the cover caps, shall be used to hold the glass securely in place.

(d) Each light of glass shall have a firm, even bearing and wherever any sheet of glass is applied to structural work (such as curbs, purlins, etc.), it shall be cushioned with an asphalt strip. Where it laps over other glass, it shall be cushioned with a sealing strip.

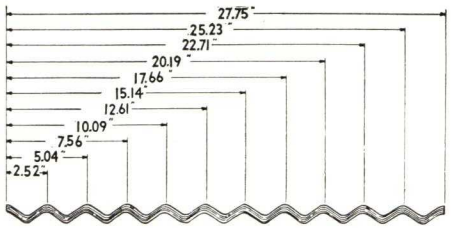
At the bottom (or eaves) of Corrugated Wire Glass construction and at the top (in conjunction with the ridge or flashings), the openings caused by the corrugations of the glass shall be filled with a sealing strip especially designed and supplied for this purpose.



NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing The size of curbs, purlins ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support All bolts and screws to be 1/4" in diameter

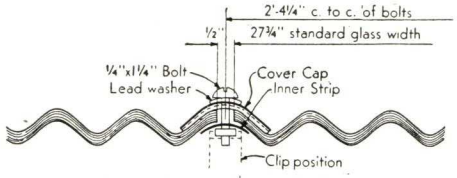
SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS ISOMETRIC DETAIL OF TYPICAL LAP JOINT	PLATE NUMBER P-100 Sept. 1937

STANDARD SIZE AND SPACING FOR ORIGINAL SOLID CORRUGATED WIRE GLASS



STANDARD SHEET OF CORRUGATED WIRE GLASS

THICKNESS—3/8"



TYPICAL COVER CAP JOINT

NOTES

Standard width glass (27¾ in.) should be used wherever possible on account of ease in setting and because cut sizes are more difficult to obtain in case of breakage.

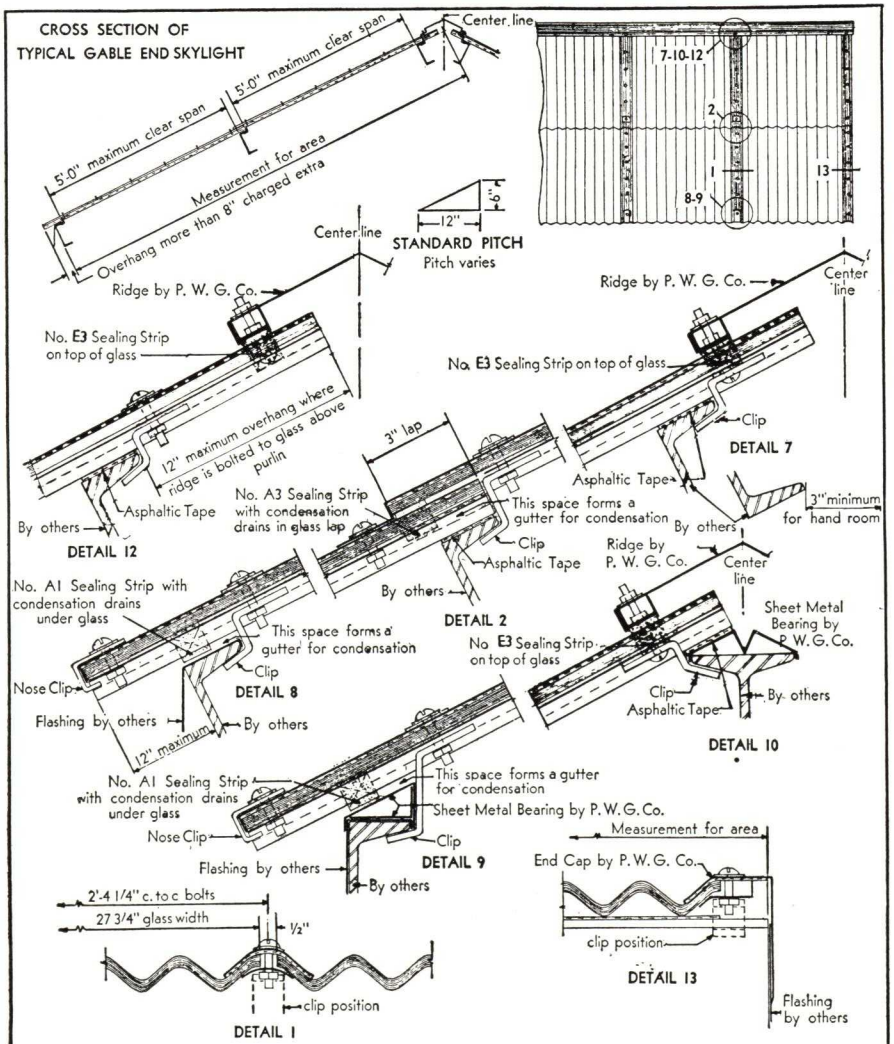
When glass must be cut in widths narrower than 27¾ in. it can only be supplied in multiples of the full corrugation or 2½ in.—viz., 25¼ in., 22¾ in., 20¼ in. and 17¾ in.

In arranging corrugated wire glass sheets to suit a given opening it is often necessary to cut out more than one 2½-in. corrugation. Then it is advisable to divide the cutting among several sheets rather than cut all from one sheet.

Glass more than 27¾ in. wide cannot be supplied.

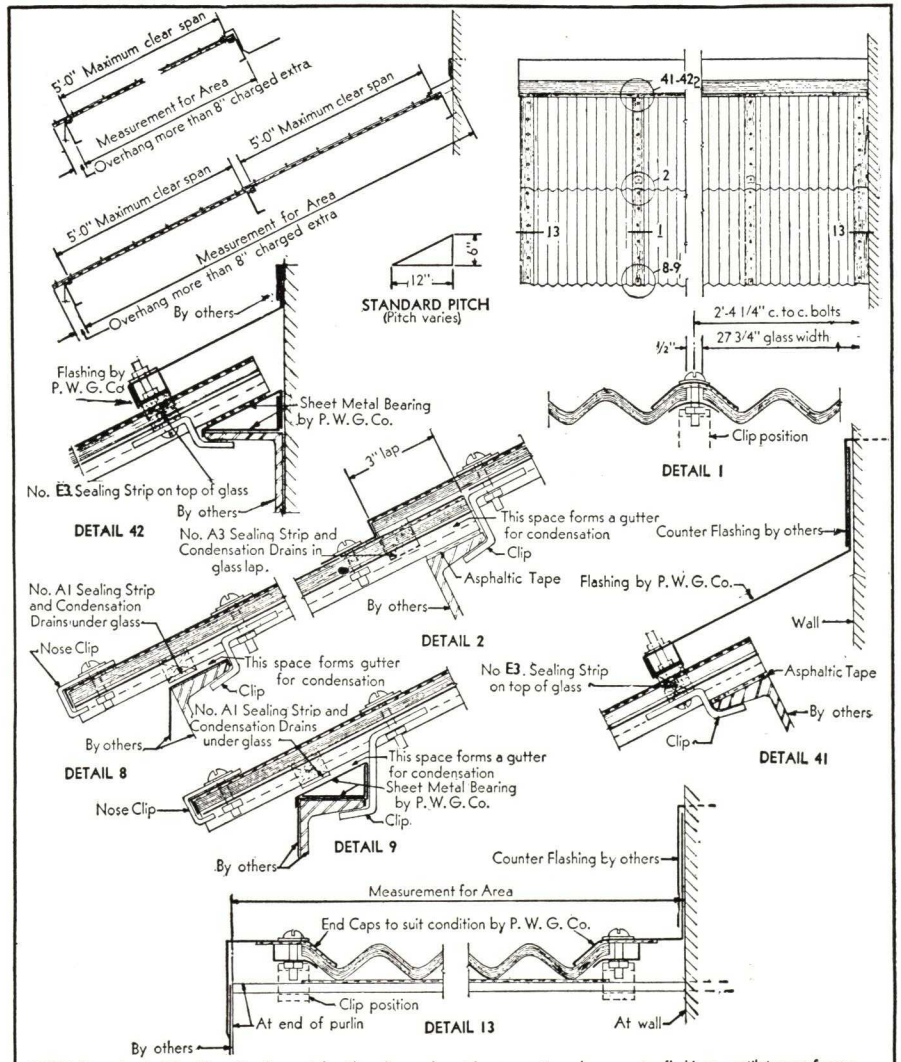
The lengths of the sheets depend upon the conditions under which the glass is used. The conditions governing are shown in the Typical Detail Sheets for different types of skylights and glass roof construction.

DEEP ANGLE			
Lts.	Width	Lts.	Width
1	2′- 4¼″	51	120′- 0¾″
2	4′- 8½″	52	122′- 5″
3	7′- 0¾″	53	124′- 9¼″
4	9′- 5″	54	127′- 1½″
5	11′- 9¼″	55	129′- 5¾″
6	14′- 1½″	56	131′-10″
7	16′- 5¾″	57	134′- 2¼″
8	18′-10″	58	136′- 6½″
9	21′- 2¼″	59	138′-10¾″
10	23′- 6½″	60	141′- 3″
11	25′-10¾″	61	143′- 7¼″
12	28′- 3″	62	145′-11½″
13	30′- 7¼″	63	148′- 3¾″
14	32′-11½″	64	150′- 8″
15	35′- 3¾″	65	153′- 0¼″
16	37′- 8″	66	155′- 4½″
17	40′- 0¼″	67	157′- 8¾″
18	42′- 4½″	68	160′- 1″
19	44′- 8¾″	69	162′- 5¼″
20	47′- 1″	70	164′- 9½″
21	49′- 5¼″	71	167′- 1¾″
22	51′- 9½″	72	169′- 6″
23	54′- 1¾″	73	171′-10¼″
24	56′- 6″	74	174′- 2½″
25	58′-10¼″	75	176′- 6¾″
26	61′- 2½″	76	178′-11″
27	63′- 6¾″	77	181′- 3¼″
28	65′-11″	78	183′- 7½″
29	68′- 3¼″	79	185′-11¾″
30	70′- 7½″	80	188′- 4″
31	72′-11¾″	81	190′- 8¼″
32	75′- 4″	82	193′- 0½″
33	77′- 8¼″	83	195′- 4¾″
34	80′- 0½″	84	197′- 9″
35	82′- 4¾″	85	200′- 1¼″
36	84′- 9″	86	202′- 5½″
37	87′- 1¼″	87	204′- 9¾″
38	89′- 5½″	88	207′- 2″
39	91′- 9¾″	89	209′- 6¼″
40	94′- 2″	90	211′-10½″
41	96′- 6¼″	91	214′- 2¾″
42	98′-10½″	92	216′- 7″
43	101′- 2¾″	93	218′-11¼″
44	103′- 7″	94	221′- 3½″
45	105′-11¼″	95	223′- 7¾″
46	108′- 3½″	96	226′- 0″
47	110′- 7¾″	97	228′- 4¼″
48	113′- 0″	98	230′- 8½″
49	115′- 4¼″	99	233′- 0¾″
50	117′- 8½″	100	235′- 5″



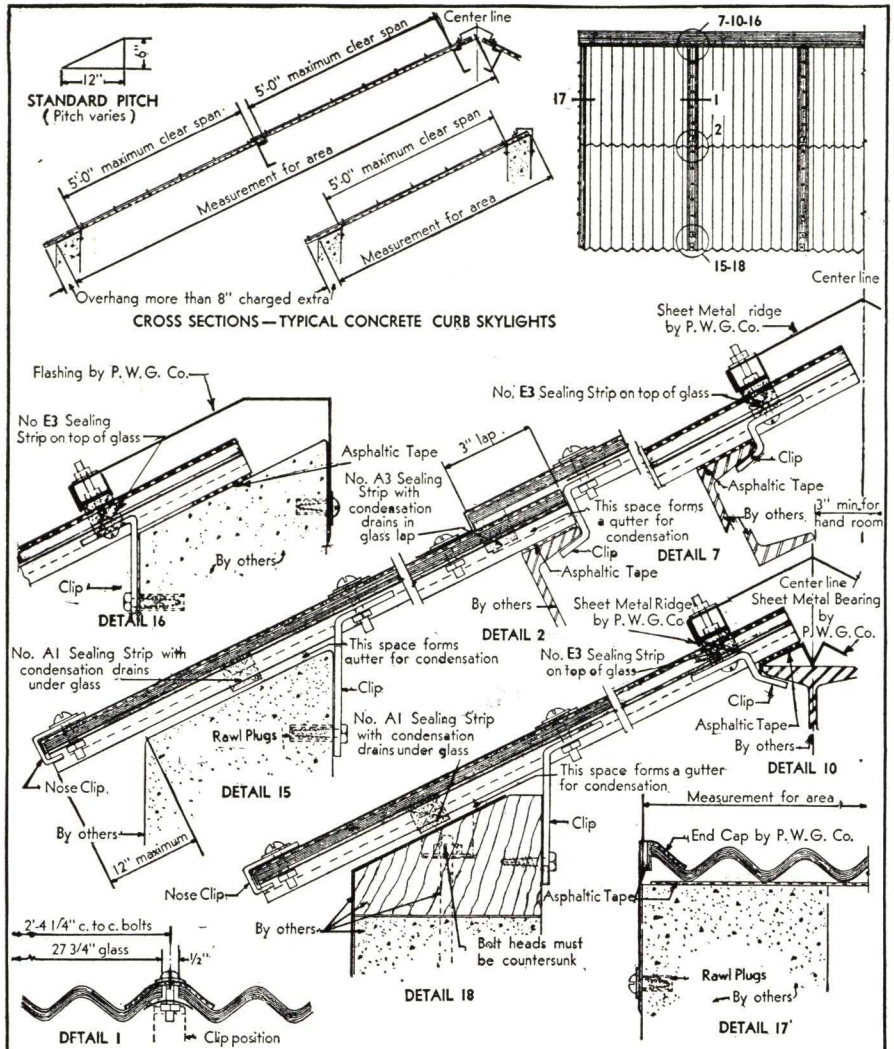
NOTE-Pennsylvania Wire Glass Co. does not furnish, purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH GABLE ENDS AND STEEL FRAMING	PLATE NUMBER P-101 Sept. 1937



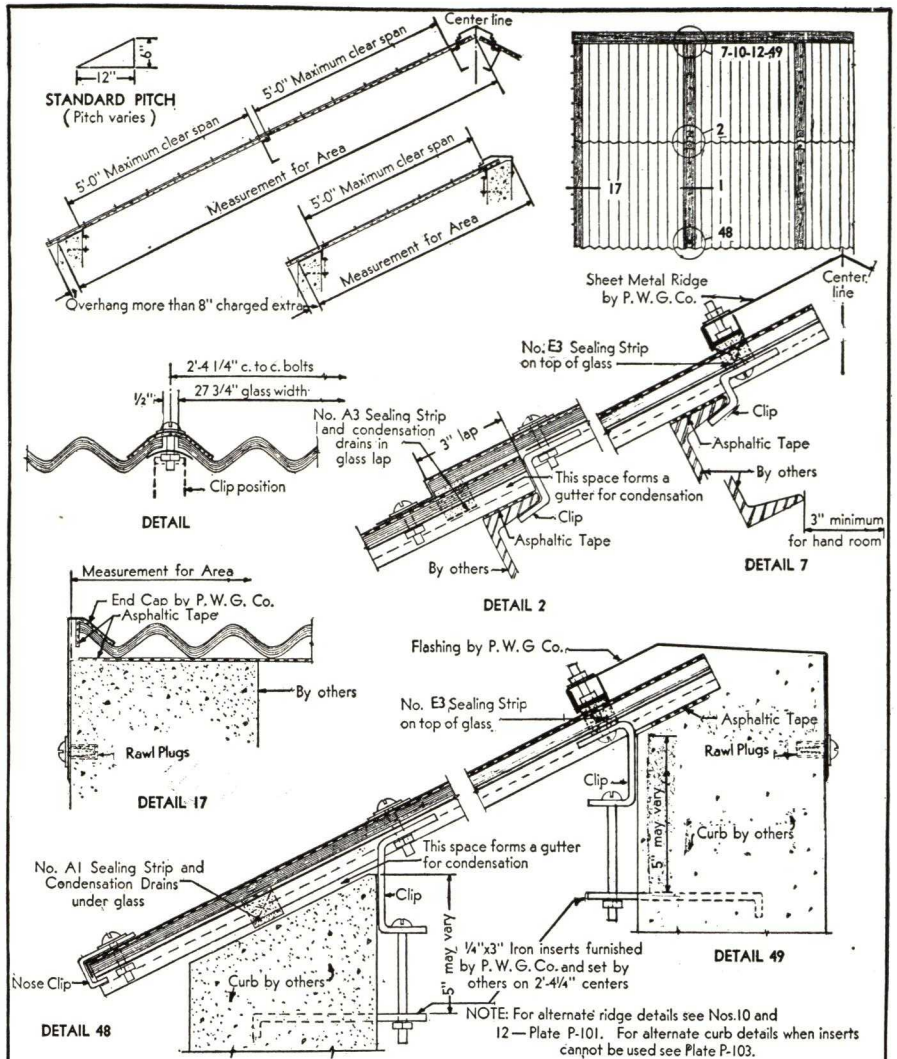
NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SINGLE PITCH SKYLIGHTS—STEEL CURB FRAMING	PLATE NUMBER P-102 Sept. 1937



NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter

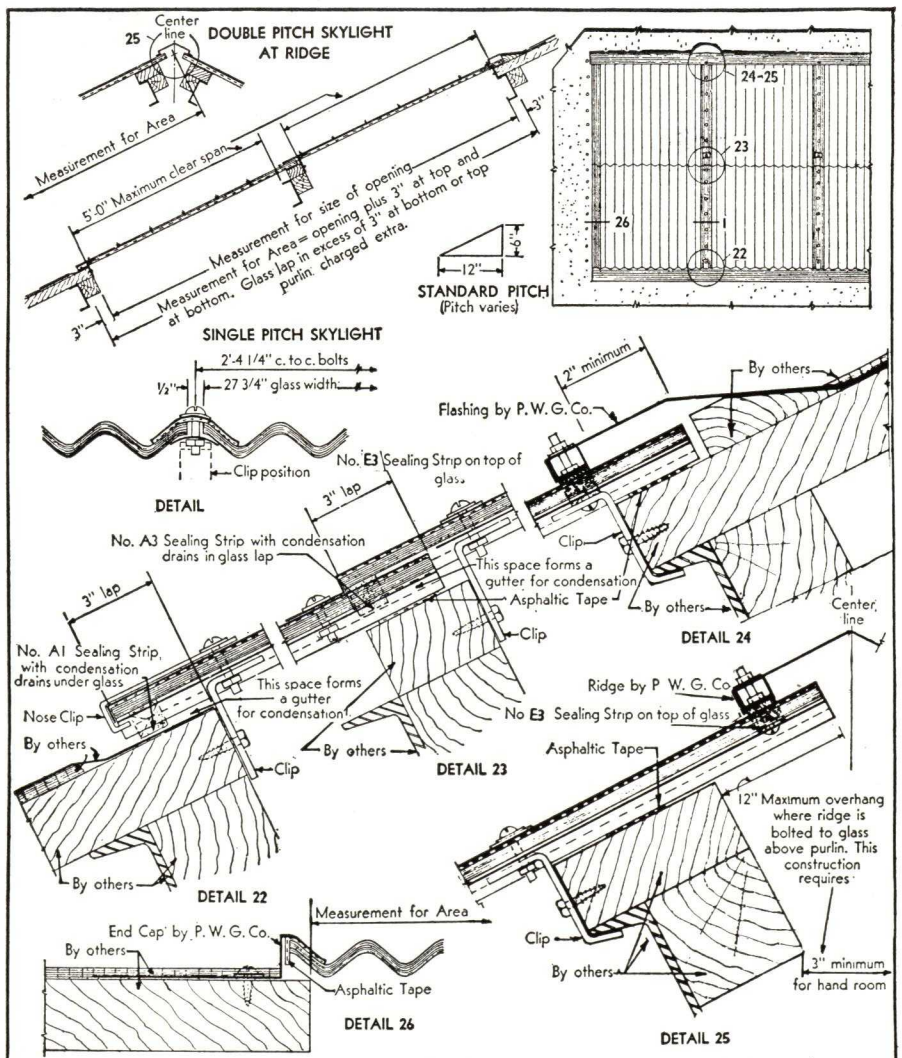
SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH CONCRETE CURBS	PLATE NUMBER P-103 Sept. 1937



NOTE: For alternate ridge details see Nos. 10 and 12 — Plate P-101. For alternate curb details when inserts cannot be used see Plate P-103.

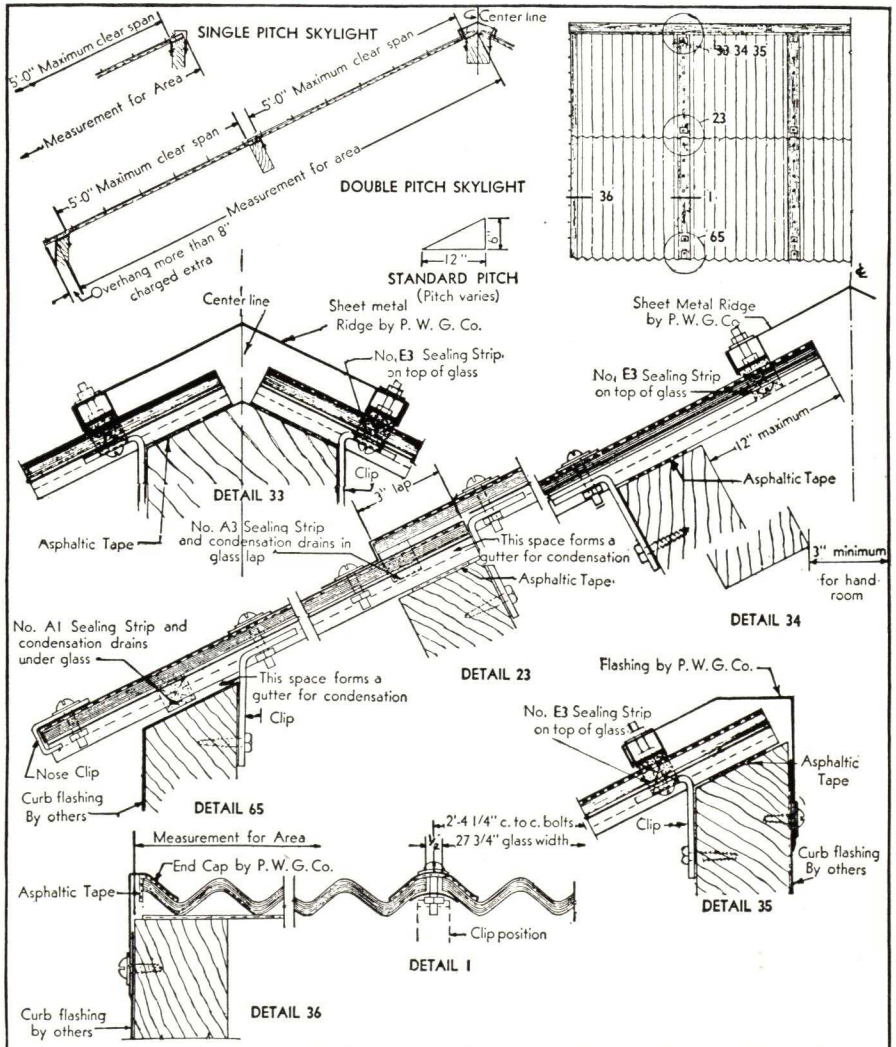
NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support All bolts and screws to be 1/4" in diameter

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH CONCRETE CURBS	PLATE NUMBER P-104 Sept. 1937



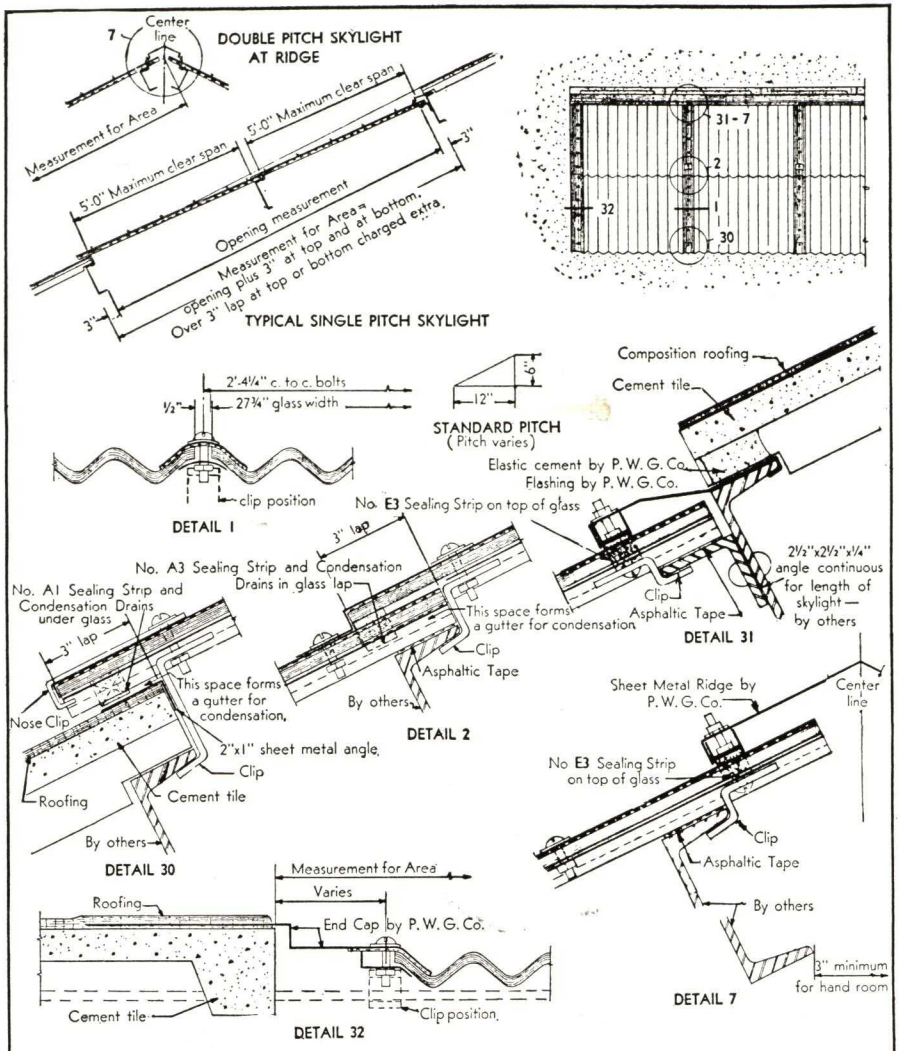
NOTE - Pennsylvania Wire Glass Co. does not furnish, purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGNIAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS ON WOOD-SHEATHED ROOF	PLATE NUMBER P-105 Sept. 1937



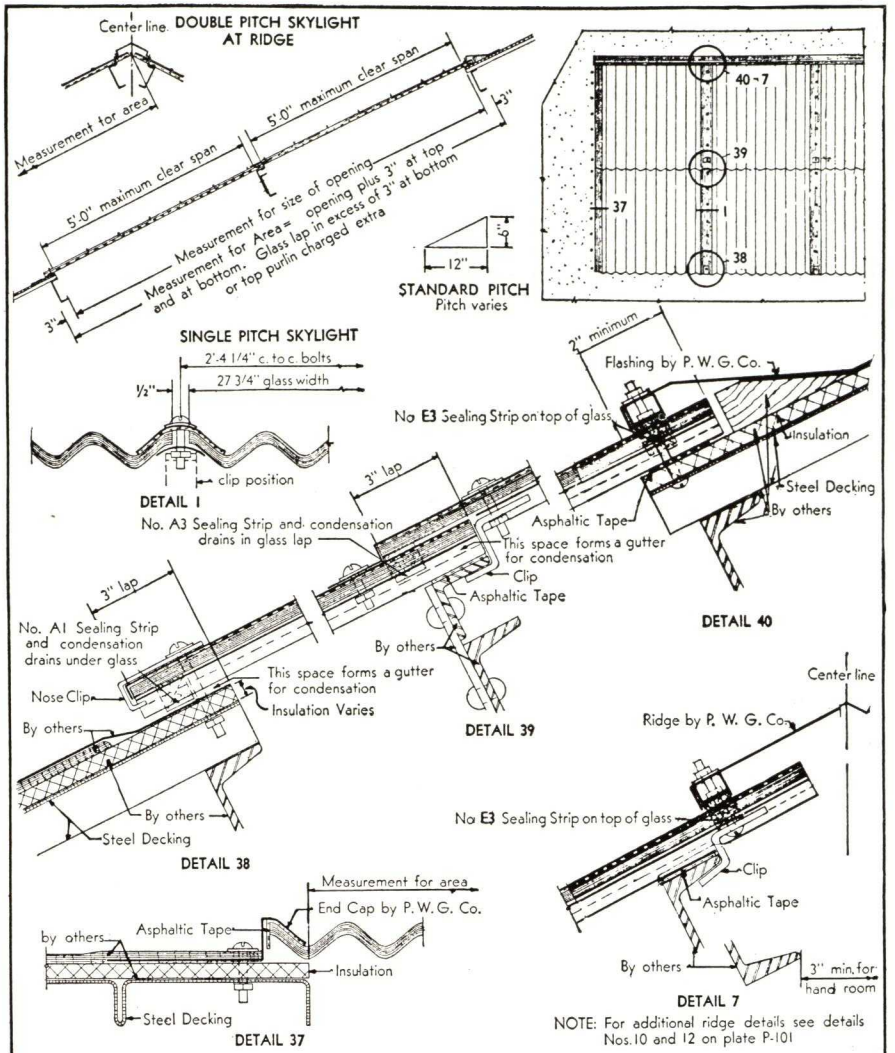
NOTE - Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH WOOD FRAMING	PLATE NUMBER P-106 Sept. 1937



NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

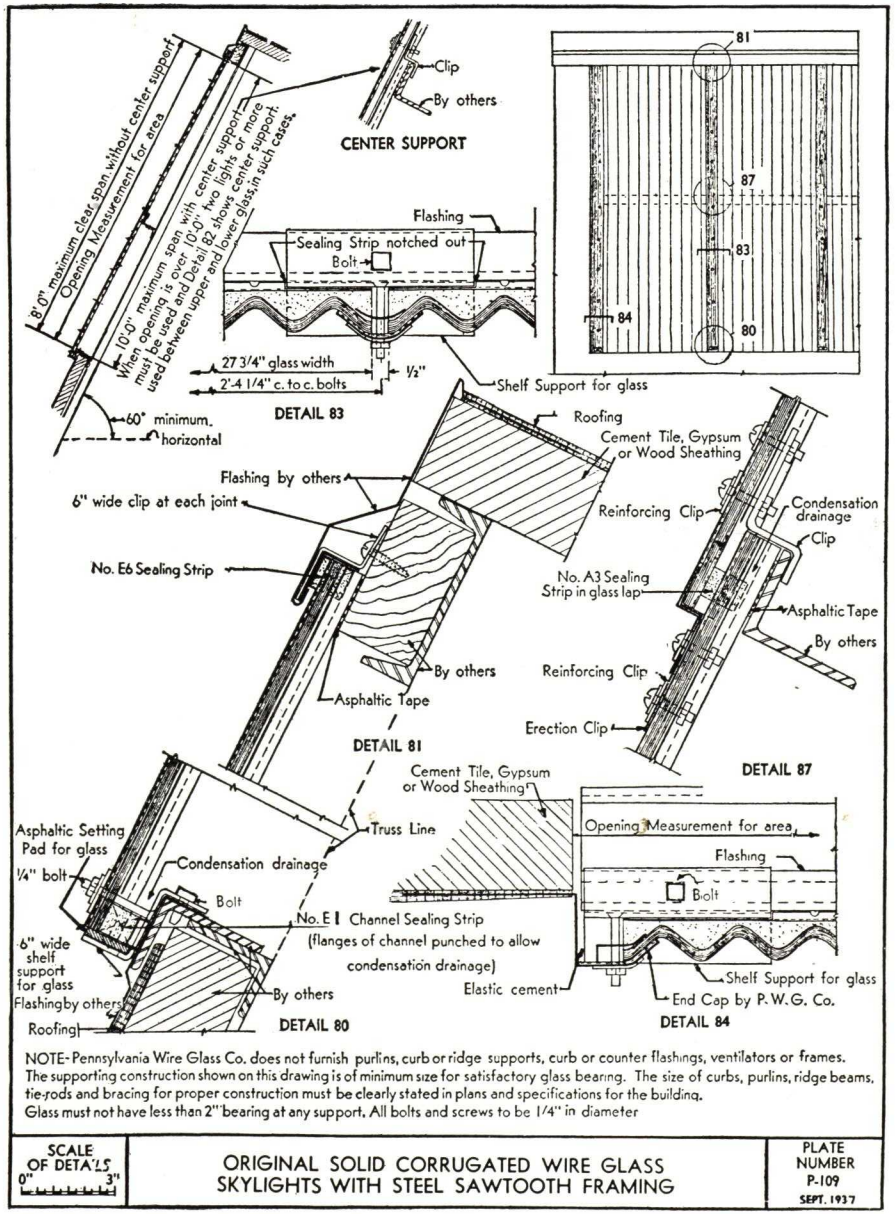
SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH CEMENT TILE ROOFING	PLATE NUMBER P-107 Sept. 1937



NOTE: For additional ridge details see details Nos. 10 and 12 on plate P-101

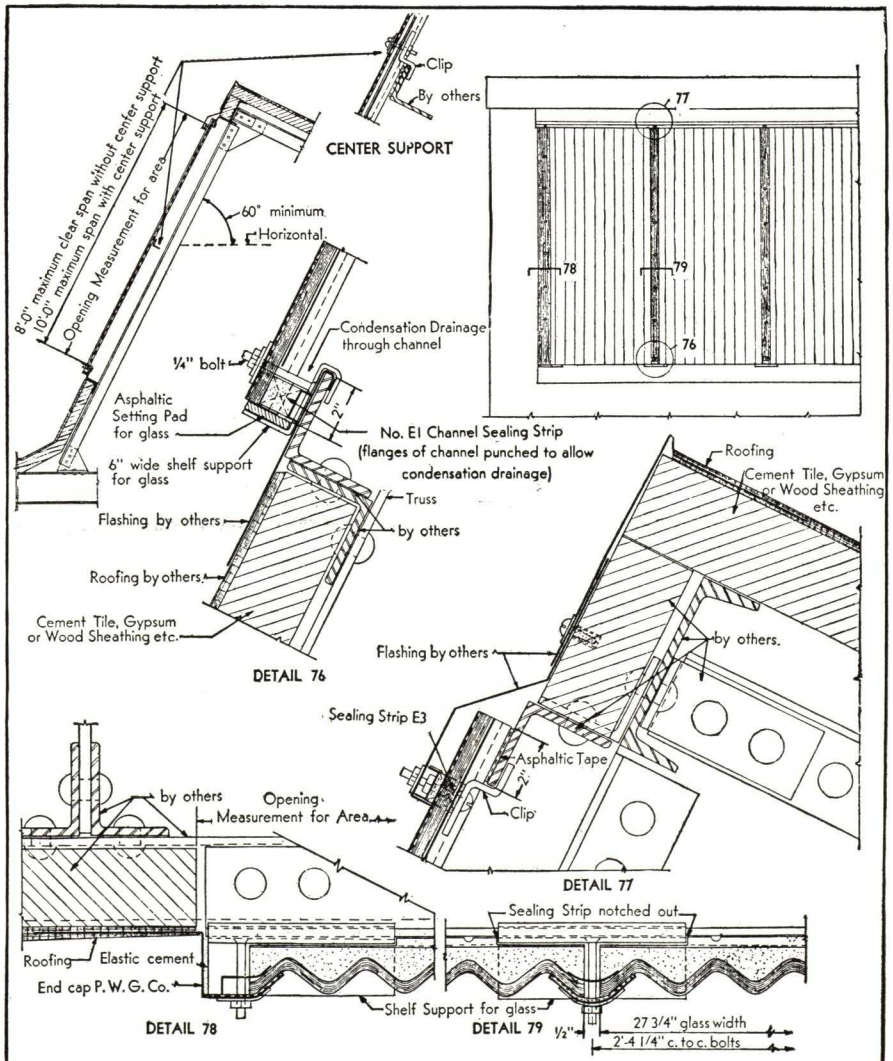
NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH STEEL DECK ROOFING	PLATE NUMBER P-108 Sept. 1937



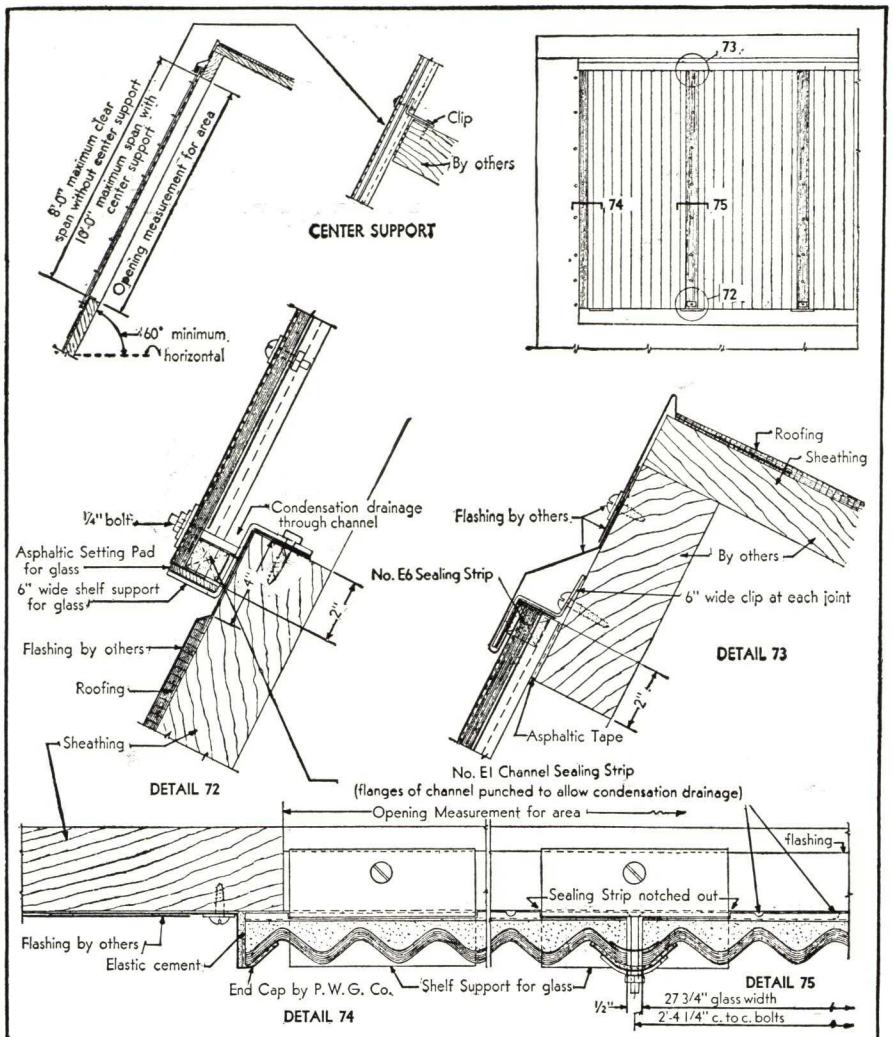
NOTE- Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH STEEL SAWTOOTH FRAMING	PLATE NUMBER P-109 SEPT. 1937



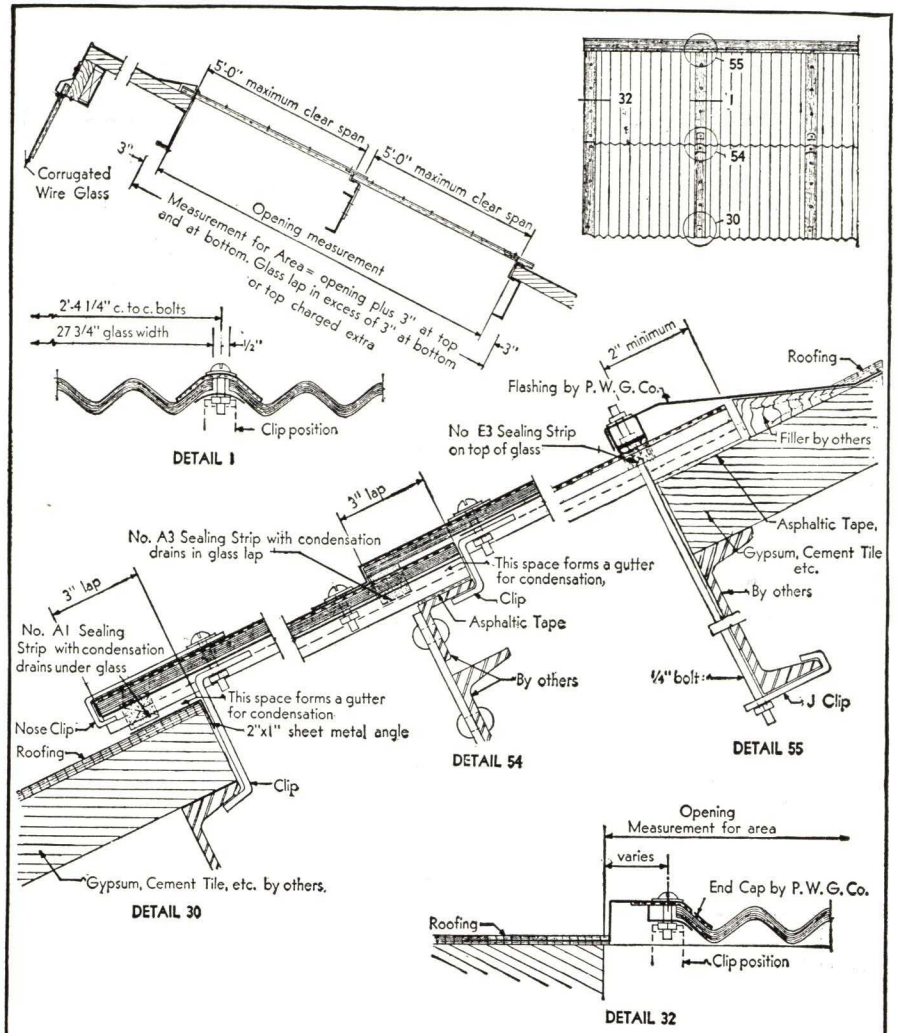
NOTE- Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The sizes of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be ¼" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH STEEL SAWTOOTH FRAMING	PLATE NUMBER P-110 SEPT. 1937



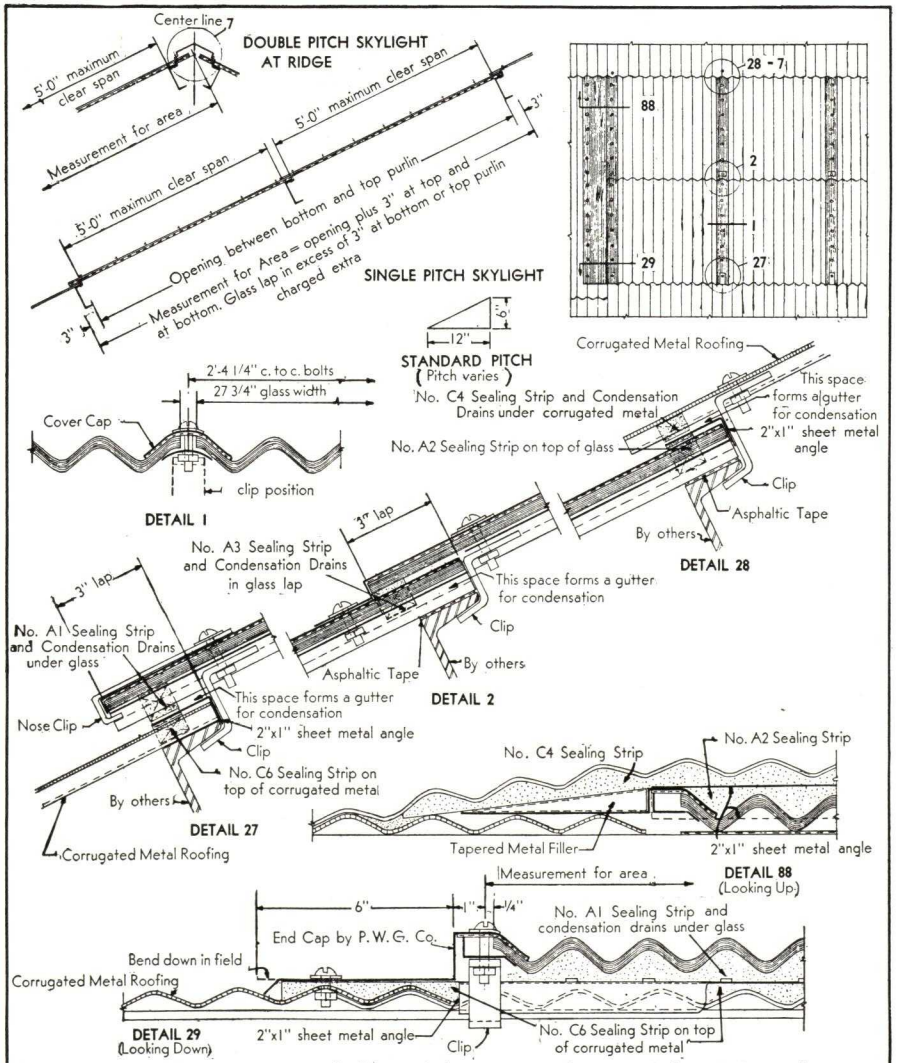
NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH STEEL SAWTOOTH FRAMING	PLATE NUMBER P-111 Sept. 1937



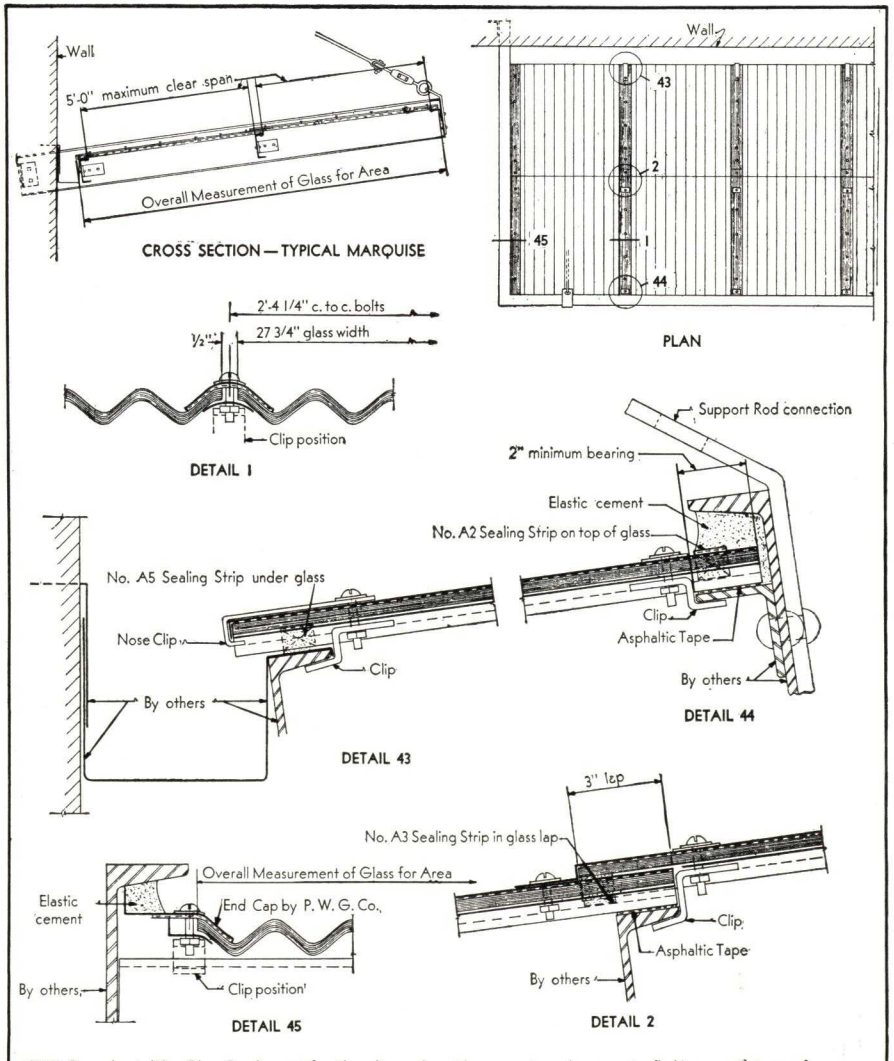
NOTE-Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS USED ON BACK SLOPES OF SAWTOOTHS	PLATE NUMBER P-112 Sept. 1937



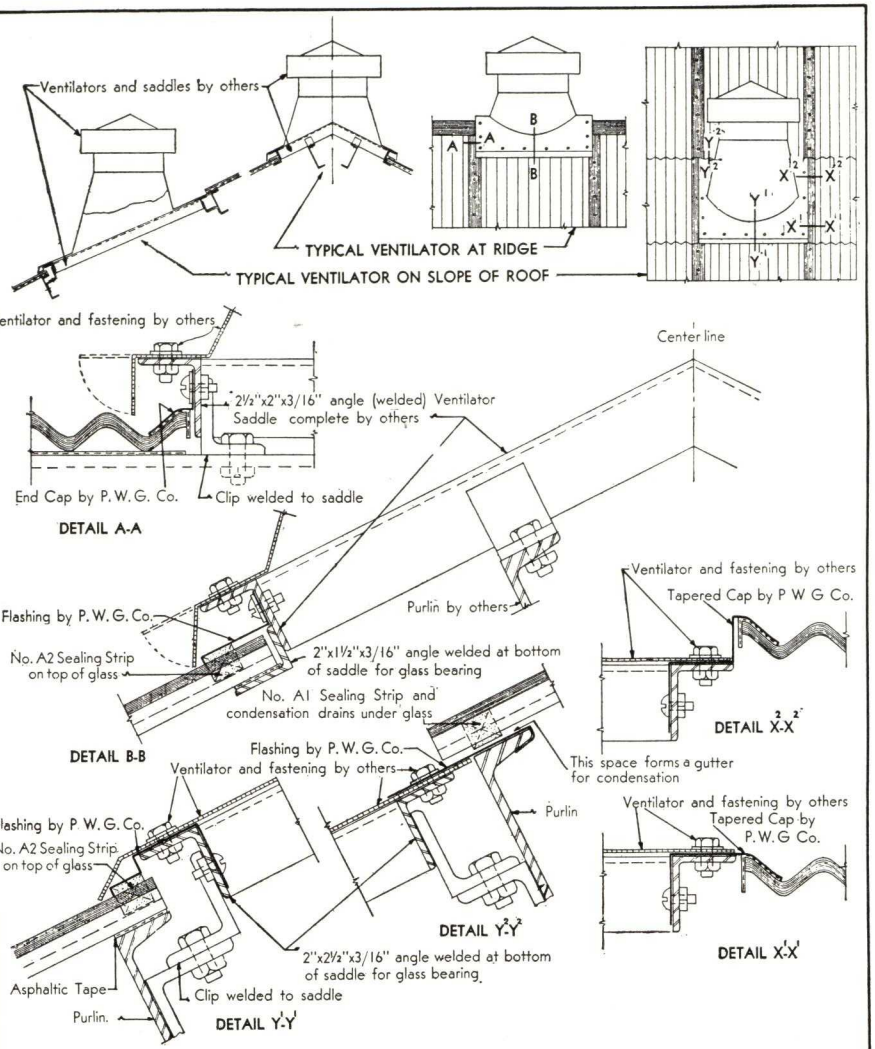
NOTE-Pennsylvania Wire Glass Co. does not furnish, purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be ¼" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH CORRUGATED SHEET METAL ROOFING	PLATE NUMBER P-113 Sept. 1937



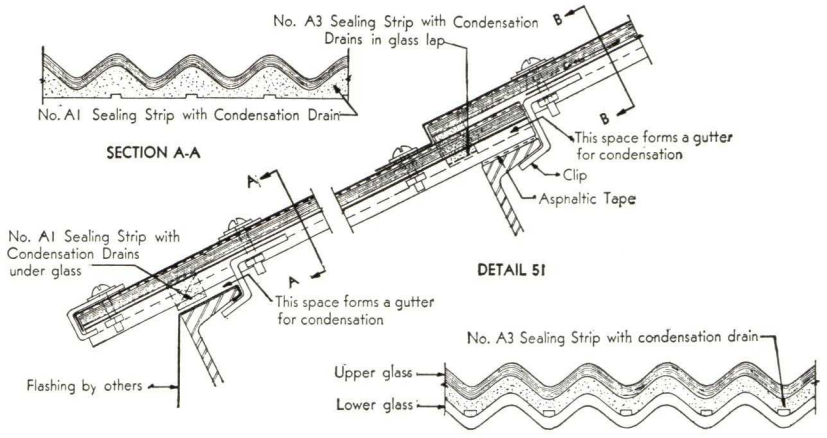
NOTE- Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS WITH STEEL FRAMED MARQUISE	PLATE NUMBER P-114 Sept. 1937

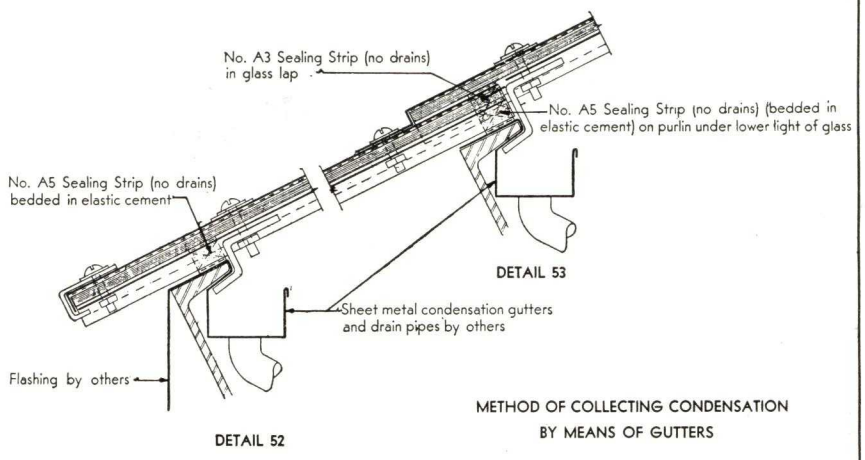


NOTE Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The sizes of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be ¼" in diameter

SCALE OF DETAILS 0" 3"	ORIGNIAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS WITH TYPICAL SHEET METAL VENTILATORS	PLATE NUMBER P-115 Sept. 1937



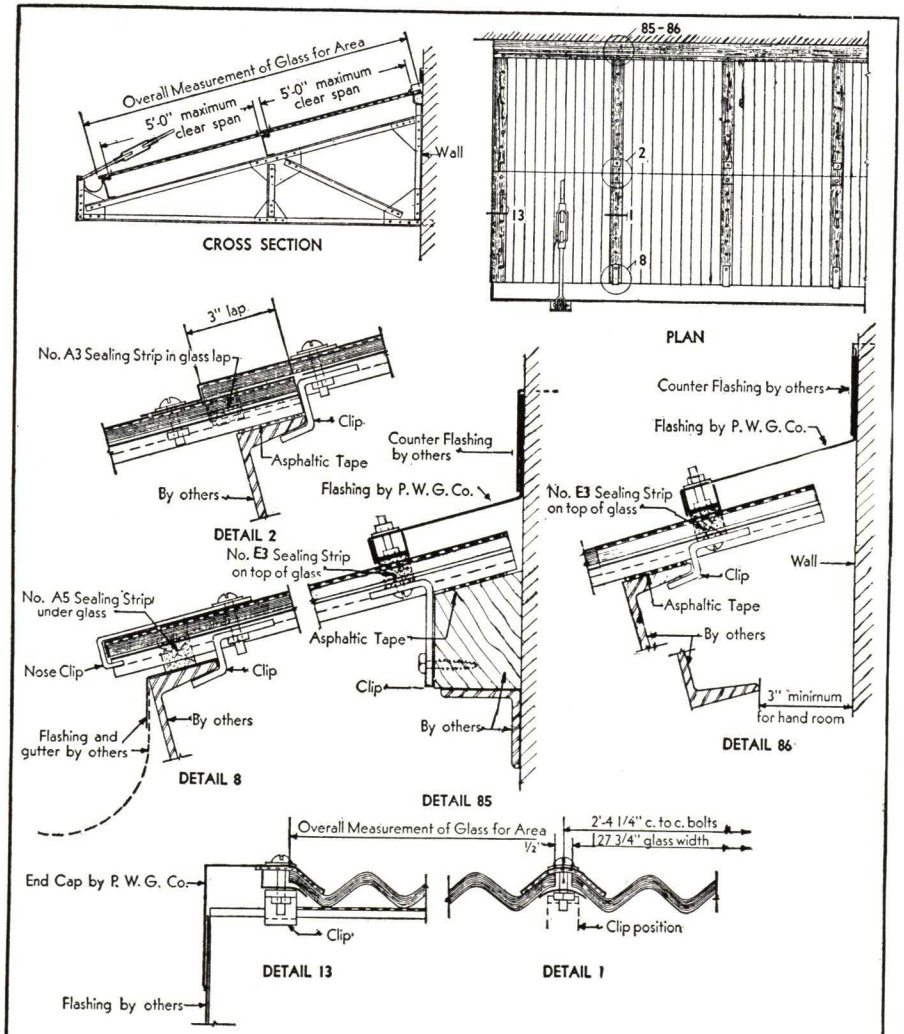
METHOD OF DRAINING CONDENSATION THROUGH CONDENSATION TUBES



METHOD OF COLLECTING CONDENSATION BY MEANS OF GUTTERS

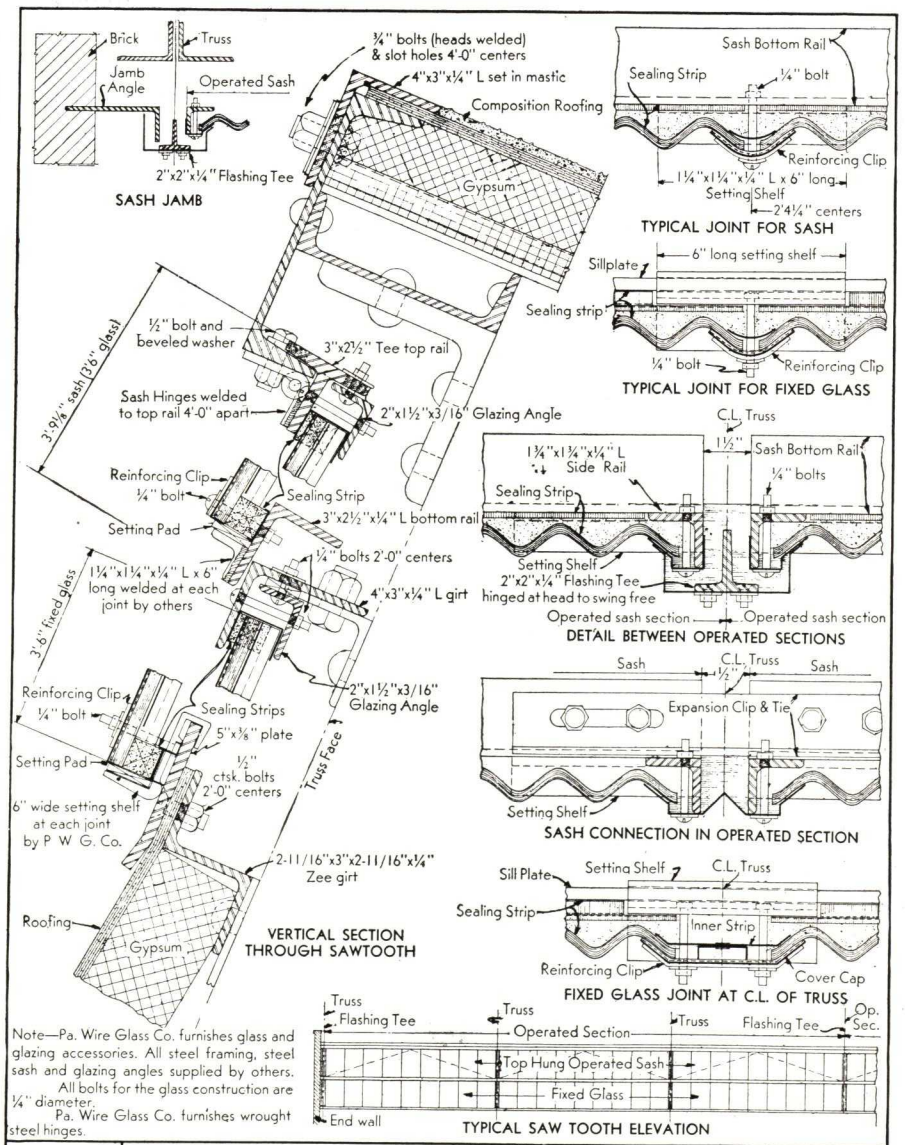
NOTE- Pennsylvania Wire Glass Co. does not furnish purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SKYLIGHTS METHODS OF DRAINING CONDENSATION	PLATE NUMBER P-116 Sept. 1937



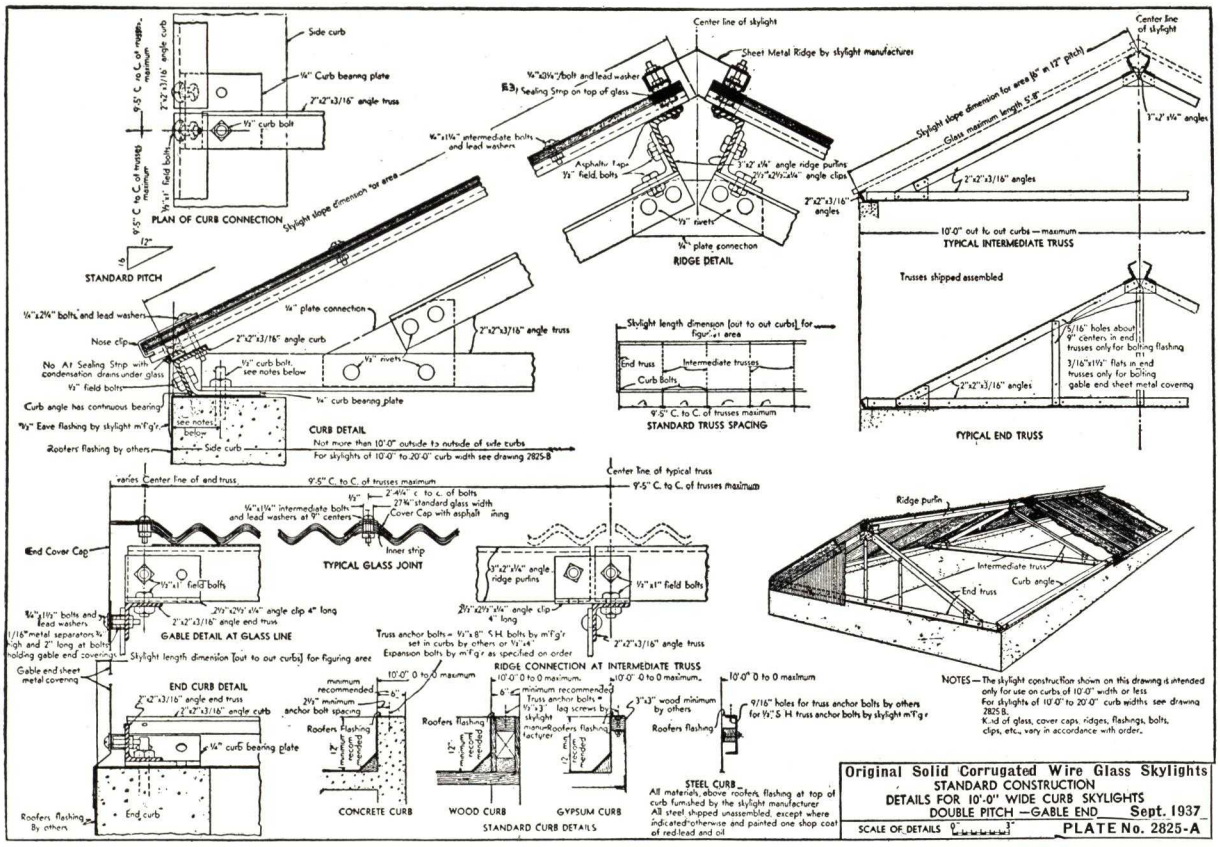
NOTE-Pennsylvania Wire Glass Co. does not furnish, purlins, curb or ridge supports, curb or counter flashings, ventilators or frames. The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of curbs, purlins, ridge beams, tie-rods and bracing for proper construction must be clearly stated in plans and specifications for the building. Glass must not have less than 2" bearing at any support. All bolts and screws to be 1/4" in diameter

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS WITH STEEL FRAME CANOPIES	PLATE NUMBER P-117 SEPT. 1937

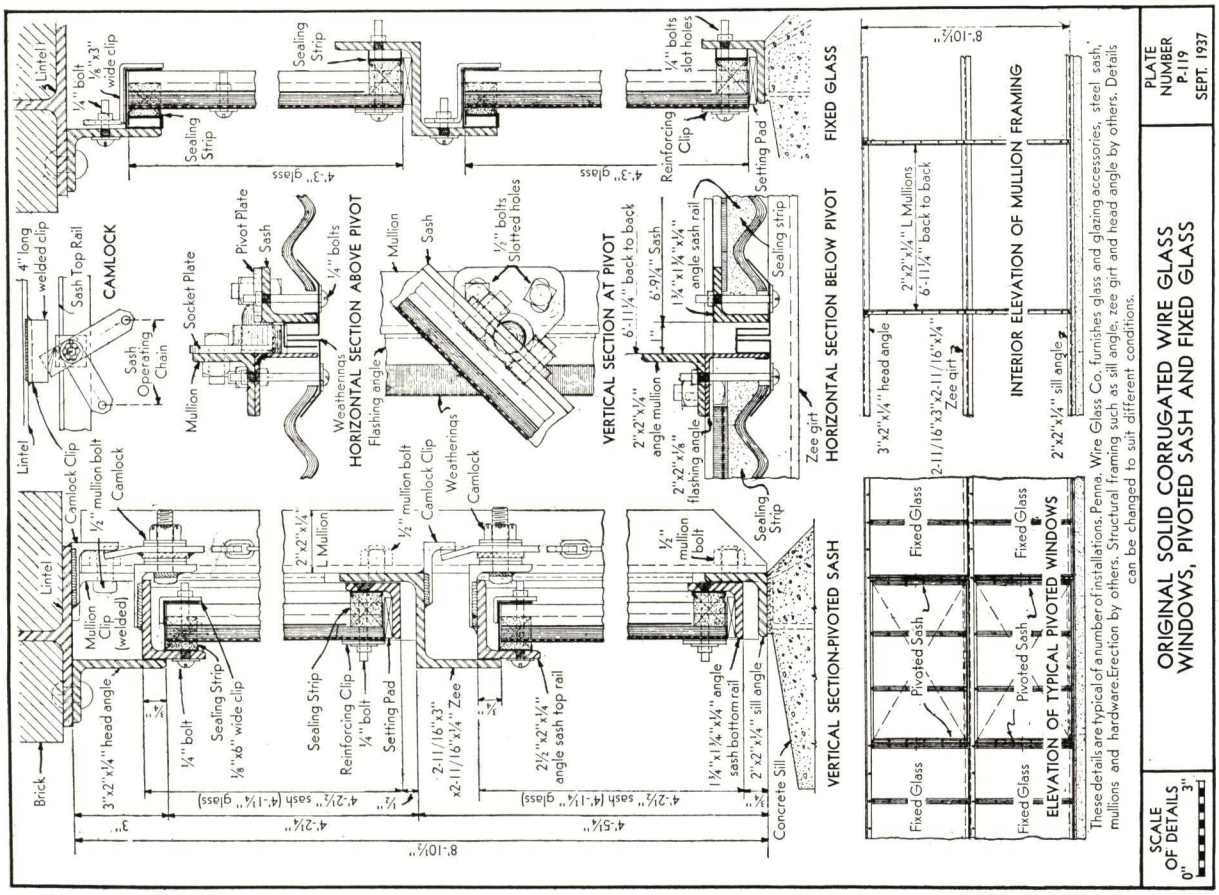


Note—Pa. Wire Glass Co. furnishes glass and glazing accessories. All steel framing, steel sash and glazing angles supplied by others. All bolts for the glass construction are 1/4" diameter. Pa. Wire Glass Co. furnishes wrought steel hinges.

SCALE OF DETAILS 0" 3"	ORIGINAL SOLID CORRUGATED WIRE GLASS SAWTOOTH, TOP HUNG, OPERATED SASH AND FIXED GLASS	PLATE NUMBER P118 SEPT. 1937



Original Solid Corrugated Wire Glass Skylights
STANDARD CONSTRUCTION
DETAILS FOR 10'-0" WIDE CURB SKYLIGHTS
DOUBLE PITCH — GABLE END Sept. 1937
SCALE OF DETAILS 3" PLATE No. 2825-A

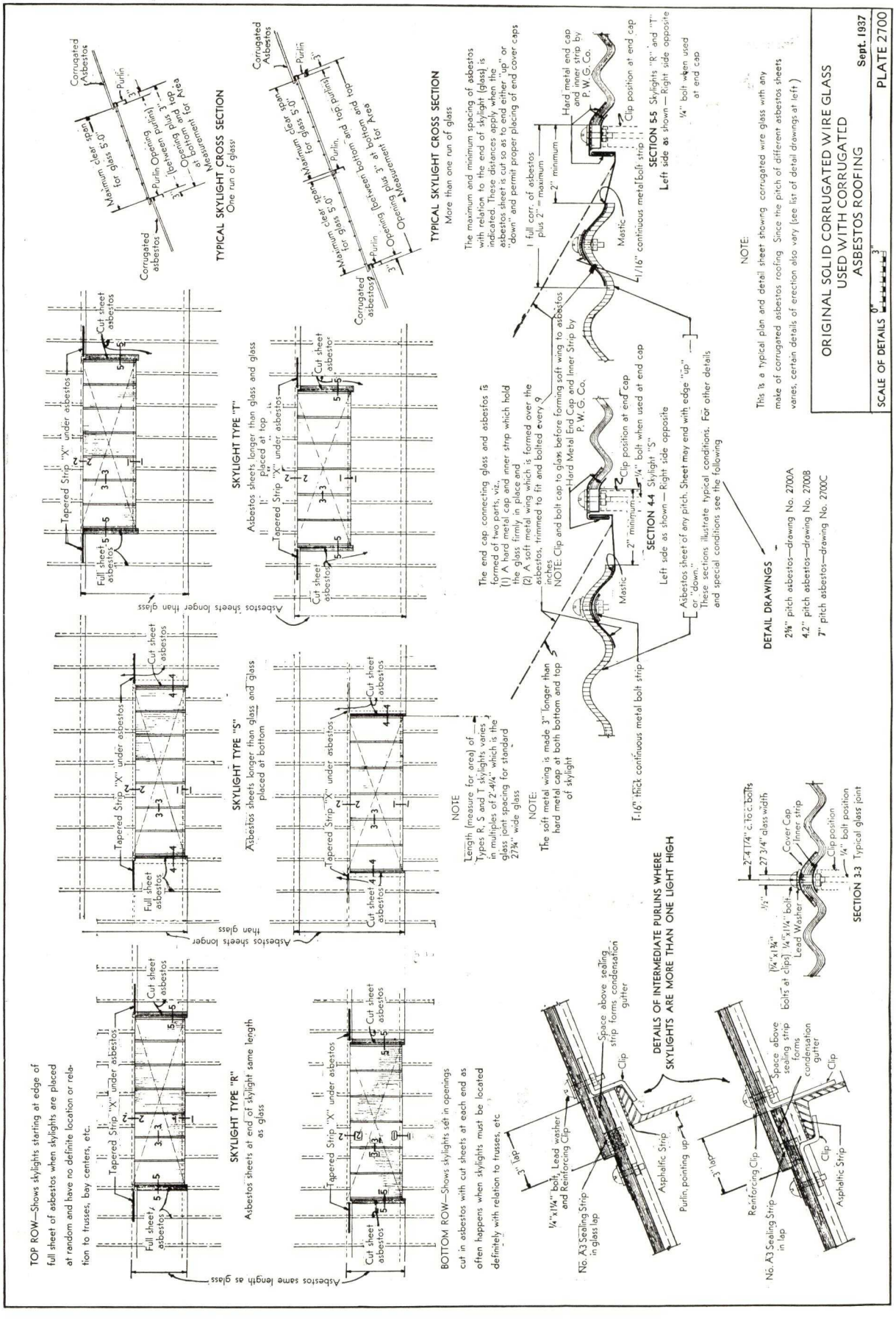


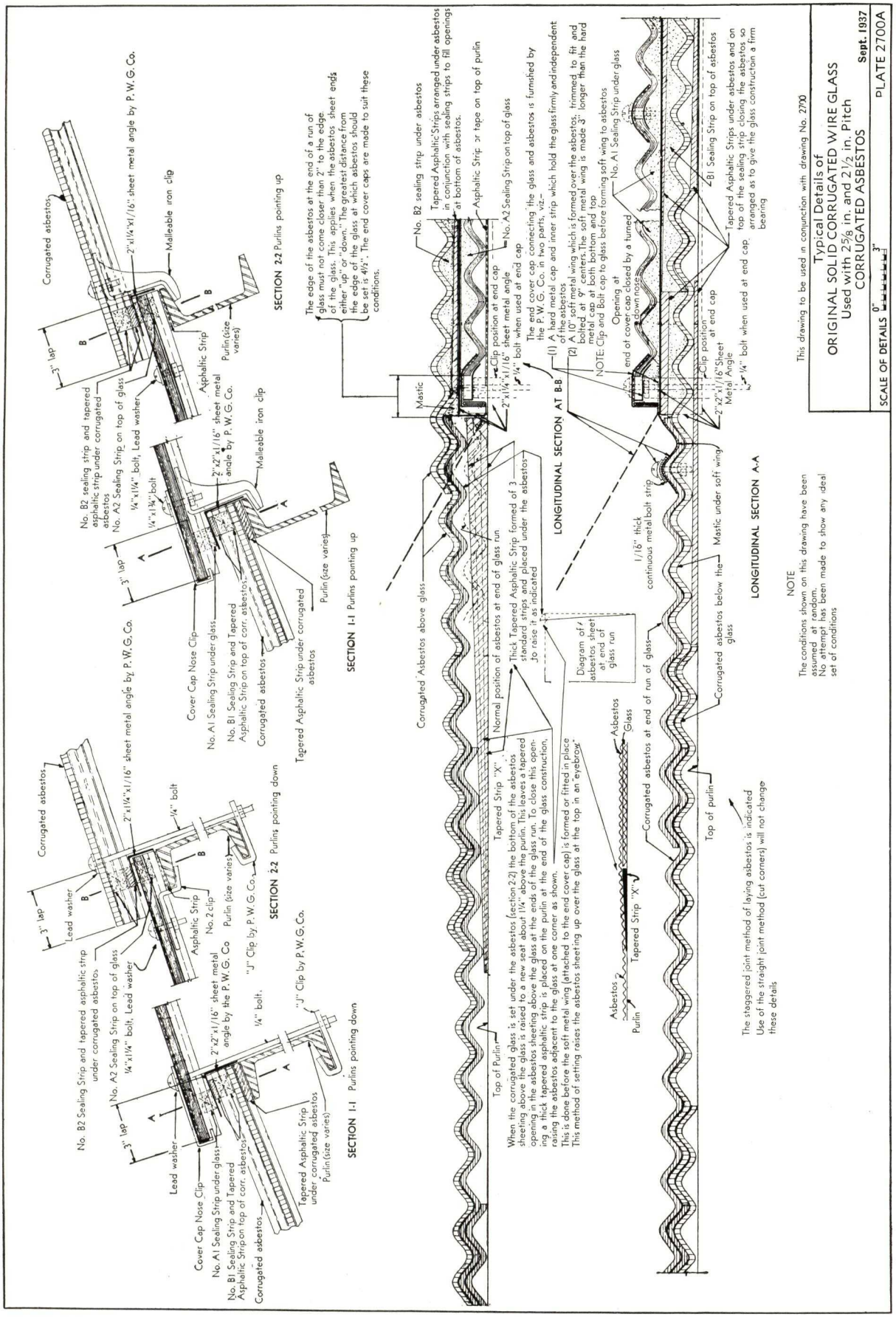
ORIGINAL SOLID CORRUGATED WIRE GLASS WINDOWS, PIVOTED SASH AND FIXED GLASS

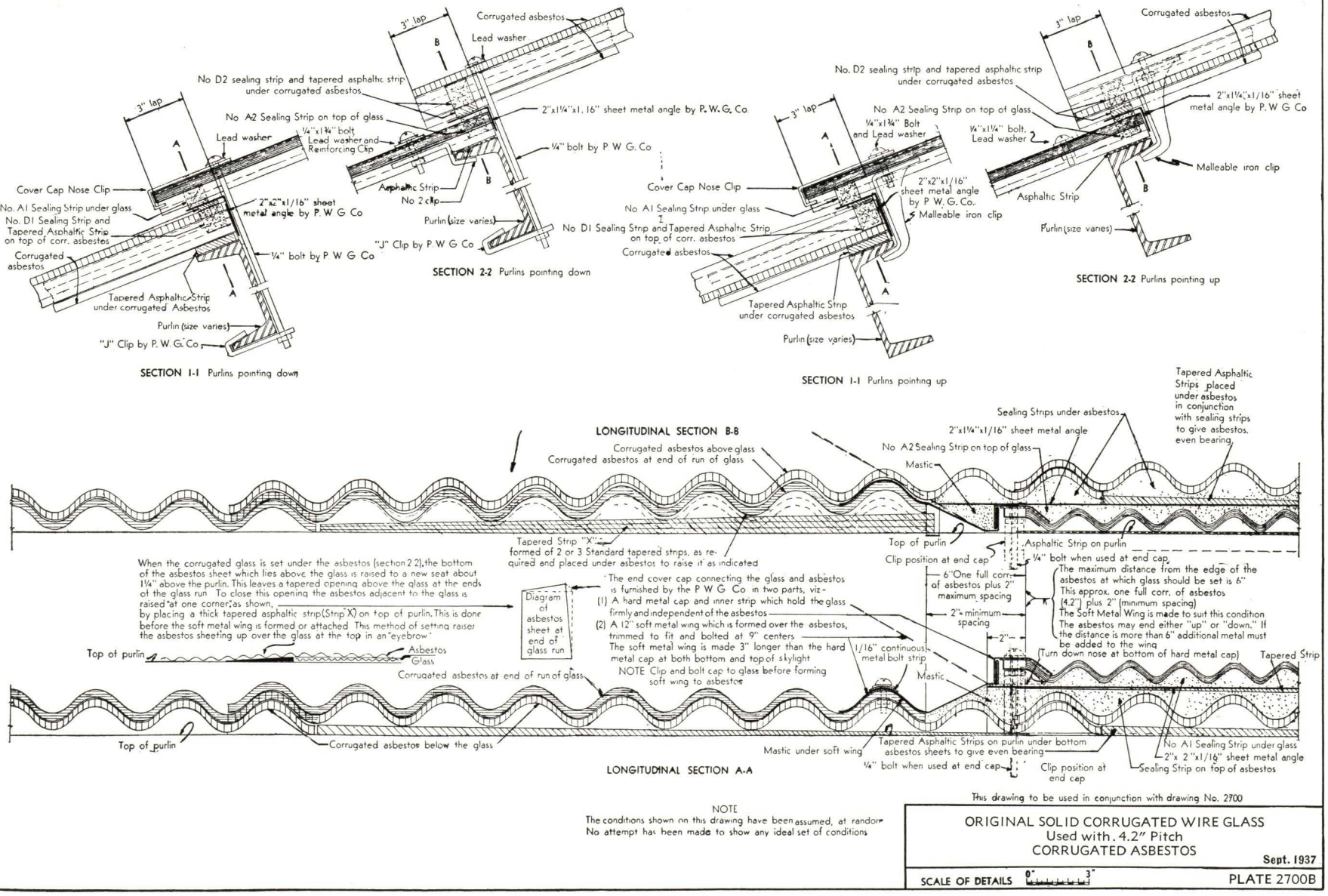
PLATE NUMBER P-119 SEPT. 1937

These details are typical of a number of installations. Penna. Wire Glass Co. furnishes glass and glazing accessories, steel sash, mullions and hardware. Erection by others. Structural framing such as sill angle, zee girt and head angle by others. Details can be changed to suit different conditions.

SCALE OF DETAILS 3"


ORIGINAL SOLID CORRUGATED WIRE GLASS
USED WITH CORRUGATED
ASBESTOS ROOFING
Sept. 1937
PLATE 2700
SCALE OF DETAILS 0" 3"
TYPICAL SKYLIGHT CROSS SECTION
One run of glass
TYPICAL SKYLIGHT CROSS SECTION
More than one run of glass
SKYLIGHT TYPE "T"
Asbestos sheets longer than glass and glass placed at top
SKYLIGHT TYPE "S"
Asbestos sheets longer than glass and glass placed at bottom
SKYLIGHT TYPE "R"
Asbestos sheets at end of skylight same length as glass
TOP ROW—Shows skylights starting at edge of full sheet of asbestos when skylights are placed at random and have no definite location or relation to trusses, bay centers, etc.
BOTTOM ROW—Shows skylights set in openings cut in asbestos with cut sheets at each end as often happens when skylights must be located definitely with relation to trusses, etc
NOTE
Length (measure for area) of Types R, S and T skylights varies in multiples of 2'-4¼" which is the glass joint spacing for standard 27¾" wide glass
NOTE:
The soft metal wing is made 3" longer than hard metal cap at both bottom and top of skylight
The end cap connecting glass and asbestos is formed of two parts, viz.,
(1) A hard metal cap and inner strip which hold the glass firmly in place and
(2) A soft metal wing which is formed over the asbestos, trimmed to fit and bolted every 9 inches
NOTE: Clip and bolt cap to glass before forming soft wing to asbestos
The maximum and minimum spacing of asbestos with relation to the end of skylight (glass) is indicated. These distances apply when the asbestos sheet is cut so as to end either "up" or "down" and permit proper placing of end cover caps
SECTION 4-4 Skylight "S"
Left side as shown — Right side opposite
SECTION 5-5 Skylights "R" and "T"
Left side as shown — Right side opposite
DETAIL DRAWINGS
2¾" pitch asbestos—drawing No. 2700A
4.2" pitch asbestos—drawing No. 2700B
7" pitch asbestos—drawing No. 2700C
NOTE:
This is a typical plan and detail sheet showing corrugated wire glass with any make of corrugated asbestos roofing. Since the pitch of different asbestos sheets varies, certain details of erection also vary (see list of detail drawings at left)
DETAILS OF INTERMEDIATE PURLINS WHERE SKYLIGHTS ARE MORE THAN ONE LIGHT HIGH
SECTION 3-3 Typical glass joint


Typical Details of
ORIGINAL SOLID CORRUGATED WIRE GLASS
Used with 2⅝ in. and 2½ in. Pitch
CORRUGATED ASBESTOS
Sept. 1937
PLATE 2700A
SCALE OF DETAILS 0" 3"
This drawing to be used in conjunction with drawing No. 2700
SECTION 2-2 Purlins pointing down
SECTION 1-1 Purlins pointing down
SECTION 2-2 Purlins pointing up
SECTION 1-1 Purlins pointing up
LONGITUDINAL SECTION AT B-B
LONGITUDINAL SECTION A-A
NOTE
The conditions shown on this drawing have been assumed at random.
No attempt has been made to show any ideal set of conditions
Corrugated asbestos
Lead washer
No. B2 Sealing Strip and tapered asphaltic strip under corrugated asbestos
No. A2 Sealing Strip on top of glass
¼" x 1¼" bolt, Lead washer
2" x 1¼" x 1/16" sheet metal angle by P. W. G. Co.
Malleable iron clip
Asphaltic Strip
Purlin (size varies)
3" lap
Cover Cap Nose Clip
No. A1 Sealing Strip under glass
No. B1 Sealing Strip and Tapered Asphaltic Strip on top of corr. asbestos
Tapered Asphaltic Strip under corrugated asbestos
2" x 2" x 1/16" sheet metal angle by the P. W. G. Co
"J" Clip by P. W. G. Co.
¼" bolt.
No. 2 clip
The edge of the asbestos at the end of a run of glass must not come closer than 2" to the edge of the glass. This applies when the asbestos sheet ends either "up" or "down." The greatest distance from the edge of the glass at which asbestos should be set is 4½". The end cover caps are made to suit these conditions.
Mastic
No. B2 sealing strip under asbestos
Tapered Asphaltic Strips arranged under asbestos in conjunction with sealing strips to fill openings at bottom of asbestos.
Asphaltic Strip or tape on top of purlin
No. A2 Sealing Strip on top of glass
Clip position at end cap
2" x 1¼" x 1/16" sheet metal angle
¼" bolt when used at end cap
The end cover cap connecting the glass and asbestos is furnished by the P. W. G. Co. in two parts, viz.—
(1) A hard metal cap and inner strip which hold the glass firmly and independent of the asbestos
(2) A soft metal wing which is formed over the asbestos, trimmed to fit and bolted to the purlin at both bottom and top
NOTE: Clip and Bolt cap to glass before forming soft wing to asbestos
Opening at end of cover cap closed by a turned down nose
No. A1 Sealing Strip under glass
Corrugated asbestos above glass
Normal position of asbestos at end of glass run
Thick Tapered Asphaltic Strip formed of 3 standard strips and placed under the asbestos to raise it as indicated
Tapered Strip "X"
Top of Purlin
When the corrugated glass is set under the asbestos (section 2-2) the bottom of the asbestos sheeting above the glass is raised to a new seat about 1/4" above the purlin. This leaves a tapered opening in the asbestos sheeting above the glass at the ends of the glass run. To close this opening, a thick tapered asphaltic strip is placed on the purlin at the end of the glass construction. raising the asbestos adjacent to the glass at one corner as shown. This is done before the soft metal wing (attached to the end cover cap) is formed or fitted in place This method of setting raises the asbestos sheeting up over the glass at the top in an "eyebrow."
Diagram of asbestos sheet at end of glass run
Asbestos
Glass
Purlin
Corrugated asbestos at end of run of glass
1/16" thick continuous metal bolt strip
Corrugated asbestos below the glass
Mastic under soft wing
The staggered joint method of laying asbestos is indicated Use of the straight joint method [cut corners] will not change these details
B1 Sealing Strip on top of asbestos
Tapered Asphaltic Strips under asbestos and on top of the sealing strip closing the asbestos so arranged as to give the glass construction a firm bearing
2" x 2" x 1/16" Sheet Metal Angle
¼" bolt when used at end cap



NOTE
The conditions shown on this drawing have been assumed, at random No attempt has been made to show any ideal set of conditions

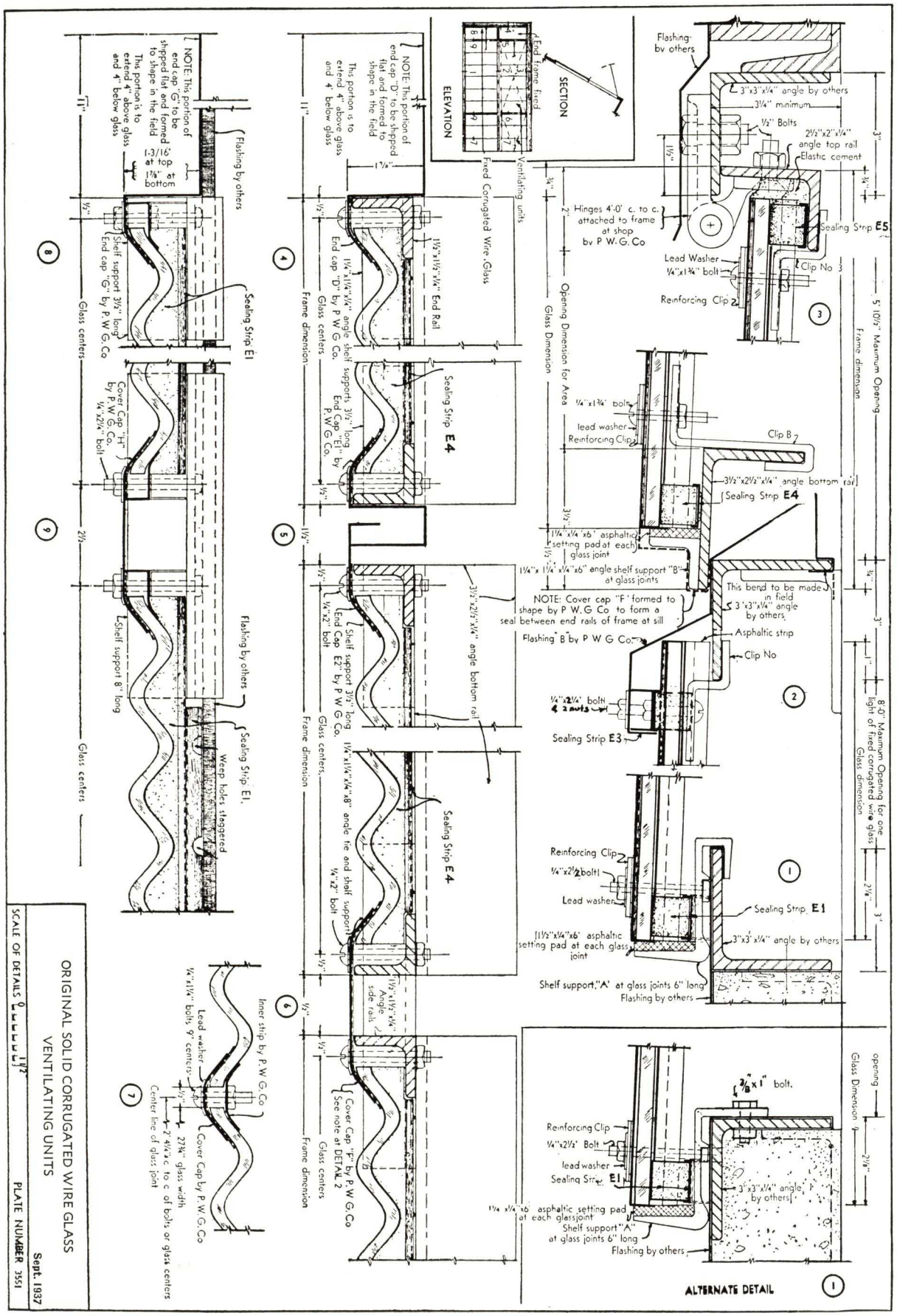
This drawing to be used in conjunction with drawing No. 2700

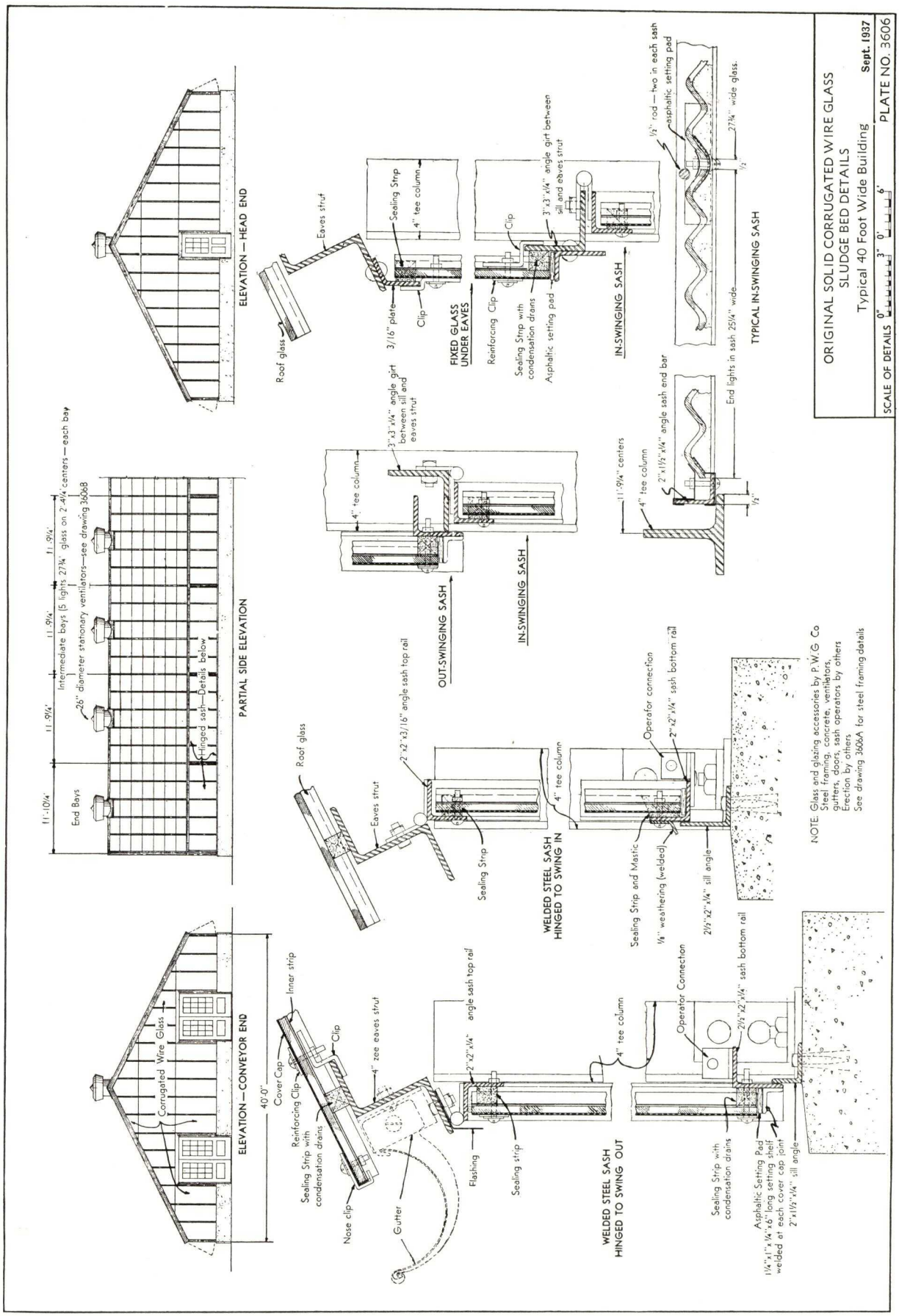
ORIGINAL SOLID CORRUGATED WIRE GLASS
Used with . 4.2" Pitch
CORRUGATED ASBESTOS

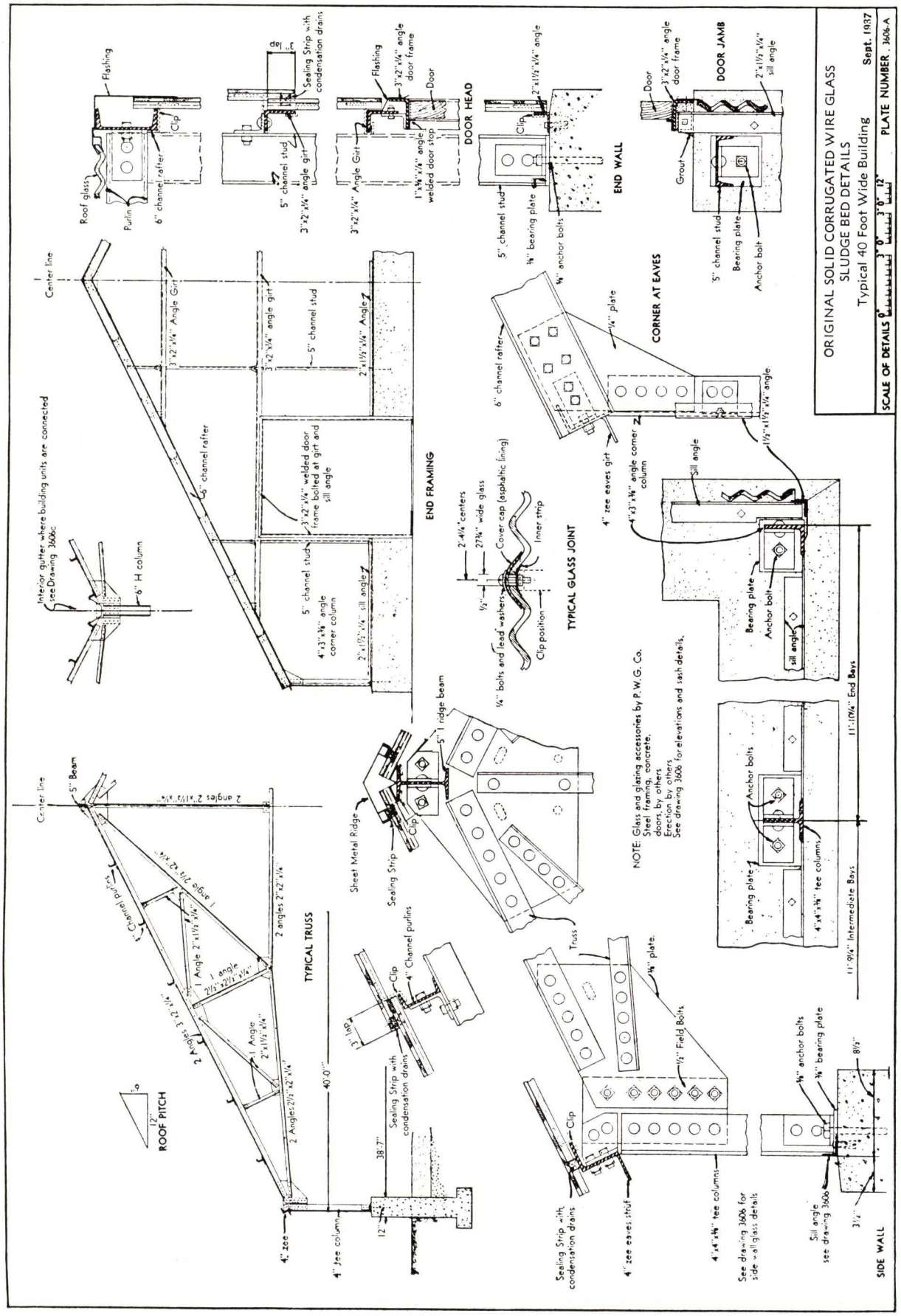
Sept. 1937

SCALE OF DETAILS 0" 3"

PLATE 2700B

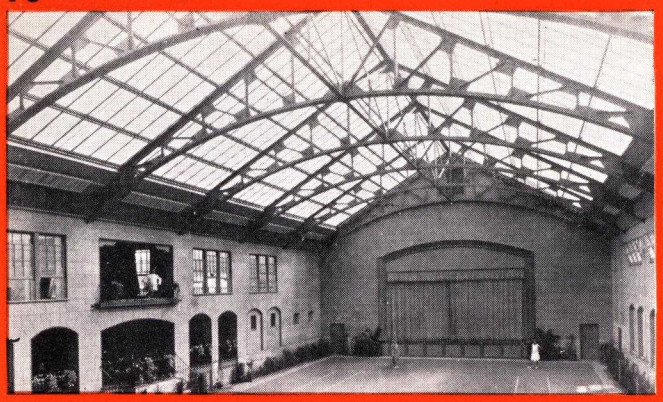

ELEVATION
SECTION
End frame fixed
Ventilating units
Fixed Corrugated Wire Glass
Flashing by others
3"x3"x¼" angle by others
3¼" minimum
½" Bolts
2½"x2"x¼" angle top rail
Elastic cement
Hinges 4'-0" c. to c. attached to frame at shop by P W G Co
Sealing Strip E5
Lead Washer ¼"x1¾" bolt
Clip No 3
Reinforcing Clip 2
5' 10½" Maximum Opening
Frame dimension
Opening Dimension for Area Glass Dimension
¼"x1¾" bolt
lead washer
Reinforcing Clip 2
Clip B 2
3½"x2½"x¼" angle bottom rail
Sealing Strip E4
1¼"x¼"x6" asphaltic setting pad at each glass joint
1¼"x1¼"x¼"x6" angle shelf support "B" at glass joints
NOTE: Cover cap "F" formed to shape by P W G Co to form a seal between end rails of frame at sill
This bend to be made in field
3"x3"x¼" angle by others
Asphaltic strip
Flashing "B" by P W G Co
Clip No 2
¼"x2¼" bolt 4 2 nuts
Sealing Strip E3
8'-0" Maximum Opening for one light of fixed corrugated wire glass
Glass dimension
Reinforcing Clip 2
¼"x2½" bolt
Lead washer
Sealing Strip E1
1½"x¼"x6" asphaltic setting pad at each glass joint
3"x3"x¼" angle by others
Shelf support "A" at glass joints 6" long
Flashing by others
ALTERNATE DETAIL
⅜"x1" bolt.
Reinforcing Clip
¼"x2½" Bolt
lead washer
Sealing Strip E1
1¼"x¼"x6" asphaltic setting pad at each glass joint
Shelf support "A" at glass joints 6" long
Flashing by others
opening
Glass Dimension
2⅛"
3"
1"
¼"
Glass centers
Frame dimension
11"
½"
2½"
NOTE: This portion of end cap "G" to be shipped flat and formed to shape in the field
This portion is to extend 4" above glass and 4" below glass
1-3/16" at top
1⅞" at bottom
Shelf support 3½" long
End cap "G" by P W G Co
Sealing Strip E1
Cover Cap "H" by P W G Co. ¼"x2¼" bolt
Shelf support 8" long
Flashing by others
Sealing Strip E1
Weep holes staggered
NOTE: This portion of end cap "D" to be shipped flat and formed to shape in the field
This portion is to extend 4" above glass and 4" below glass
1⅞"
1½"x1½"x¼" End Rail
1¼"x1¼"x¼" angle shelf supports 3½" long End Cap "E1" by P W G Co.
Sealing Strip E4
3½"x2½"x¼" angle bottom rail
Shelf support 3½" long End Cap "E2" by P W G Co.
¼"x2" bolt
1¼"x1¼"x¼"x8" angle tie and shelf support
¼"x2" bolt
Sealing Strip E4
1½"x1½"x¼" Angle side rails
Cover Cap "F" by P W G Co See note at DETAIL 2
Inner strip by P W G Co
Lead washer ¼"x1¼" bolts 9" centers
Cover Cap by P W G Co
27¾" glass width
2' 4¼" c to c of bolts or glass centers
Center line of glass joint
ORIGINAL SOLID CORRUGATED WIRE GLASS VENTILATING UNITS
SCALE OF DETAILS 1½"
Sept. 1937
PLATE NUMBER 3551


ORIGINAL SOLID CORRUGATED WIRE GLASS
SLUDGE BED DETAILS
Typical 40 Foot Wide Building
Sept. 1937
PLATE NO. 3606
SCALE OF DETAILS 0" 3" 0' 6'
ELEVATION — HEAD END
PARTIAL SIDE ELEVATION
End Bays
Intermediate bays (5 lights 27¾" glass on 2-4¼" centers — each bay
26" diameter stationary ventilators — see drawing 3608
Hinged sash — Details below
11'-10¼"
11'-9¼"
ELEVATION — CONVEYOR END
40'-0"
Corrugated Wire Glass
Cover Cap
Inner strip
Clip
Reinforcing Clip
Sealing Strip with condensation drains
Nose clip
Gutter
4" zee eaves strut
2"x2"x¼" angle sash top rail
Flashing
Sealing strip
WELDED STEEL SASH HINGED TO SWING OUT
4" tee column
Operator Connection
2½"x2"x¼" sash bottom rail
Asphaltic Setting Pad 1¼"x1"x¼"x6" long setting shelf welded at each cover cap joint
2"x1½"x¼" sill angle
Roof glass
Eaves strut
2"x2"x3/16" angle sash top rail
Sealing Strip
WELDED STEEL SASH HINGED TO SWING IN
Operator connection
2"x2"x¼" sash bottom rail
Sealing Strip and Mastic
⅛" weathering (welded)
2½"x2"x¼" sill angle
NOTE: Glass and glazing accessories by P.W.G. Co
Steel framing, concrete, ventilators, gutters, doors, sash operators by others
Erection by others
See drawing 3606A for steel framing details
Roof glass
Eaves strut
Sealing Strip
4" tee column
3/16" plate
Clip
FIXED GLASS UNDER EAVES
Reinforcing Clip
Sealing Strip with condensation drains
Asphaltic setting pad
3"x3"x¼" angle girt between sill and eaves strut
IN-SWINGING SASH
½" rod — two in each sash
Asphaltic setting pad
27¾" wide glass.
½"
TYPICAL IN-SWINGING SASH
3"x3"x¼" angle girt between sill and eaves strut
4" tee column
OUT-SWINGING SASH
IN-SWINGING SASH
11'-9¼" centers
4" tee column
2"x1½"x¼" angle sash end bar
End lights in sash 25¼" wide
½"

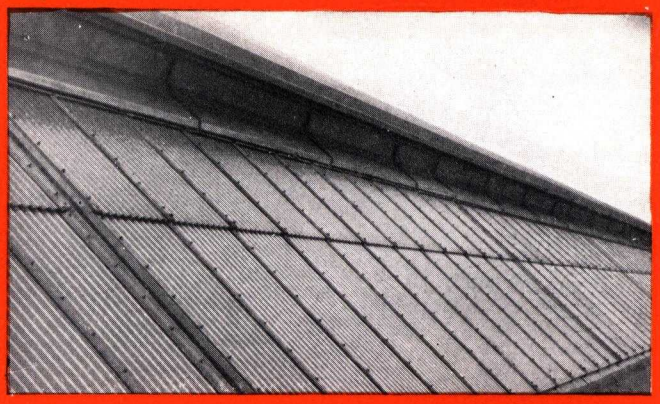

ORIGINAL SOLID CORRUGATED WIRE GLASS
SLUDGE BED DETAILS
Typical 40 Foot Wide Building
Sept. 1937
SCALE OF DETAILS 0" 3" 0" 3" 0" 12"
PLATE NUMBER 3606-A
Flashing
Clip
Roof glass
Purlin
6" channel rafter
Sealing Strip with condensation drains
5" channel stud
3"x2"x¼" angle girt
Flashing
3"x2"x¼" angle door frame
Door
3"x2"x¼" Angle Girt
1"x¾"x¼" angle welded door stop
DOOR HEAD
Clip
2"x1½"x¼" angle
5" channel stud
¾" bearing plate
¾" anchor bolts
END WALL
Door
3"x2"x¼" angle door frame
DOOR JAMB
2"x1½"x¼" sill angle
Grout
5" channel stud
Bearing plate
Anchor bolt
Center line
3"x2"x¼" Angle Girt
3"x2"x¼" angle girt
5" channel stud
2"x1½"x¼" Angle
6" channel rafter
3"x2"x¼" welded door frame bolted at girt and sill angle
Interior gutter where building units are connected see Drawing 3606c
6" H column
5" channel stud
4"x3"x⅜" angle corner column
2"x1½"x¼" sill angle
END FRAMING
2'-4¼" centers
27¾" wide glass
Cover cap (asphaltic lining)
Inner strip
½"
¼" bolts and lead washers
Clip position
TYPICAL GLASS JOINT
6" channel rafter
¼" plate
CORNER AT EAVES
4" tee eaves girt
4"x3"x⅜" angle corner column
1½"x1½"x¼" angle
Sill angle
Bearing plate
Anchor bolt
Sill angle
Center line
5" Beam
2 angles 2"x1½"x¼"
Angle 2½"x2"x¼"
Channel purlins
1 Angle 2"x1½"x¼"
1 angle 2½"x2½"x¼"
2 angles 2½"x2"x¼"
2 angles 2½"x2"x¼"
TYPICAL TRUSS
ROOF PITCH
12"
4" tee
4" tee column
40'-0"
38'-7"
12"
Sealing Strip with condensation drains
Clip
4" Channel purlins
12" 16#
Sheet Metal Ridge
Sealing Strip
5" I ridge beam
Clip
Truss
NOTE: Glass and glazing accessories by P.W.G. Co.
Steel framing, concrete, doors, by others
Erection by others
See drawing 3606 for elevations and sash details.
Anchor bolts
Bearing plate
4"x4"x⅜" tee columns
11'-10¼" End Bays
11'-9¼" Intermediate Bays
Sealing Strip with condensation drains
4" tee eaves strut
Clip
½" Field Bolts
¾" plate
4"x4"x⅜" tee columns
See drawing 3606 for side wall glass details
¾" anchor bolts
¾" bearing plate
8½"
Sill angle see drawing 3606
3½"
SIDE WALL

PENNSYLVANIA WIRE GLASS COMPANY

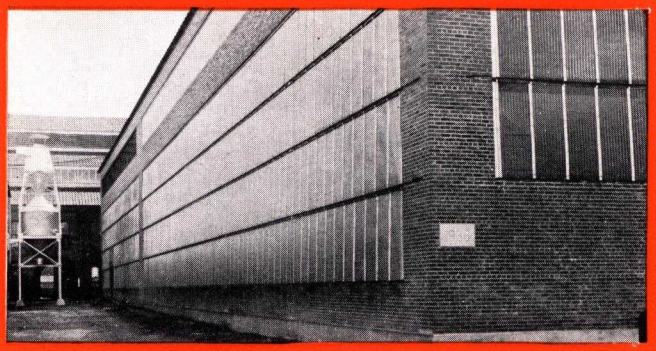
PHILADELPHIA, PA.



INDOOR TENNIS COURT OF MRS. H. E. TALBOT
DAYTON, OHIO
C. W. G. Roof

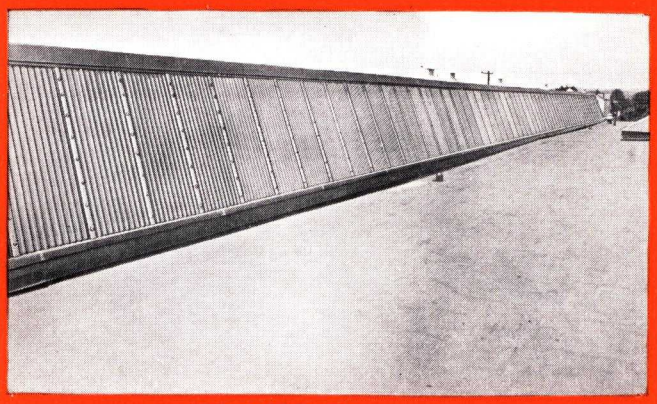


PENNSYLVANIA RAILROAD STATION
NEWARK, N. J.
20,824 sq. ft. C. W. G. Skylight Construction

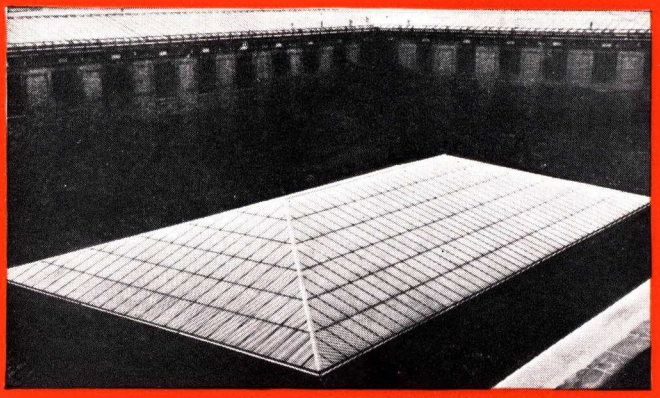


U. S. PIPE AND FOUNDRY COMPANY
CHATTANOOGA, TENN.
14,836 sq. ft. White and Actinic C. W. G. Sidewall Construction

CHESAPEAKE AND OHIO R. R. SHOPS
RUSSELL, KY.
68,000 sq. ft. Curb Skylights



LELAND ELECTRIC CO.
DAYTON, OHIO
20,000 sq. ft. Sawtooth Skylights



POST OFFICE, 33rd St. and Eighth Ave.
NEW YORK CITY
7,100 sq. ft. Hip Skylight

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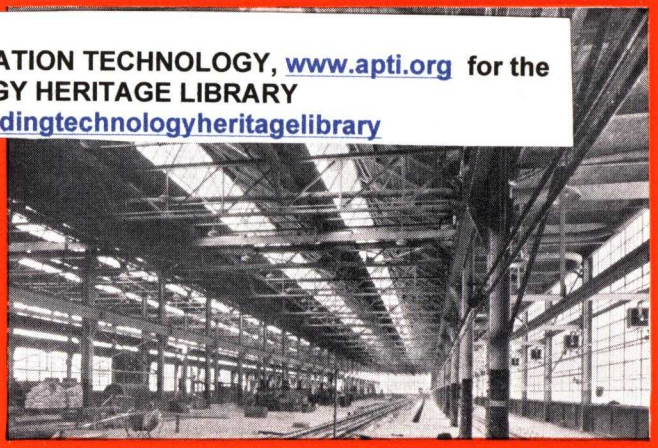
FORD MOTOR CO.
LINCOLN DIVISION—DETROIT, MICH.
C. W. G. on Back Slopes of Sawtooths



LIBBEY-OWENS SHEET GLASS CO.
TOLEDO, OHIO
C. W. G. Sawtooth Skylights

GLENDON A. RICHARDS CO.

Winter Avenue and Blumerich Street, Northwest
GRAND RAPIDS, MICH.

SIMPLICITY PUTTYLESS SKYLIGHT

GENERAL DESCRIPTION

The Simplicity Puttyless Skylight is a thoroughly high quality product designed especially for use by the discriminating architect on the better classes of buildings to provide the maximum amount of daylight per square foot of area with the lowest maintenance cost. The construction lends itself to erection in the field with a minimum amount of time and labor.

The skylight consists of a steel supporting frame of tee rafters with angle curb and ridge members. The rafters are provided with sheet metal condensation gutters resting on malleable iron saddles secured to the tee rafters and spaced approximately 18 in. o.c., through which are secured the brass mounting cap bolts. Over the gutters the glass is laid, set in heavy, enduring came lead glazing channels. The mounting caps are set over the glass with bearing on the lead glazing channels compressing (through the brass bolts) the glazing channel firmly against both sides of the glass. The ridge cap and end flashing are then applied completing the assembly.

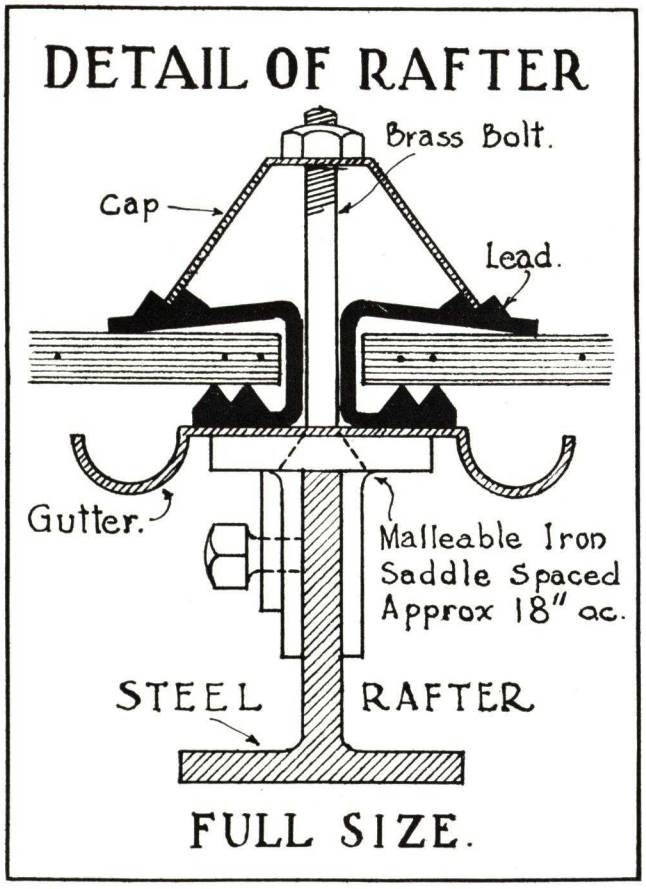
The skylight construction has been used on nationally known buildings designed by prominent architects.

VENTILATOR

The Simplicity Skylight Ventilator provides ventilation where required. It is ridge-hinged, lift type and provided with efficient operating devices. They may be placed in any Simplicity Puttyless Skylight by removing the glass and substituting the ventilating unit. They are also made with flat flanges for use independently on shingle and composition pitched roofs.

ADVANTAGES

(1) Absolutely permanent weathertight construction.
(2) Maximum amount of dayight.
(3) All condensation conducted to the exterior.
(4) Lead glazing strip reduces glass breakage.
(5) Ease of erection with low labor costs.
(6) Ease of glass replacement.
(7) Moderate cost, quality considered.



MATERIALS AND ASSEMBLY

Frame—The skylight rafters are galvanized steel or aluminum tees, of sizes selected to suit the particular conditions. The ridge and hip members are of two sections of galvanized steel or aluminum. This construction permits the frame for each slope consisting of rafters, ridge, and hip members to be completely shop assembled. Field erection is thus reduced to bolting the two section members of hips and ridges together and anchoring frame to curb.

Malleable Iron Saddles—To support the condensation gutter and the brass cap bolts, galvanized malleable or aluminum saddle lugs approximately 18 in. o.c., are secured to the tee rafters.

Gutters, Caps, Ridge Covers and Flashings—No. 24 gauge lead coated metal; No. 24 gauge galvanized iron or aluminum; 16 oz. cold rolled copper; gutters, No. 22 gauge.

Glazing Strips—The glazing strips are of heavy, specially formed came lead. The soft lead takes up all unevenness in the glass surface with a continuous bearing, provides fully for contraction and expansion, thus reducing glass breakage and makes an absolutely wind and weather tight joint.

SPECIFICATIONS

Furnish and erect where shown on plans Simplicity Puttyless Skylights as made by GLENDON A. RICHARDS Co., Grand Rapids, Mich., or equivalent fulfilling this company's established standards for materials and construction.

The design shall allow for free expansion and contraction of the glass or movement due to vibration. Each light of glass shall be entirely independent of every other light and the glass held laterally in a manner to prevent its contact with any rigid part of the skylight frame. The bearing of the glass shall be permanently flexible, adjusting itself to warpage or irregularities in the glass.

Sheet metal work for caps, gutters, flashings, etc., shall be *(specify material)*.

J. MERRILL RICHARDS
119 West First Street
BOSTON, MASS.

AMERICAN 3 WAY-LUXFER PRISM CO.
2139 West Fulton Street, CHICAGO, ILL.
517 West 45th Street, NEW YORK, N. Y.

"Thermag" Semi-Vacuum Skylight

(PATENTS PENDING)

Insulation Against Heat and Cold—Solar Radiation Retarded

For Metal and Concrete Reinforced Skylights, see File Index

Unusual Insulation and Lighting Advantages

Due to its scientific construction with 50%-vacuum blocks, the Thermag Skylight possesses decidedly low thermal conductivity. In fact, comparative tests show the Thermag to have about three times the insulating value of ordinary metal skylights. Consequently, with this improved insulation against heat and cold, Thermag makes the maintenance of uniform temperatures easier. Likewise, with Thermag's retarded transmission of solar radiation, the load on air conditioning machinery is materially less.

The Thermag is absolutely watertight and airtight and has no top fins to aid convection. Interior comfort is increased from a thermal as well as a lighting standpoint. Heating costs are naturally reduced.

The insulation value of Thermag is comparable to that of an 8-in. brick wall with ½ in. of plaster, or a 6-in. concrete roof deck with metal lath and plaster.

In addition, the Thermag Skylight gives *even* illumination and eliminates concentrated light rays.

Thermag's Low Coefficient of Heat Transfer

As shown in the illustration, the Thermag Skylight is constructed of rugged, semi-vacuum glass units supported by a carrying grid of special design and fabrication.

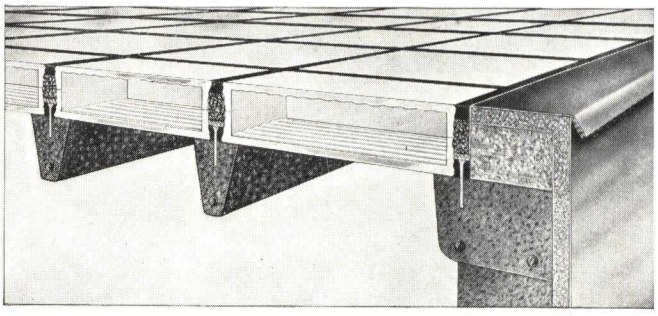
The Thermag glass units are manufactured by the Owens-Illinois Glass Company by the same method as used in producing their well-known "Insulux" Building Blocks; they are of special design and strength to meet requirements for skylight installations. Thermag glass units average 50% vacuum and have resistance to heat transfer and transmission of solar radiation similar to "Insulux" Blocks.

The supporting grid has a high thermal insulation determined by standardized methods to be as effective as that of the glass units, themselves. The grid—designed to give rigidity and strength to the span—is built of concrete, as conductivity of concrete is many times less than that of steel. To further reduce the conductivity, insulation is interposed between the grid member and the top surface between all glass blocks. Consequently, the semi-vacuum glass units are surrounded by a zone of approximately the same unusually low thermal conductivity.

It is this combination of glass, cement, insulation and vacuum that enables Thermag to produce excellent results wherever installed.

Thermag's Evenly Diffused Light

Thermag, likewise, insures unusual lighting efficiency. It gives *even* four-way distribution over large areas the same shape as the skylight opening. Its diffusion angles average 50°. It eliminates objectionable highly concentrated rays. The water-white crystal glass, with or without wire inserted in the top plate, has white coated sides. It admits a white work light that is desirable in every respect.



Thermag Skylight Construction

In the inner surfaces of the Thermag glass unit, the Magnalite Light Diffusing Design is incorporated. The properties of Magnalite Diffusion insure a clear, satisfactory light without high light concentrations and therefore permit smaller skylight openings to accomplish desirable results.

Advantages of Thermag

Insulation against heat and cold—easier to maintain uniform temperature, heating costs reduced.

Transmission of solar radiation retarded—less load on air conditioning machinery.

Magnalite Light Diffusing Design—even illumination over wide areas the same shape as the skylight opening.

Interior comfort increased thermally and visually. Watertight, airtight and permanent.

Cost of Thermag

First cost is the only cost. Savings in maintenance over a period of years render this nominal, and the construction can be considered for most types of buildings. Mechanics are sent anywhere to make installations; or complete panels, of suitable size, are shipped from the factory. All materials and workmanship for each installation are fully guaranteed in writing.

Specifications

Furnish and install where shown on plans Thermag Semi-vacuum Skylights, using Owens-Illinois Glass Co.'s special Thermag Skylight Glass Units.

Units shall be 9⅛ in. square, 2¼ in. thick over-all and spaced approximately 9⅝ in. on centers. Top plate shall have wire inserted (or plain) and the glass thickness shall be not less than ⅜ in. in its least section. Sides shall be coated white. Magnalite Four-Way Light Diffusing Design shall be incorporated in inner surfaces leaving exposed surfaces smooth.

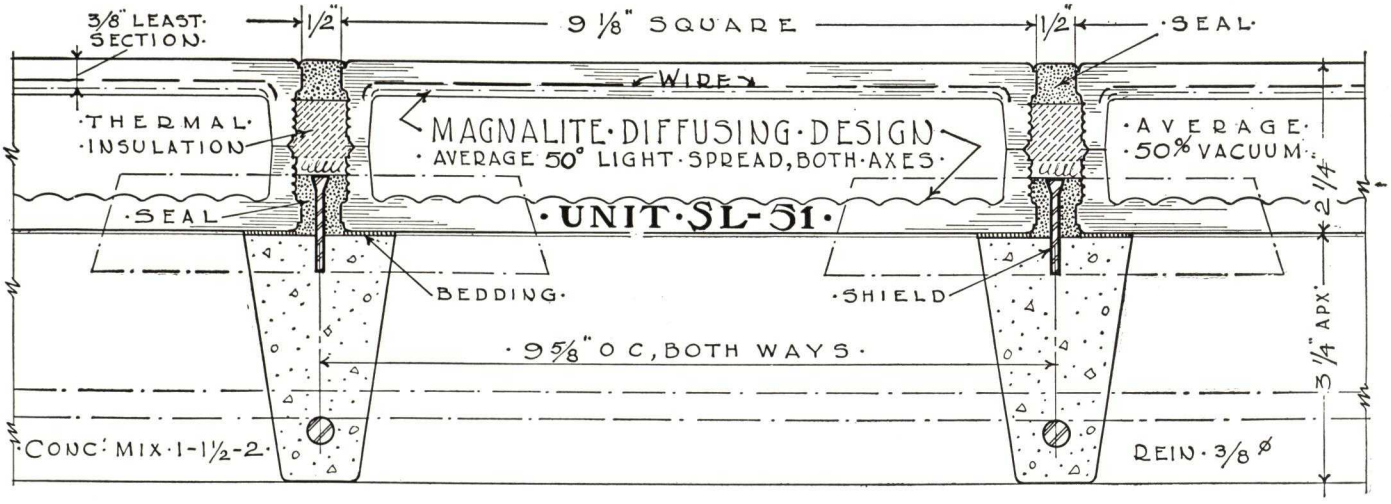
There shall be a continuous zone of thermal insulation extending around each glass unit and situated between tops of spacers or shields and top surface of the construction. Grid resistance to heat transfer shall be equal or more than that of the glass units.

Top surface shall be flush and no metal nor concrete shall be exposed to the weathering surface between glass blocks.

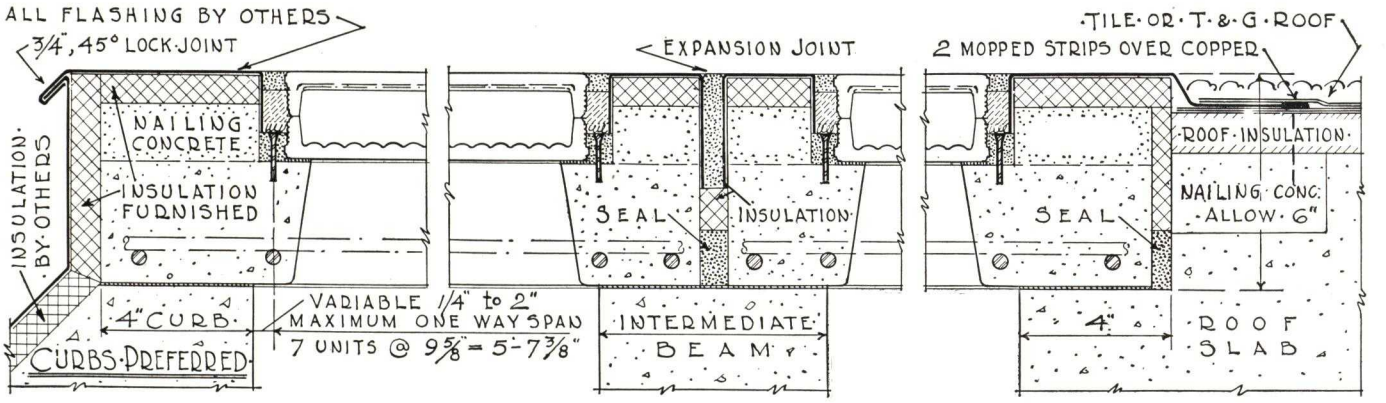
All borders shall be flashed and thermally insulated as per manufacturer's details.

Skylights shall be as manufactured by J. MERRILL RICHARDS, 119 West First Street, Boston, Mass., the American 3 Way-Luxfer Prism Co., 2139 West Fulton St., Chicago, Ill., and 517 West 45th Street, New York, N. Y., or other licensees.

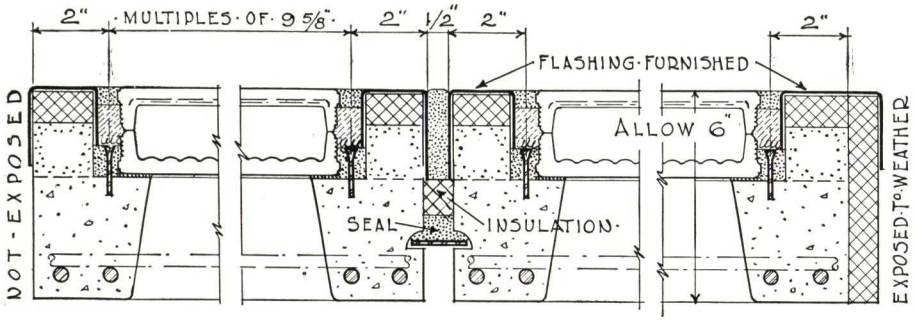
THERMAG SEMI-VACUUM SKYLIGHT



SECTION SHOWING DETAIL OF CONSTRUCTION IN BOTH DIRECTIONS



CURB & FLUSH CONNECTIONS FOR WORK CAST IN PLACE



DETAIL SECTION OF STANDARD PRE-CAST SLABS

STRUCTURAL DATA

WT PER SQ FT 32# APPROX
LIVE LOAD 40#
MAXIMUM ONE WAY CLEAR SPAN NOT OVER 6'-0"
VENTILATORS INSTALLED IF REQUIRED
KEEP CURBS AS LOW AS LATITUDE PERMITS FOR BETTER LIGHT DIFFUSION

NOTE

MAXIMUM SIZE PRECAST SLABS TO CONTAIN NOT OVER 28 UNITS

SCHEDULE OF OVERALL PRE-CAST SLAB SIZES

ALLOW 1/2" EXPANSION JOINTS BETWEEN SLABS

UNITS	SIZE	UNITS	SIZE	UNITS	SIZE
3 x 4	2'-8 7/8" x 3'-6 1/2"	4 x 4	3'-6 1/2" x 3'-6 1/2"	5 x 5	4'-4 1/8" / 4'-4 1/8"
3 x 5	" " x 4'-4 1/8"	4 x 5	" " x 4'-4 1/8"		
3 x 6	" " x 5'-1 3/4"	4 x 6	" " x 5'-1 3/4"		
3 x 7	" " x 5'-11 3/8"	4 x 7	" " x 5'-11 3/8"		

SHIPPING WEIGHT APX. 38 lbs. p.sq.ft.
CAULKING MATERIALS FURNISHED
PRIME JOINTS BEFORE CAULKING

J. MERRILL RICHARDS

Richard's "New Unity" Skylights. Glass Roofs

TELEPHONE
South Boston 1667

119-122 West First Street, BOSTON, MASS.

REPRESENTATIVES IN EASTERN CENTERS

Products

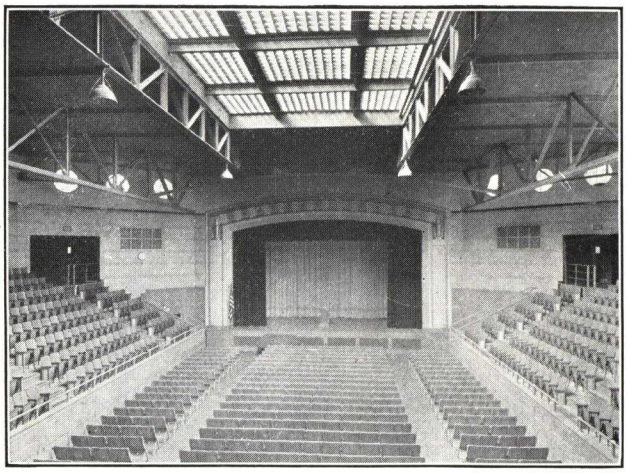
RICHARDS' "NEW UNITY" SKYLIGHT Types WF. For Thermag Semi-vacuum Skylight, see File Index.

For Magnalite Obscuring Diffusing Sheet Glass see Products Index for Glass (Obscuring-Diffusing).

CONSTRUCTION AND USES OF "NEW UNITY" HORIZONTAL SKYLIGHTS

"New Unity" Skylight Constructions

"New Unity" Skylight Construction does not depend on concrete for watertightness since no concrete is exposed to the weathering surfaces. Magnalite Diffusing Tiles or heavy ribbed wire glass units are placed into shields anchored in the supporting grid of reinforced concrete and glazed with a watertight tar and sulphur compound. The constructions are so designed that no concrete is exposed on top between the lights of glass. Reglets are provided in the concrete borders to receive the roofer's flashings so that *no concrete is exposed to the weathering surfaces in the entire skylight construction.*



Magnalite Diffusing Tile Installation, Hovey Institute, Waltham, Mass.

DANIEL W. GIBBS AND KILHAM, HOPKINS & GREELEY ASSOC.
Note even distribution of sunlight

Feature—Magnalite Crystal Diffusing Tiles

The "Four-Way" light diffusing principle of Magnalite Diffusing Glass (see Products Index for Glass) is available in "New Unity" Skylights, Type WF. Magnalite Tiles will eliminate excessive interior sun glare and concentrated sun rays by spreading light of equal intensity over large areas beneath, the same shape as the skylight opening.

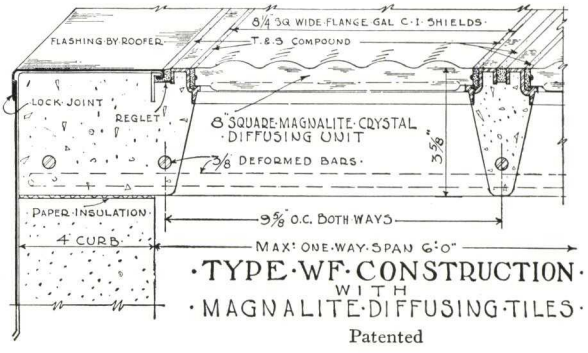
Diffusing Angles Average 50°.

Shadows Reduced to a Minimum — Soffit Highly Ornamental.

Excellent Interior Vision—Self-cleaning Top Surface.

Heat Diffusion.

Skylight openings glazed with Magnalite Tiles will produce better interior vision than larger ones glazed with ordinary glass. Skylight areas can be reduced without sacrificing daylighting results—*a saving in Winter heat losses, and less Summer heat admitted.*



Patented

Specifications

Richards' "New Unity" Glass and Reinforced Concrete Skylights Type WF having no concrete exposed to the weathering surfaces in the entire construction. The Glass shall be Magnalite Light Diffusing Tiles (or $\frac{7}{16}$ in. thick Ribbed Wire Glass). Reglets shall be left around the outside rows of glass units to receive the roofer's flashings where required.

Guarantee

Materials and workmanship are fully guaranteed in writing for each installation.

Where to Use Richards' "New Unity" Skylights

Architectural designs can be improved by the use of "New Unity" Skylights in *Interior Courts, Set Backs,* and on *Roofs* where steeply pitched skylights would be objectionably visible on the skyline.

Installation

Richards' "New Unity" Skylights are installed in place by mechanics skilled in the art.

PARTIAL LIST OF RICHARDS' SKYLIGHT INSTALLATIONS

INSTALLATION	ARCHITECT	INSTALLATION	ARCHITECT
Melrose High School, Melrose, Mass.	J. Williams Beal Sons	Exeter Academy, Exeter, N. H.	Cram and Ferguson
Christian Science Publishing Society Building, Boston, Mass.	Chester Lindsay Churchill	U. S. P. O., Wilkes-Barre, Pa.	Federal Architects
Albany Savings Bank, Albany, N. Y.	Henry Ives Cobb, Jr.	Enoch Pratt Library, Baltimore, Md.	Friz and Friz
Seaside Hotel, Atlantic City, N. J.	Cook and Blount	Middletown Savings Bank, Middletown, Conn.	Hopkins and Dentz
Fitchburg High School, Fitchburg, Mass.	Coolidge, Shepley, Bulfinch and Abbott	Norfolk Prison Colony, Norfolk, Mass.	McLaughlin and Burr
Lynn Highland Elementary School,	George A. Cornet	Quincy Market Canopy, Boston, Mass.	McLaughlin and Burr
Federal Reserve Board Building, Washington, D. C.	Paul P. Cret	U. S. P. O., Quincy, Mass.	John M. Gray Co.
		Archives Building, Washington, D. C.	Parker, Thomas and Rice
		English High School, Boston, Mass.	John Russell Pope
			Richmond and Leeds

RICHARDS & KELLY MANUFACTURING CO.

ESTABLISHED 1885

309-311 West Twenty-third Street
CHICAGO, ILL.

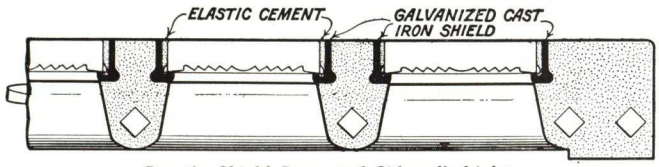
PRODUCTS

Shield Protected Sidewalk Lights
Transparent Roofing
Permalite Roofing
Standard Sidewalk Doors
Heavy Duty Sidewalk Doors
Coalhole Covers and Frames

SIDEWALK LIGHTS AND ROOF LIGHTS

Shield Protected Sidewalk Lights

For use where construction will be subjected to heavy pedestrian traffic and wide temperature variations with a minimum of maintenance.



Detail—Shield Protected Sidewalk Lights

Specifications — All sidewalk lights as shown on plans shall be RICHARDS & KELLY MANUFACTURING COMPANY'S *Shield Protected* construction, using 3½-in. square glass, set in galvanized cast iron shields. Construction shall be capable of sustaining a minimum live load of 300 lbs. per sq. ft. uniformly distributed.

Glass Guarantee

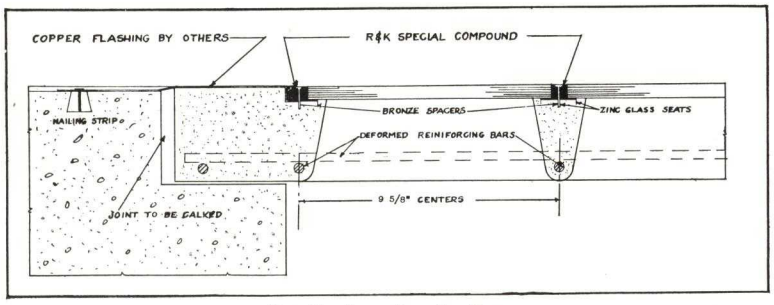
We will furnish free of charge, f.o.b. our factory, any glass broken in our galvanized cast iron shield construction for a period of five years, unless breakage is caused by fire or misuse.

Permalite Roofing

Permanent Skylights

Leakproof — burglarproof — fireproof — permanent. These are but a few of the many features of the new *Permalite* reinforced concrete roofing construction. It is essentially different from older types in that no concrete is exposed to the weather.

Construction—*Permalite* roofing, as shown, is available in the standard construction using 9-in. square glass spaced on 9⅝-in. centers or with larger glass units if desired. Panel thicknesses vary with length of span and size of glass used.

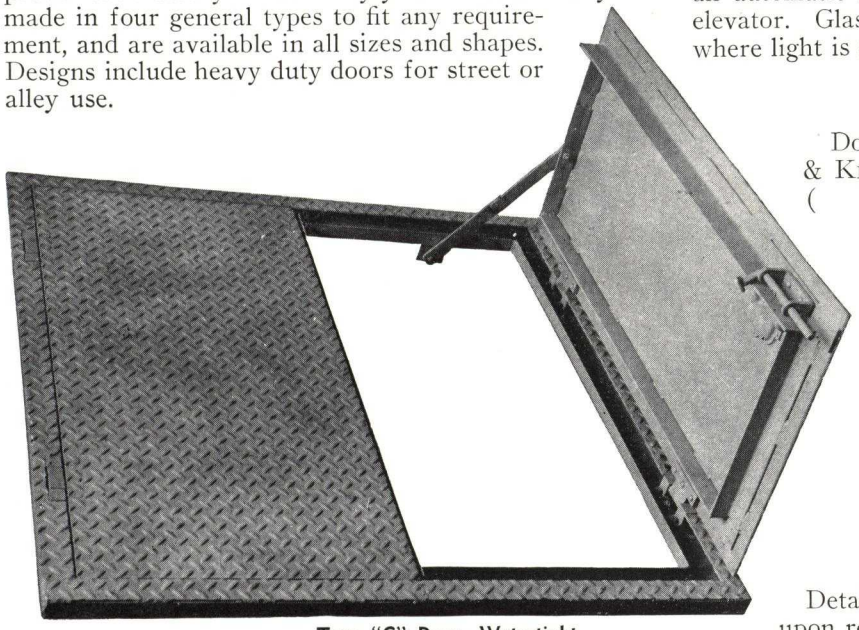


Detail—Permalite Roofing

SIDEWALK DOORS

General Information

All doors are of the finest construction and have been proven satisfactory in over fifty years of use. They are made in four general types to fit any requirement, and are available in all sizes and shapes. Designs include heavy duty doors for street or alley use.



Type "C" Door—Watertight

Special Equipment

Doors can be furnished with striker plates and with an automatic lock operated with the bow irons of an elevator. Glass insets can be placed in the door leaves where light is required in the space below.

Specifications

Doors as shown on plans shall be RICHARDS & KELLY MANUFACTURING COMPANY'S Type ( ), or equal and shall conform with city ordinances. Doors shall be flush and capable of sustaining a live load of at least 300 lbs. per sq. ft., evenly distributed (heavier, if required). All exposed surfaces shall be covered with checkered plate and door leaves fitted with brass hinges. Arms shall be furnished to hold doors in open position and to prevent hinge strain. (If watertight) doors shall be provided with gutters at least 1¾ in. wide tapped for drain connection.

Details

Details and descriptive literature will be sent upon request.

H. H. ROBERTSON COMPANY

Robertson World-Wide Building System

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CANADA; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES, AGENCIES AND BRANCH OFFICES

ALLENTOWN, PA., H. N. Crowder, 446 Union St.
ATLANTA, GA., H. H. Robertson Company, 413 Bona Allen Bldg.
BALTIMORE, MD., H. H. Robertson Company, 1635 Baltimore Trust Bldg.
BIRMINGHAM, ALA., H. H. Robertson Company, 2019 Sixth Ave., No.
BOSTON, MASS., H. H. Robertson Company, 14 High School Ave. (Quincy, Mass.)
BUFFALO, N. Y., H. H. Robertson Company, 602 Jackson Bldg.
BUTTE, MONT., Archie W. Adams, 618 Metals Bank Bldg.
CHARLESTON, W. VA., Fireproof Products Co., 422 Professional Bldg.
CHARLOTTE, N. C., Edwin C. Boyette, Jr., 1025 Arosa Ave. (Box 27)
CHICAGO, ILL., H. H. Robertson Company, 360 No. Michigan Ave.
CINCINNATI, OHIO, H. H. Robertson Company, 1315 American Bldg.
CLEVELAND, OHIO, H. H. Robertson Company, 1526 Hanna Bldg.
DENVER, COLO., J. Q. Lalor, 1125 So. Vine St.
DETROIT, MICH., H. H. Robertson Company, 635 New Center Bldg.
EASTON, PA., H. N. Crowder, 103 No. Fourth St.
EAST ORANGE, N. J., H. H. Robertson Company, 25 No. Harrison St.
JACKSONVILLE, FLA., H. H. Robertson Company, P. O. Box 4523
KNOXVILLE, TENN., R. G. Jeffries, 409 W. Clinch Ave. (P. O. Box 2023)
LITTLE ROCK, ARK., Wherry & Company, 115 Center St.
LOS ANGELES, CALIF., H. H. Robertson Company, 816 W. Fifth St.
MARQUETTE, MICH., C. H. Cooper
MINNEAPOLIS, MINN., Hauenstein & Burmeister, 614 Third Ave., So.
NEW HAVEN, CONN., H. H. Robertson Company, 207 Orange St.
NEW ORLEANS, LA., H. H. Robertson Company, 736 Whitney Bank Bldg.
NEW YORK, N. Y., H. H. Robertson Company, 475 Fifth Ave.
PHILADELPHIA, PA., H. H. Robertson Company, 1307 Real Estate Trust Bldg.
PITTSBURGH, PA., H. H. Robertson Company, 2000 Grant Bldg.
PORTLAND, ME., W. O. Hutchins, 193 Middle St.
PORTLAND, ORE., Mercer Steel Company, 838 N. W. 13th Ave.
RICHMOND, VA., R. M. Nolting, 1103 E. Main St. (P. O. Box 1011)
ST. LOUIS, MO., H. H. Robertson Company, 1218 Olive St.
SALT LAKE CITY, UTAH, L. Brandenburger, 153 W. Second South St.
SAN FRANCISCO, CALIF., H. H. Robertson Company, 50 Hawthorne St.
SCRANTON, PA., F. H. Coffin, 210 Brooks Bldg.
SEATTLE, WASH., Arthur A. Dally, 332 Pioneer Bldg.
SOUTH BOSTON, MASS., Northeastern Metals Co., 307 Dorchester Ave.
SYRACUSE, N. Y., F. J. Ludwick, 1126 Chimes Bldg.
TULSA, OKLA., Murray R. Womble, 316 Atco Bldg.
WASHINGTON, D. C., J. R. Nichols, 428 Woodward Building

FOR ENGLAND: H. H. ROBERTSON CO., MERSEY IRON WORKS, ELLESMERE PORT, CHESHIRE

FOR CANADA: H. H. ROBERTSON CO., LTD.

TORONTO (MAIN OFFICE), 611 Metropolitan Building

MONTREAL OFFICE, 526 Confederation Building

Products

ROBERTSON WEATHERPROOF SKYLIGHTS, SIDEWALL SASH, MONITOR SASH and SPECIAL SASH.

For Robertson Protected Metal (RPM), Protected Metal V-Beam Sheets, Ventilators; Robertson Floor Wiring Method, and Robertson Steel Floor, see File Index.

TRADE-MARK

Patents

Robertson Weatherproof Skylights and Sash are protected by United States Patents No. 1,666,764; No. 1,668,564; No. 1,763,275; No. 1,792,704, and No. 1,803,514; also protected by other patents in the United States and foreign countries. Other patents pending.

ROBERTSON WEATHERPROOF SKYLIGHTS (PUTTYLESS TYPE)

A skylight cannot be perfectly satisfactory until it is weatherproof. Realizing this, Robertson Engineers co-operated with fellows of the Mellon Institute of Industrial Research to produce a really weatherproof skylight. The Robertson Skylight sold today is unique, in that *it is perfectly weatherproof.*

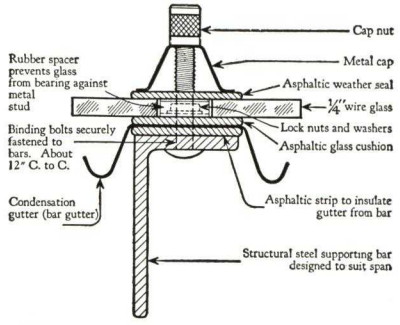
New production methods, standardization and accurate calculation of the amount and location of glass necessary to produce the most daylight, make the Robertson Weatherproof Skylight the most economical buy in the skylight field.

Although many architects would not ask for more in a skylight than the quality of weatherproofness, the Robertson Skylight has the following additional factors of superiority:

(1) It is as strong as any other part of the building. Load-carrying members are structural steel bars, suited to the load and span, with a minimum thickness of $\frac{3}{16}$ in. However, bars can be furnished also in aluminum or brass. Coated bars are furnished where moisture condensation conditions are bad. Any engineer can check the strength of the steel bars with standard deflection formulas for steel structural members.

(2) Bar and condensation gutter are separated from each other by asphalt felt cushions.

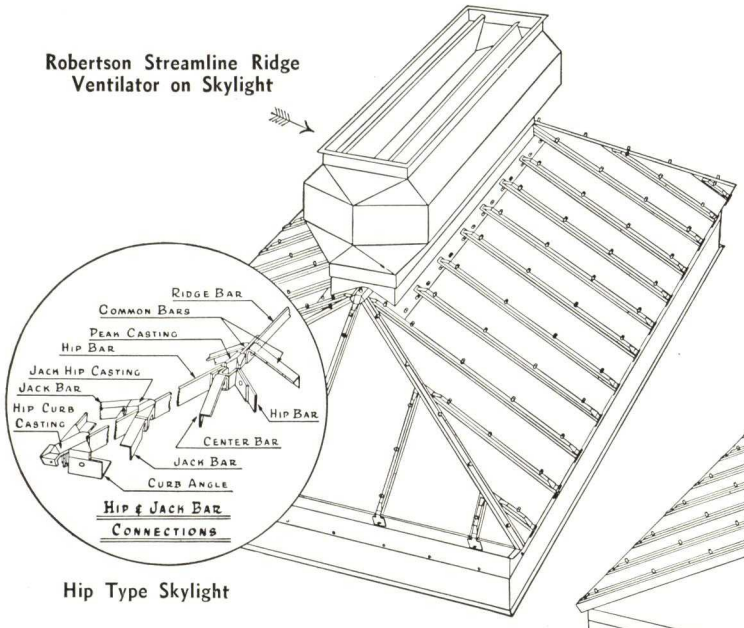
(3) Asphaltic felt cushions are used between all glass and metal members.



Cross-sectional View Showing Details of Robertson Glazing Construction

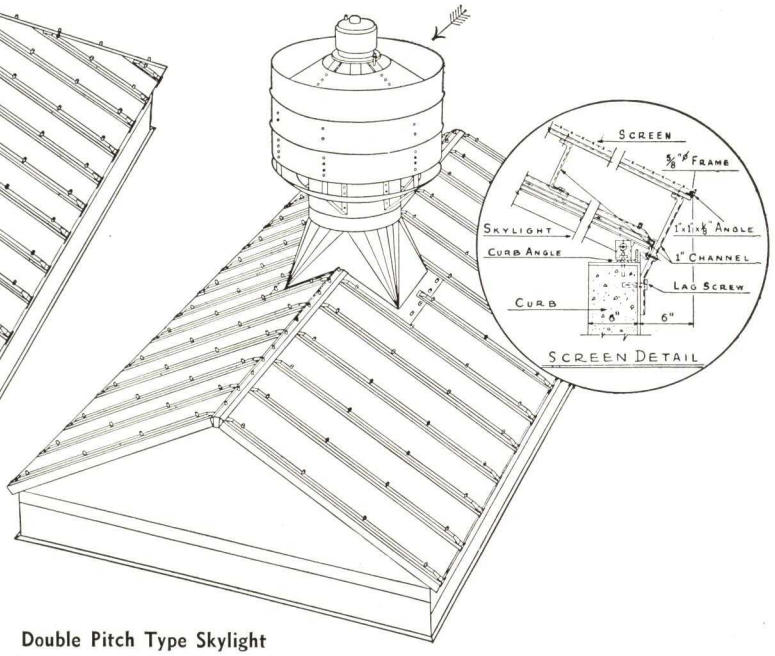
SEVERAL TYPES OF ROBERTSON WEATHERPROOF SKYLIGHT CONSTRUCTION

Robertson Streamline Ridge Ventilator on Skylight



Hip Type Skylight

Robertson Fan Type Ventilator on Skylight



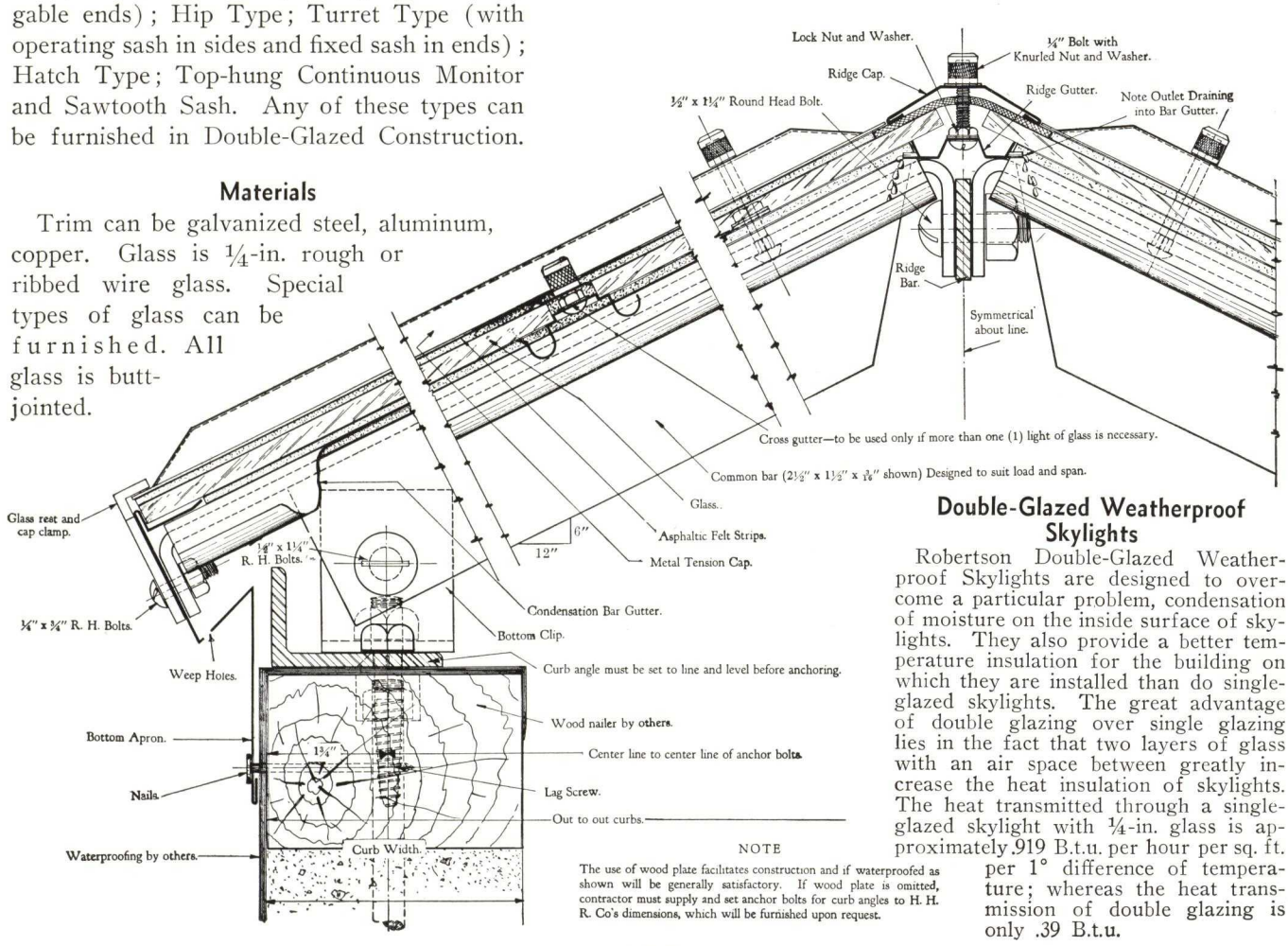
Double Pitch Type Skylight

Types

Single Pitch; Depressed Head (with top of skylight inserted under roofing and bottom raised above roofing to provide perfect watershed); Double Pitch (with glass or metal gable ends); Hip Type; Turret Type (with operating sash in sides and fixed sash in ends); Hatch Type; Top-hung Continuous Monitor and Sawtooth Sash. Any of these types can be furnished in Double-Glazed Construction.

Materials

Trim can be galvanized steel, aluminum, copper. Glass is ¼-in. rough or ribbed wire glass. Special types of glass can be furnished. All glass is butt-jointed.



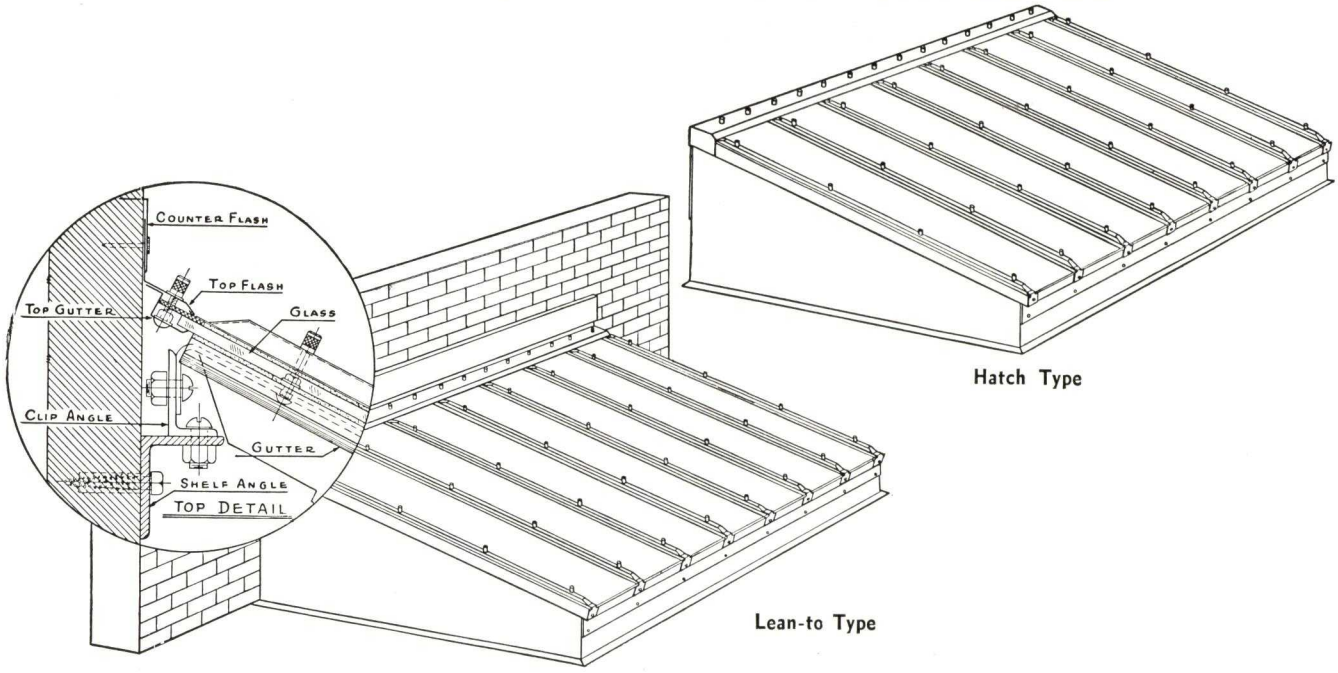
NOTE

The use of wood plate facilitates construction and if waterproofed as shown will be generally satisfactory. If wood plate is omitted, contractor must supply and set anchor bolts for curb angles to H. H. R. Co's dimensions, which will be furnished upon request.

Double-Glazed Weatherproof Skylights

Robertson Double-Glazed Weatherproof Skylights are designed to overcome a particular problem, condensation of moisture on the inside surface of skylights. They also provide a better temperature insulation for the building on which they are installed than do single-glazed skylights. The great advantage of double glazing over single glazing lies in the fact that two layers of glass with an air space between greatly increase the heat insulation of skylights. The heat transmitted through a single-glazed skylight with ¼-in. glass is approximately .919 B.t.u. per hour per sq. ft. per 1° difference of temperature; whereas the heat transmission of double glazing is only .39 B.t.u.

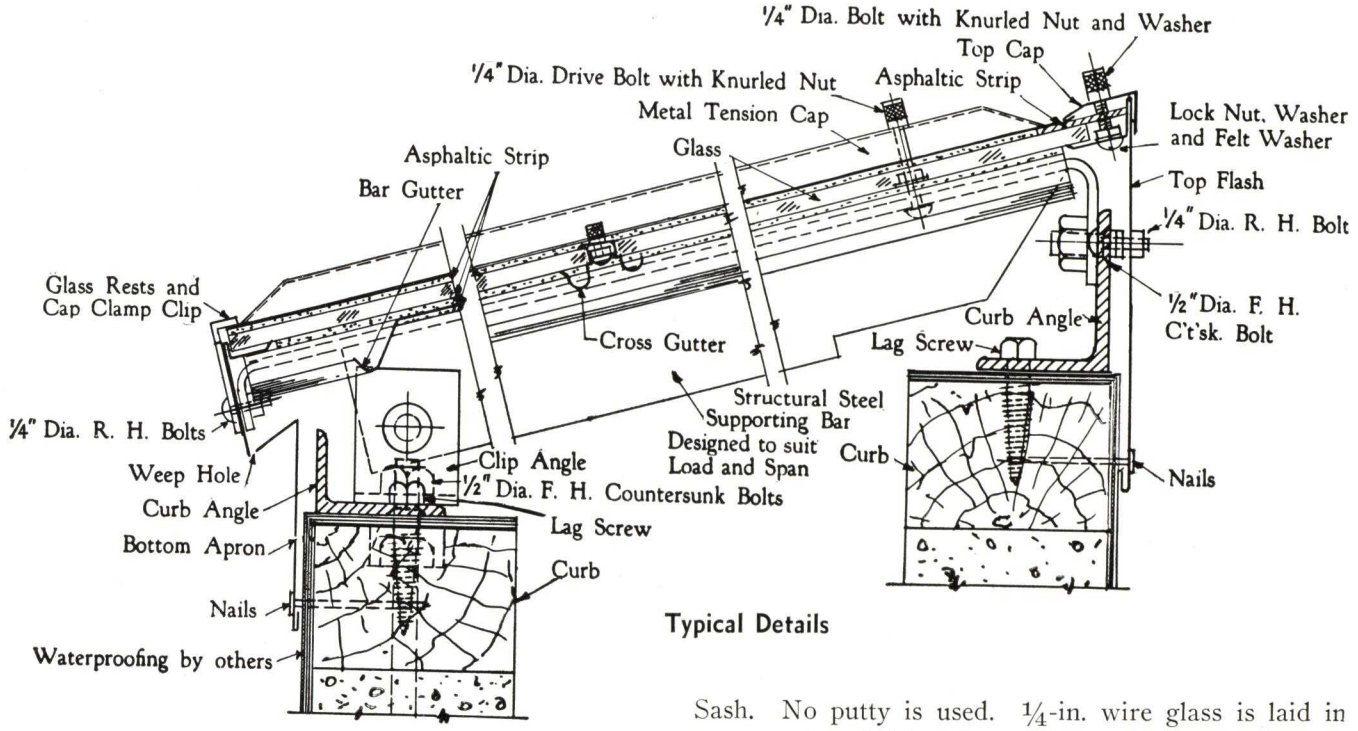
ROBERTSON WEATHERPROOF SKYLIGHTS (PUTTYLESS TYPE)



Hatch Type

Lean-to Type

ROBERTSON SINGLE PITCH WEATHERPROOF SKYLIGHT



Typical Details

ROBERTSON SIDEWALL SASH (PUTTYLESS TYPE)

Designed and fabricated like the steel framework of the building. Entire weight of steel is concentrated in load-carrying bars. Intermediate glass-supporting bars are eliminated. Large panes of glass (up to 6x2 ft.) are used. Sash can be furnished in single- or double-glazed construction. The sash does not sag. There is no network of small bars to rust out. No load-carrying member has ever had to be replaced in any Robertson Sash. No putty is used. ¼-in. wire glass is laid in permanent asphaltic felt cushions. Any type of operator desired may be used.

ROBERTSON FLOATING MOUNTING SKYLIGHT

This unique skylight, also weatherproof, was designed by Robertson Engineers for use where vibration is especially bad, as in forge shops. Installations have proved that glass in these skylights will not break under vibrations that would otherwise prevent the use of skylights altogether.

SAINT PAUL CORRUGATING CO.

Sheet Metal Fabricators for Fifty Years

Skylights, Ventilators, Sheet Metal Products

South End Wabasha Bridge, SAINT PAUL, MINN.

PRODUCTS

Saint Paul Skylights (puttyless or putty type).
Also manufacturers of Saint Paul Ventilators, Steel Buildings, Steel Ceilings, Sheet Metal Building Material of all kinds, Corrugated Metal Pipe, Flumes and Road-Building Accessories including Anti-Washout Strips.
For Steel Decking, see File Index.

SAINT PAUL SKYLIGHTS

Skylights for industrial plants, exhibition buildings, paper mills, machine shops, railway terminals, school buildings, and all other structures where adequate lighting is a requisite.

Distinctive Features

By examining the detail drawing of the Saint Paul Skylight, you will note that the main bars interlock at the ridge, also at the curb. This interlocking feature, together with the construction of the ridge and hip bars, adds considerably to the strength of the skylight.

A metal flashing insert around wall and skylight which is formed with a projected drip is entirely a separate member and is not a structural part of the skylight. It can be put in place either before or after the skylight is set up.

All glass supporting bars and curb are provided with condensation gutter of ample size, the condensation being carried through the interior by these gutters, and to the exterior through weep holes in the curb between each main bar.

Used on Big Jobs

Daylight in the new (1936) swine barn, 306x270 ft. in size, at the Minnesota State Fair Grounds is supplied by 2,000 lineal feet of Saint Paul Skylights (puttyless type). There are 1,135 panes of wire glass (20x48 in.) in the 12 sawtooth sections and maltese cross monitor. Similar puttyless type skylights were supplied by us for the new horse barn, 350x330 ft., "the world's biggest barn," and the new poultry barn, both opened for the 1937 exposition.

The Chicago and North Western Railway selected the Saint Paul (putty type) Skylights for its freight transfer house, at Proviso, Ill., covering 21 acres. This transfer house is in 12 units (see below), 3 skylights going into each unit, 36 skylights in all. Each skylight provides a glass area of 3740 sq. ft.; total area under glass 134,640 sq. ft.; 16,000 panes of wire glass glazed in putty. All skylight bars and caps are machine cut, and all formations power pressed. Curb, ridge and supporting bars are 18-gauge. The bar caps are 24-gauge.

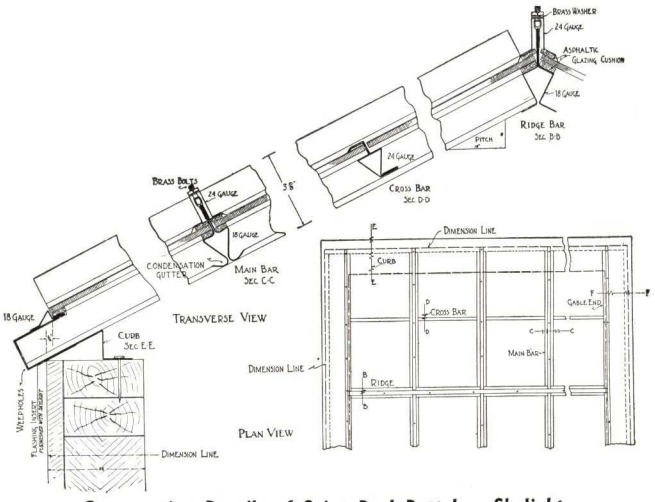
The job required 420 ventilators also made by us. They are 24-gauge, Saint Paul Oval Dome type.

Drawings Gladly Supplied

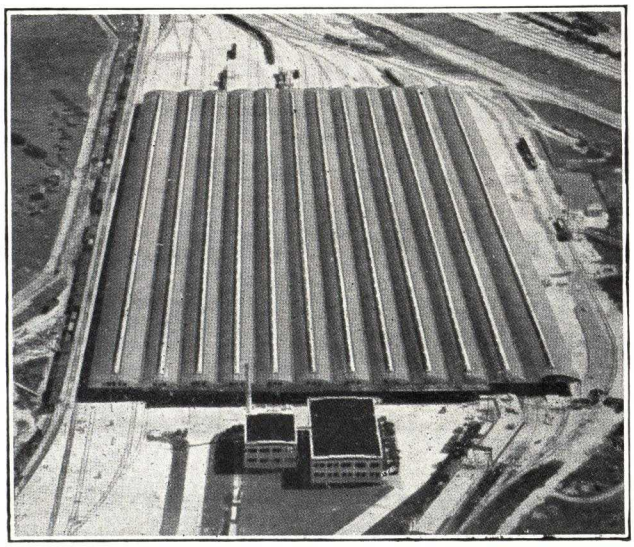
We shall be glad to supply drawings, showing plans, elevations, sections and details of Saint Paul Guaranteed Skylights (puttyless or putty type) on application. Ask for catalog, stating which type is desired. Also if you give us workable information, we shall be glad to furnish suggestions based on long practice and on the most effective and economical form of construction for your particular job.

Everything in Sheet Metal Products

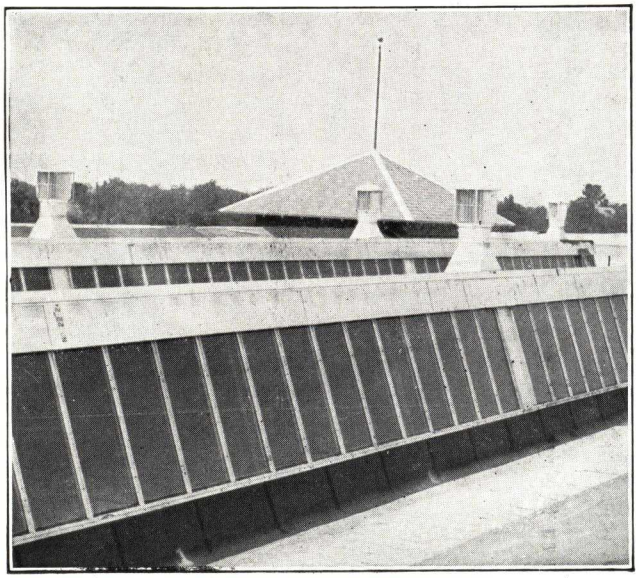
We have been fabricating Sheet Metal Products for fifty years. Samples of materials and products gladly supplied. Write for information.



Construction Details of Saint Paul Puttyless Skylight



Saint Paul Skylights in Chicago & North Western Freight Transfer House, Proviso, Ill.



Saint Paul Skylights in Minnesota State Fair Swine Barn

VENT-O-LITE COMPANY

Industrial Skylights and Ceiling Light Sash

4230 West Taylor Street, CHICAGO, ILL.

Product

PUTTYLESS OR PUTTIED, STATIONARY OR VENTILATING GABLE AND SAWTOOTHED SKYLIGHTS; STANDARDIZED CEILING LIGHT SASH.

Construction

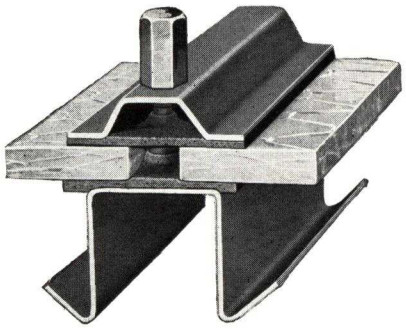
Heavy 18-gauge pressed steel sections, assembled without solder and supported on steel angle trusses spaced not more than 6 ft. on centers, provide an individual structure of the skylight unit.

Materials

As required by the nature of building, Vent-O-Lite is furnished in galvanized copper-bearing steel, copper or aluminum.

Operating Device

A heavy rack and pinion type driven by a worm and worm gear, controlled from the floor with either loose rod or chain. Information relative motor operator control will be furnished on request.



Standard Puttyless Construction

Designed to reduce maintenance expense, at only a slight increase in initial cost over putty glazing. Vent-O-Lite provides those desirable features required for a high grade assembly

Feature

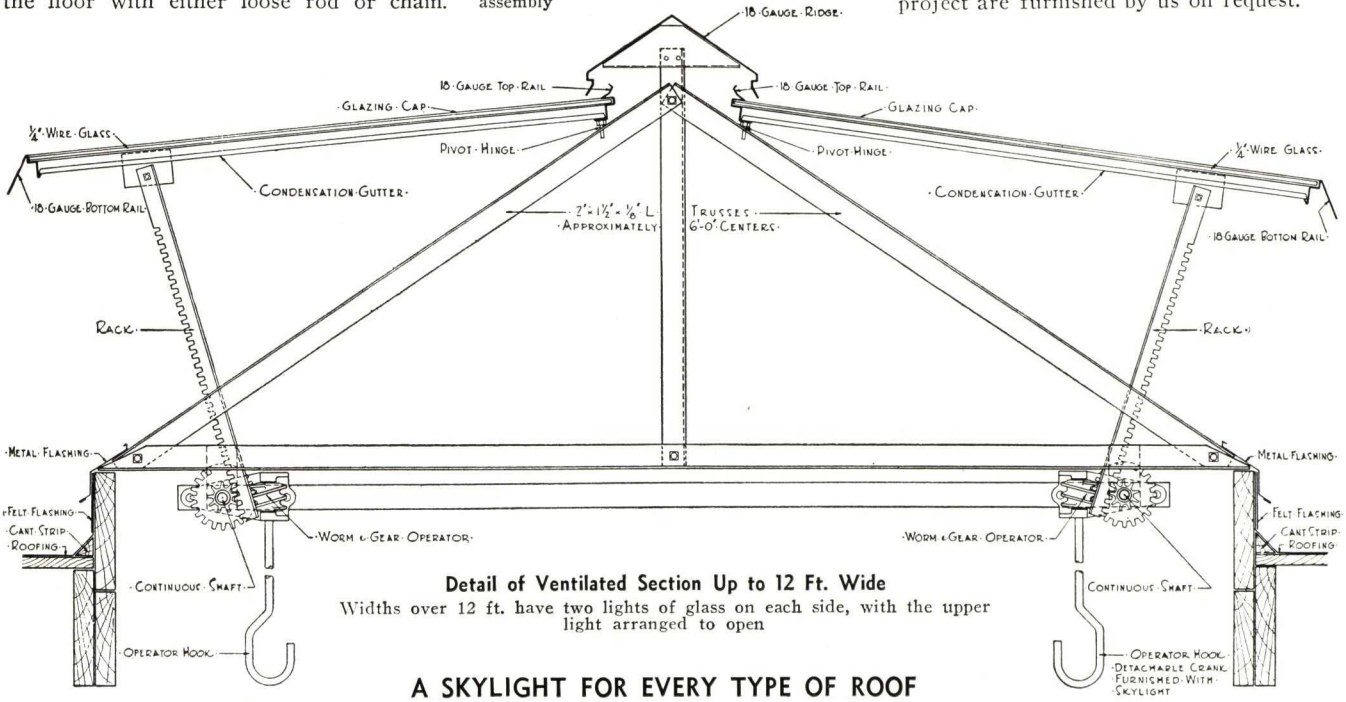
Standard sizes described by the outside to outside dimensions of the curb are carried in stock, to facilitate prompt shipment. Standard sizes are multiples of 2 ft. in width and length.

Erection

These skylights are erected complete by our own erection crew, or can be erected by others from our instructions and setting plans, depending upon the size of the installation.

Details

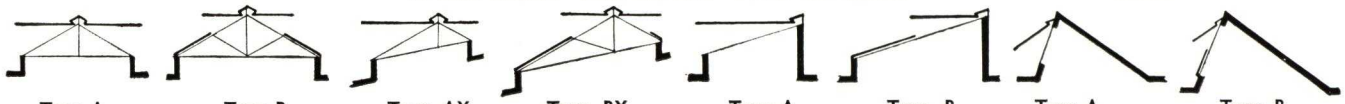
Detail drawings and specifications to incorporate in the plans of the individual project are furnished by us on request.



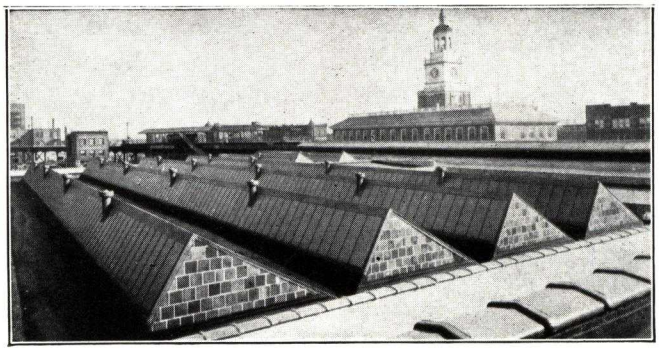
Detail of Ventilated Section Up to 12 Ft. Wide

Widths over 12 ft. have two lights of glass on each side, with the upper light arranged to open

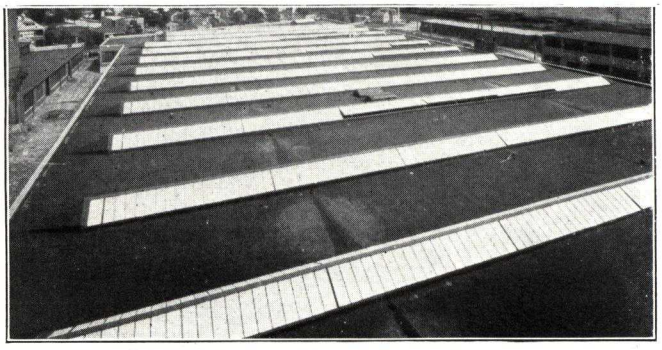
A SKYLIGHT FOR EVERY TYPE OF ROOF



Type A	Type B	Type AX	Type BX	Type A	Type B	Type A	Type B
Gable—Max. width 12 ft.	Gable—Widths over 12 ft.	Max. width 10 ft.	Widths over 10 ft.	Single Pitch Max. width 7 ft.	Single Pitch Widths over 7 ft.	Sawtooth Max. height 7 ft.	Sawtooth Heights over 7 ft.

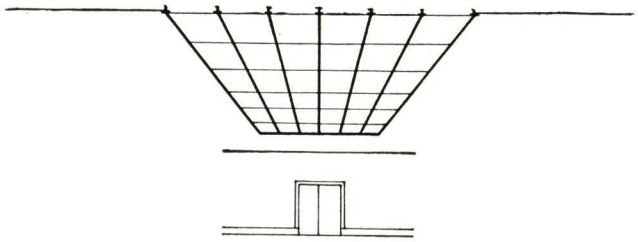


Puttyless Sawtooth Skylights



26,000 Sq. Ft. of Standard Vent-O-Lite

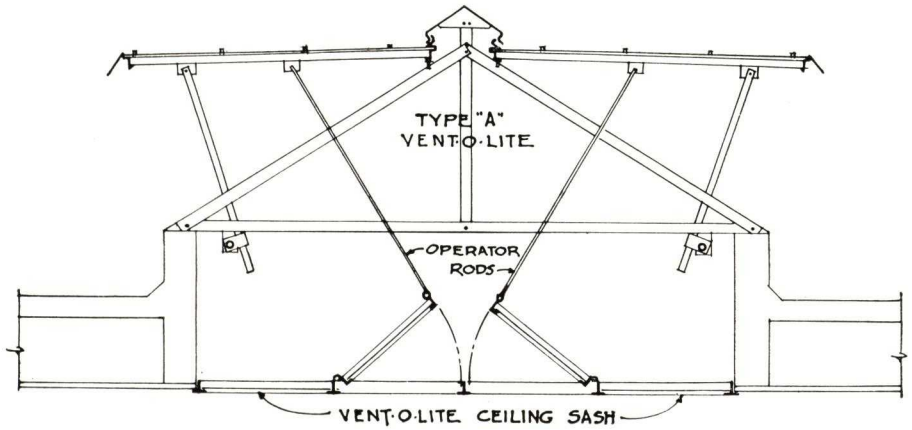
STANDARDIZED CEILING LIGHT SASH



Designed especially for use in air-conditioned buildings and buildings having temperature control. It is adaptable for use in connection with stationary and ventilating skylights, and in existing as well as new buildings. A reduction of heat loss is assured and protection is provided against cold air entering a building through the skylight.

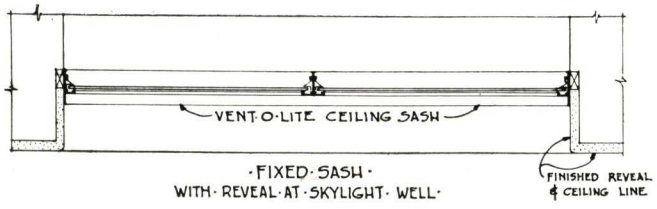
Two types of construction are offered. Type "X" is an extruded aluminum or bronze non-corrosive construction. Type "XT" has a pressed steel supporting bar with an extruded aluminum or bronze snap-on moulding for the finishing member. Puttyless glazing is provided, with the glass resting on resilient cushions of wool felt, and held in position with spring brass glazing clips. Details of this ceiling-light sash are furnished upon request.

TYPICAL APPLICATIONS



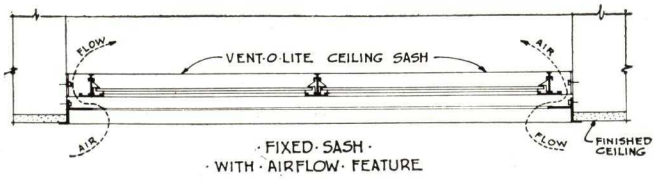
·SECTION·SHOWING·VENT-O-LITE·CEILING·SASH·
OPERATED IN CONJUNCTION WITH TYPE "A" VENT-O-LITE·

VENT-O-LITE standard ceiling-light sash can be provided with ventilating panels. When ceiling-light sash is used in conjunction with a ventilating skylight, the ventilating panel is connected to the sash of the skylight, so that when the skylight is opened the ventilating panel also opens.



·FIXED·SASH·
WITH·REVEAL·AT·SKYLIGHT·WELL·

Fixed ceiling-light sash is furnished, without the ventilating panels. It can be located in the skylight well with a reveal, as illustrated, or it can be located flush with the ceiling, according to your desires.



·FIXED·SASH·
·WITH·AIRFLOW·FEATURE

Fixed ceiling-light sash with air flow feature is also offered. This construction offers a most original and effective method of providing a constant air circulation in the area between the ceiling-light sash and the skylight.

MEMORANDA

ESTABLISHED 1873

E. VAN NOORDEN COMPANY

Manufacturers of Vanco Skylights, Ventilators and Sheet Metal Work

TELEPHONE
Highland 3040 to 3042

100 Magazine Street, BOSTON, MASS.

NEW YORK REPRESENTATIVE, Kenneth Hargreaves, 155 E. 42nd Street, NEW YORK, N. Y.

Products

Manufacturers of DURATITE and ANCHOR BAR ROLLED STEEL SKYLIGHTS.

Load carrying members also in bronze and aluminum.

Also manufacturers of Stationary and Revolving Ventilators, Steel Nailing Bucks, Kalamein Work, Bois Steel Stairs, Sheet Metal Work.

Note: Constructions shown on this page are thoroughly protected by United States and Canadian Patents.

DURATITE SKYLIGHT (Patented)

The Duratite Skylight combines steel for load carrying members, and copper or other non-corrosive metal for trim and drainage members.

Steel Work—1½x2-in. Steel Tees—approximately 24-in. o.c. Combined with continuous steel base angles and steel ridge and hip members, provide a self-supporting steel structure of great strength. All connections to bars top and bottom consist of steel plates welded to bars. Bolts are used only for field connections.

Trim—Sheet metal portions are of copper, leadcoated copper or aluminum independently applied to the steel structure. This permits a free movement of the imposed members so that expansion and contraction will not affect the weather tightness of the skylight.

Caps (Patented)—Are made with closed ends. They seal the joint at head by flashing into ridge cap. They are underlaid with a weather strip of heavy saturated felt in contact with the glass.

Vanco Saddles and Bolts (Patented)—Bronze saddles are clinched to bars at 20-in. intervals. In combination with ¼-in. brass bolts, they draw the cap and stripping down in contact with the glass. No snapping of bolts due to expansion and contraction as the saddles permit a free movement.

Bar Gutters (Patented)—The bar gutter encases the flange of steel tee. The special form of the bar gutter permits the application of the saddles above the gutter member—thus there is no penetration of the gutter member by the cap bolt and no possibility of moisture reaching the steel.

Base Gutter and Apron—Collect and drain condensation and protect lower steel portions. Apron serves as cap flashing for roofer's base flashing.

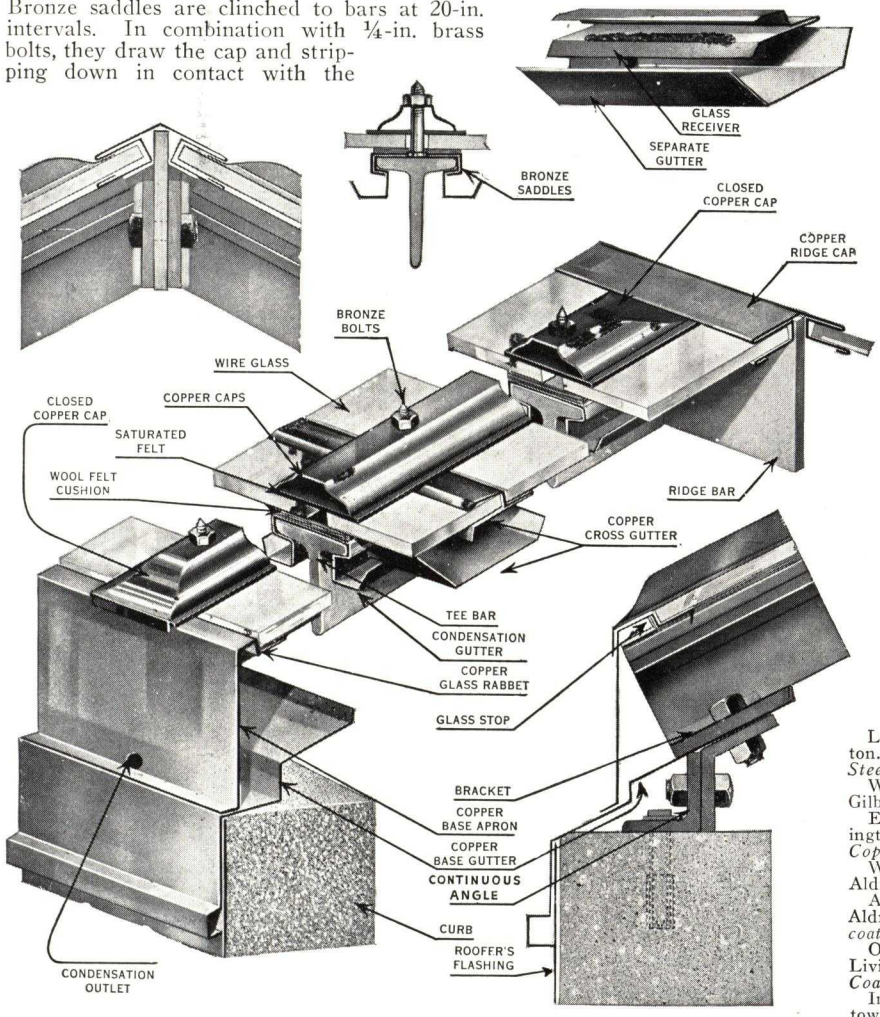
Vanco Double Cross Gutters (Patented)—Glass is butted with double cross gutters inserted to convey condensation. The glass member is entirely segregated from gutter member to prevent conduction of cold and sweating. Lower member absolutely prevents "cross gutter drip."

Glass—Generally ¼-in. wire glass is loose bedded on a cushion of felt. Since the glass rests on a structural member, the glass bed is true and uniform, which prevents the glass from lying "in wind"—a common cause of breakage. Glass generally is 24 in. wide by approximately 48 in. long.

Double Glazing—Duratite skylights are also furnished double glazed where required.

Painting—All steel portions are coated with Vanco Compound to resist corrosion. Additional painting may be added for color finish. The bars are readily accessible for re-painting.

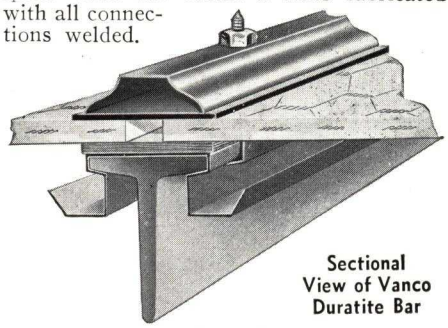
Plating—Steel portions may be treated with a range of protective media, Ship-galvanizing, Parkerizing, Ternizing (a terne coating of tin and lead) and Cadmium-plating.



Sectional Views of Duratite Skylight

Truss Bars (Patented)

Duratite Skylights are trussed for large spans—each bar forms a truss fabricated with all connections welded.



Sectional View of Vanco Duratite Bar

Prominent Installations

Labor and Interstate Commerce Buildings, Washington, D. C., Arthur Brown, Jr., Architect. *Ternized Steel Bars, Copper Trim.*

West Virginia State Capitol, Charleston, W. Va., Cass Gilbert, Architect. *Bronze Bars, Leadcoated Copper Trim.*

Exhibition Bldgs., National Zoological Park, Washington, D. C., Double *Glazed Skylights, Steel Bars, Copper and Aluminum Trim.*

Worcester Art Museum, Worcester, Mass., Wm. T. Aldrich, Architect. *Ternized Steel Bars. Aluminum Trim.*

Art Museum, Boston, Mass., Guy Lowell and Wm. T. Aldrich, Architects. *Steel Bars, Copper and Leadcoated Copper Trim.*

Oregon State Capital, Salem, Ore., Trowbridge and Livingston, Architects. *Galvanized Steel Bars, Lead Coated Copper Trim.*

Indoor Athletic Field, Wesleyan University, Middletown, Conn., McKim, Mead & White, Architects. *Steel Bars, Copper Trim.*

ÆOLUS DICKINSON

INDUSTRIAL DIVISION PAUL DICKINSON, INCORPORATED

TELEPHONE
Lafayette 1862,
1863

Ventilators, Roof Drains, Scuppers and Exhaust Heads

3322-3342 South Artesian Avenue, CHICAGO, ILL.

Products

"ÆOLUS" IMPROVED DOUBLE SYPHON ROOF VENTILATORS; FERROCAST ROOF DRAINS; DICKINSON FERROCAST SCUPPERS; DICKINSON FERROCAST CHIMNEYS (Adjustable Roof Connections); "AIR GATE" SCUPPERS.

Dickinson Ferrocast Floor Ventilators (Mushroom Type), Dickinson Ferrocast Exhaust Heads, and Dickinson Ferrocast Wall Vents.

"Æolus" Improved Double Syphon Roof Ventilators

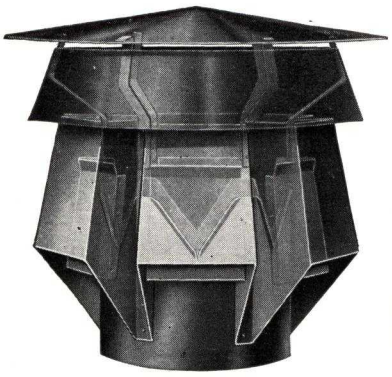
"Æolus" ventilators are used by big industries and railroads as well as on hotels, schools and office buildings. Made of any sheet metal or cast iron. No mechanical parts to get out of order. No maintenance expense.

SIZES AND CAPACITIES ÆOLUS IMPROVED DOUBLE SYPHON VENTILATORS (PATENTED)

Temp. Difference 69° F. outside, 71° F. inside — From Tests Made by L. E. Davies of Armour Institute

Wind velocity, miles per hour	Period of Time	Size of Ventilator, in.									
		12	14	16	18	20	24	30	36	40	48
		Cubic Feet of Air Through Ventilator									
5	Per min.	435	589	769	973	1,075	1,725	2,689	3,879	4,779	6,901
	Per hr.	26,100	35,340	46,140	58,380	64,500	103,500	161,340	232,740	286,740	414,060
10	Per min.	627	857	1,121	1,417	1,745	2,513	3,919	5,651	6,965	10,049
	Per hr.	37,620	51,420	67,260	85,020	104,700	150,780	235,140	339,060	417,900	602,940

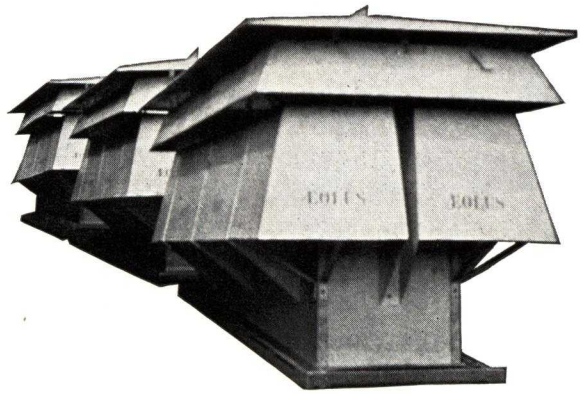
They Are Used by the Following:



"Æolus" Double Syphon Roof Ventilator

Albany Packing Co.
American Can Co.
A. T. & S. F. R. R.
Baltimore & Ohio R. R.
Crane Co.
Chesapeake & Ohio R. R.
Chicago Furniture Mart
Commonwealth Edison Co.
C. C. C. & St. L. Ry.
C. B. & Q. R. R.
Grand Trunk Ry
First Nat'l Bank, Chicago
Northern Trust Co., Chicago
Illinois Central R. R.
International Harvester Co.
Northern Pacific R. R.
New York Central R. R.
Pennsylvania R. R.
Rock Island R. R.
Standard Brands, Inc.
Southern Ry. Co.
St. Peters R. C. Church
Truscon Steel Co.
Westinghouse Electric & Mfg. Co.
Yellowstone Transportation Co.

Rectangular "Æolus" Ventilators for special conditions or appearance are often used. These can be built complete to fit roof construction either for ridge or slope. They have been successful where square or rectangular ventilators were desired.

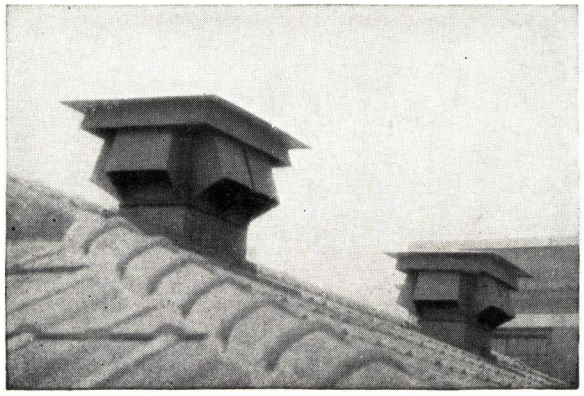


Grain elevators need efficient roof ventilation. Many installations on the following buildings are: 147 Aeolus, on a Baltimore Elevator, 56 at South Chicago, also Albany, N. Y.; and 8 large 28x116-in. above at Kansas City.

Nuvent Semi-syphon and Deflector Type

An achievement in a moderate priced effective type is our *Nuvent*. After a careful study of the air currents in action, this *Nuvent* design was perfected to fill requirements for a compact ventilator.

The semi-syphons below deflect the air upward and the deflectors at the top also cause a vacuum.



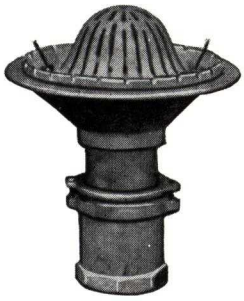
Rectangular "Aeolus" Ventilators

Dickinson Nuvent

Dickinson Ferrocast Roof Drain

This roof drain is of large area and substantial construction. Made in all sizes with or without expansion joint. Also made with side outlet. Brass and aluminum drains and expansion joint with wrought iron or brass sleeve. In service on government, industrial and railroad buildings.

La Salle Station Train Shed, Chicago, Ill.



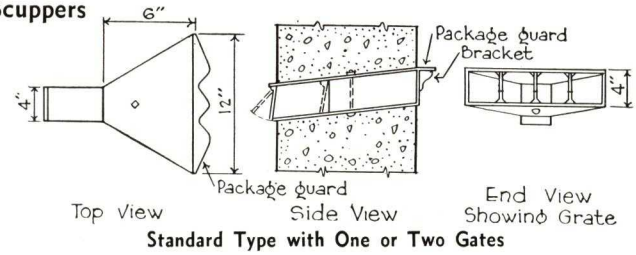
Roof Drain
with Expansion Joint

Chicago Mail Building, Chicago, Ill.

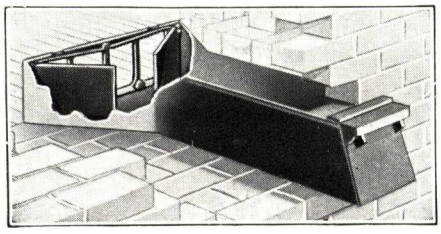
Dickinson Ferrocast Scuppers

They only cost a few dollars apiece but are worth their weight in gold when a fire occurs. Construction is entirely of light gray cast iron. They are simple, effective, durable, easily installed and approved by Underwriters' Laboratories, Inc. Made in 9 to 24-in. sizes.

Used everywhere. One scupper for 1000 sq. ft. floor area.



Standard Type with One or Two Gates



"Air Gate" Scupper

"Air Gate" Scuppers

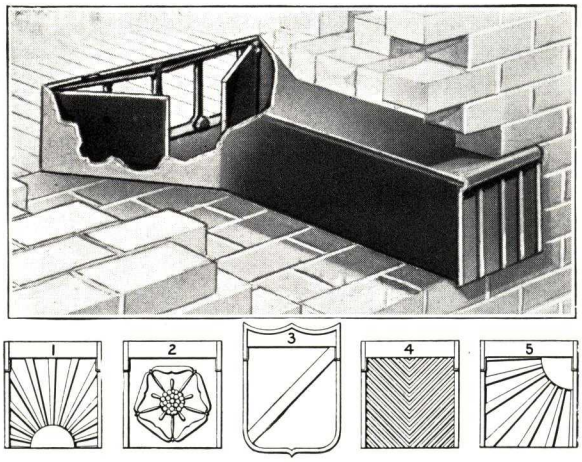
New type scupper with gates and grating on interior of wall. Embodies all features of other types of scupper plus the advantage of both grating and gates on interior end. Made in all wall thicknesses and with cast iron or bronze gates. The inside gates close by gravity and operate on minimum water pressure. The outside gate overhangs the scupper and will not become sealed when painted.

Dickinson "Ornate" Scuppers

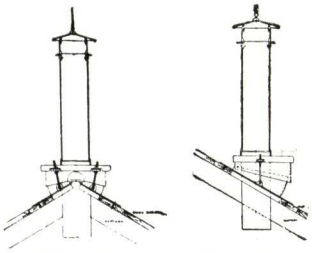
Special medallion types of outside gates can now be furnished with both our standard and air gate scuppers.

Suggestions of designs shown in illustration and listed as Nos. 1 to 5. Other designs to meet your building can be arranged.

These medallion gates are aluminum or bronze castings only.



At Right—Suggestions for
Medallion Gates



Ridge Type Slope Type
Cast Iron Chimneys

Dickinson Ferrocast Adjustable Chimneys

These chimneys are used on small buildings, garages, etc. The roof connections are adjustable to the pitch of the roof, both ridge or slope types. They are made to fit 5, 6, 7 and 8-in. pipe diameters, any length above and below roof connection.

Also cast iron extensions for brick chimneys.

ESTABLISHED 1906

AREX COMPANY

Industrial Ventilating Engineers

333 Michigan Avenue Building, CHICAGO, ILL.

AGENCIES IN PRINCIPAL CITIES — FACTORY AND WAREHOUSE: GARY, IND.

PRODUCTS

Arex-Austor (Air Exhauster), the Original Siphonage Roof Ventilator, round and rectangular.

Economy Ventilator (Plain and Fan Types).

"Arex" Adjustable Louvers; Arex Shutters.

Fans and Blowers.

Arex Attic Ventilator.

Arex Spray Booth Fan, Arex Air Conditioners, Filter Unit.

AREX-AUSTOR

Scientific Design—This ventilator, designed on the original siphonage principle, assures by natural means constant, positive and uniform ventilation. Siphon or vacuo chambers are placed to concentrate all wind currents into a steady pulling force; by means of deflections opposite each siphon, a powerful vacuum is created, drawing out air at a tremendous speed. Foul air, warm air, fumes, gases, vapors, steam and smoke are quickly and completely removed.

Construction—Fabricated in one solid unit, no solder used, every joint rigidly riveted. Nothing to get out of order—a ventilator, simple in principle, durable in construction and sure to give year-in and year-out service without attention or repair.

Made of galvanized iron, ingot or toncan metal, cold rolled copper, wrought iron or special metal, any size or gauge. Special bases and pipe connections made to order—submit sketch.

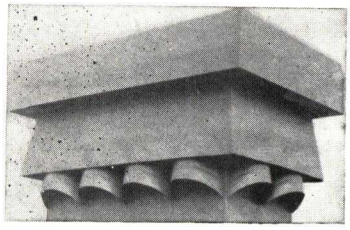
Standard Specifications—All roof ventilators to be Arex original siphonage ventilators as patented and manufactured by the Arex Company, 333 Michigan Avenue Building, Chicago, Ill.

Arex Rectangular Ventilator

(Original Siphonage Type)

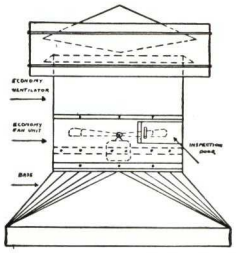
Arex Rectangular Ventilators are fabricated of all materials and in all sizes; solidly braced and heavily constructed throughout.

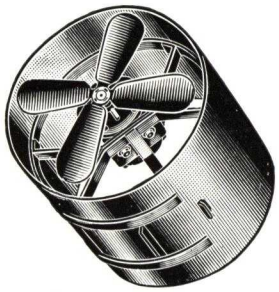
Absolutely weatherproof and stormproof.



ECONOMY ROOF VENTILATOR AND ECONOMY FAN UNIT

This ventilator is designed to meet the demand for a ventilator at lowest possible cost, yet capable of solving any ordinary ventilating problem. Absolutely guaranteed stormproof. Made in same sizes and gauges as Arex-Austors. Workmanship and materials are of the same high quality. Economy Ventilator can be furnished separately or in connection with Economy Fan Unit (with direct connected or belt-driven motors).





ECONOMY FAN UNITS

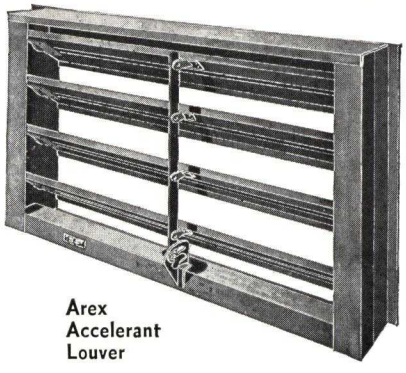
Vent., in.	Fan diam., in.	Hp.	Total ex., cu. ft. pr. min.	Ship. weight of unit lb.
10	8	1/50	400	65
12	10	1/50	625	85
14	10	1/40	850	90
16	12	1/20	1,150	105
18	14	1/20	1,625	130
20	16	1/10	2,110	150
24	18	1/6	2,825	180
30	24	1/6	4,600	240
36	30	1/4	7,950	280
42	30	1/4	9,050	375
48	36	3/4	13,600	425
54	42	1	18,100	550
60	48	2	25,400	800
66	54	2	29,500	1,000
72	54	2	31,400	1,225
84	60	3	42,900	1,390

AREX ORIGINAL ACCELERATED LOUVER

Adaptability—These high grade louvers are installed for fresh air supply in outside walls for factories, power plants, public buildings, transformer vaults, etc.

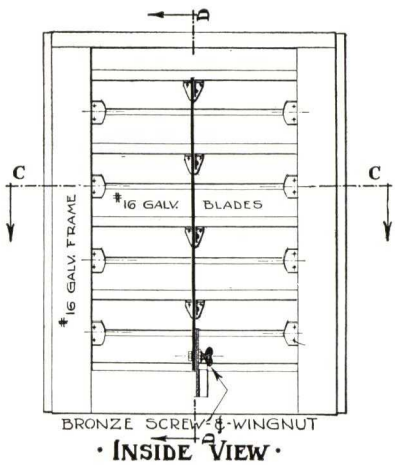
This louver is absolutely stormproof and weatherproof and is furnished with jamb style to suit requirements. Special frames constructed for any type wall. Fabricated of all metals and in all sizes.

Construction Features—(1) Bronze bearings in frame. (2) Bronze pivots for blades. (3) Adjustable quadrant device to hold blades in any position from open to closed. (4) Can be furnished with fusible link control for automatic closing in case of fire. (5) Louvers can be arranged for the thermostatic control. (6) Can be furnished with ball bearings. (7) Operating devices with gears and rod or chains for remote control in series or single units. (8) Standard louvers have No. 18 galvanized iron in frames and No. 16 galvanized iron in blades; copper 32 oz. in frame and 48 oz. in blades. (9) Standard depth for balanced louvers 4 in. Standard depth for fusible link self-closing louvers 5 in. (10) *Special frames for glass block walls.*

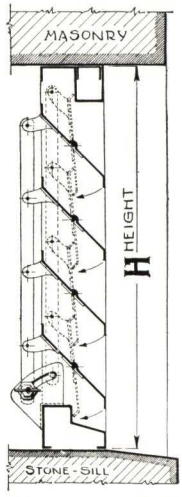


Arex Accelerant Louver

Specifications—All louvers to be Arex Accelerant Louvers as manufactured by Arex Company, 333 Michigan Avenue Building, Chicago, Ill.

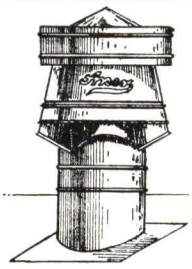


· INSIDE VIEW ·

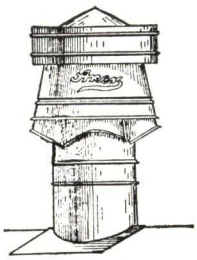


· SECTION D-D ·

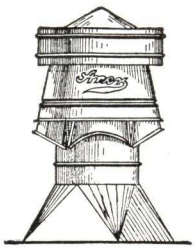
No. 1
Round Base for Flat Roof



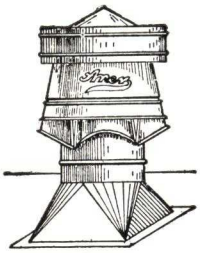
No. 3
Round Base for Slant Roof



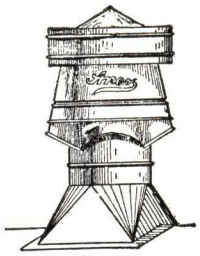
No. 5
Round Base for Gable Roof



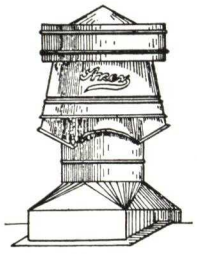
No. 7
Square to Round Base for Flat Roof



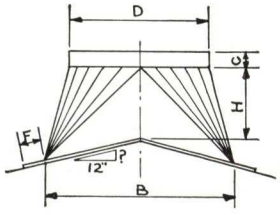
No. 8
Square to Round Base for Slant Roof

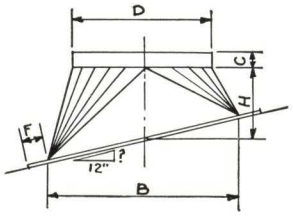


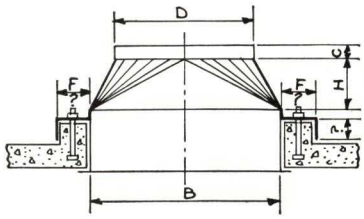
No. 9
Square to Round Base for Gable Roof



No. 12
Square to Round Base with Shoulder for Gable Roof

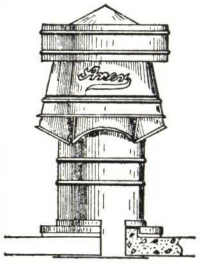






How to Order

Simply multiply cubical contents of room by number of air changes required per hour. The exhaust capacity table below will indicate the exact size of Arex-Austor required

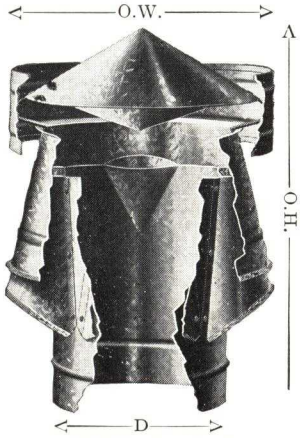


No. 15
Round Base for Flat Concrete Roof with Curb

DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) VENTILATORS

Principal dimensions, in.			Exhaust per hour, cu. ft.	Gauge of ventilators		*Ship. wt., lb.
D	O. W.	O. H.		Galv. iron	Copper oz.	
12	18	24	37,699	24	16	28
14	21	28	51,313	24	18	38
16	24	32	67,021	24	18	54
18	27	36	84,823	24	18	68
20	30	40	104,720	22	18	93
24	36	48	140,796	22	20	130
30	45	60	235,619	22	20	225
36	54	72	339,293	20	24	405
42	63	84	461,813	20	24	475
48	72	96	603,187	20	28	620
54	81	108	763,407	20	32	800
60	90	120	942,477	18-20	36	910
66	99	132	1,140,397	18	36	1170
72	108	144	1,357,167	16-18	44	1450
84	126	168	1,847,256	16	48	2225

*Weights given are for ventilators only.



Sectional View of Arex-Austor

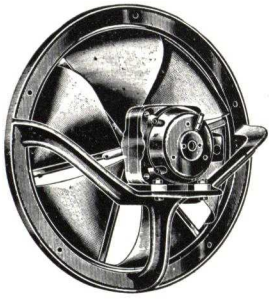
DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) BASES

Dimensions of bases, in.				Gauge of bases	
B	H	F	C	Galv. iron	Copper, oz.
15 x 15	12	4	3	24	16
17½ x 17½	13	4	3	24	18
20 x 20	14	4	3	24	18
22½ x 22½	15	4	3	24	18
25 x 25	16	4	3	22	18
30 x 30	18	4	3	22	20
37½ x 37½	21	4	3	20	20
45 x 45	24	4	3	20	24
52½ x 52½	27	5	4	20	24
60 x 60	30	5	4	18	28
67½ x 67½	33	5	4	18	32
75 x 75	36	5	4	18	36
82½ x 82½	39	6	5	16	36
90 x 90	42	6	5	16	44
105 x 105	48	6	5	16	48

Shipping weight of bases is approximately one-third of that given for ventilators.

DETAILS AND DATA, AREX-AUSTOR VENTILATORS AND BASES

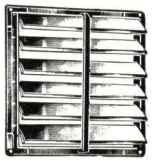
AREX EXHAUST FANS



The exhaust fans can be furnished with bucket, disc, paddle or propeller blades, direct connected or belt driven. Fans can be furnished in sizes from 12 to 72 in., a.c. or d.c., one or four-speed, 500 to 42,000 c.f.m.

AREX AUTOMATIC SHUTTERS

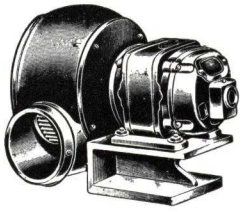
The Arex Shutters are made of special lightweight aluminum, insuring maximum capacity of air delivered. The vanes interlock in such a way that the inward draft will seal them more firmly. The shutters are made in sizes from 12 to 72 in.



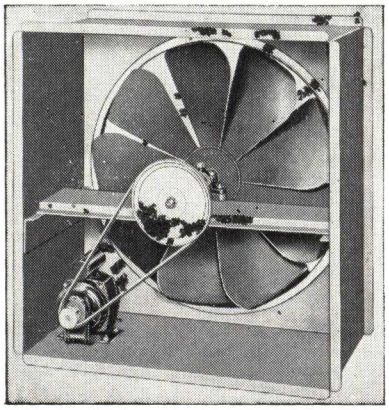
AREX UTILITY AND VOLUME BLOWERS

Utility Blowers are made for deliveries of 75 to 1,200 c.f.m. Widely used for chemical laboratory hoods, washrooms, moving picture booths, kitchens, etc.

Volume Blowers range in capacity from 500 to 50,000 c.f.m. Low tip speed, quietness in operation, low power consumption and durability in construction.

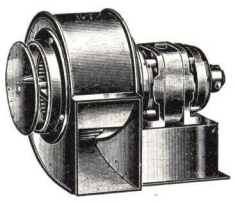


Type A

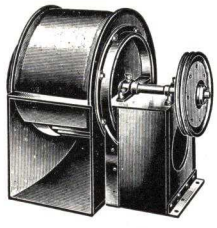


AREX ATTIC FAN VENTILATOR

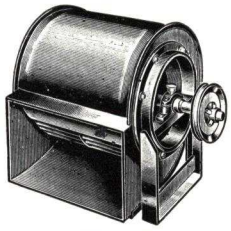
Attic fans are designed to handle a large volume of air at low operating cost. Absolute quietness in operation; rubber-cushioned (full-floating). Built in four sizes—24 to 42 in. with deliveries from 3,200 to 8,200 c.f.m.



Type B



Type F



Type G

THE ALLEN CORPORATION

Engineers and Manufacturers of Ventilating Appliances

9753 Erwin Avenue, DETROIT, MICH.

SALES ENGINEERS IN ALL PRINCIPAL CITIES

PRODUCTS AND SERVICES

Products

ALLEN MULTI-VANE TURBINE VENTILATORS.
ALLEN ELECTRO-WIND TURBINE VENTILATORS.
Also manufacturers of:
Allen Electric Exhaust Fans (direct drive).
Allen Attic Fans (slow speed—multi-blade).
Allen Air Circulators (room coolers).
Alco Stationary Ventilators.

Allen Engineering Service

Complete layouts and recommendations for equipment best suited to solve air removal problems. Naturally, there is no charge or obligation connected with this service.

ALLEN ELECTRO-WIND TURBINE VENTILATOR

The Allen Electro-Wind Turbine Ventilator (Patent No. 1,965,171) is a dual purpose exhauster efficiently combining the forces of nature and electricity. This unique ventilator, introduced several years ago, has been refined in design and construction to achieve greater capacity with practically silent operation. All ball bearing construction, including the motor, means that a minimum of attention is required and that lubrication problems are practically eliminated.

As a wind driven unit, it embodies all the fine performance of the turbine ventilator, originally designed and patented by Allen. When additional exhaust capacity is required, the electric motor, operating through a sturdy free-wheeling clutch, picks up the multi-blade rotor and revolves it at a high rate of speed, more than doubling the exhaust.

Exclusive Features

(a) Motor not in path of exhaust.
(b) Exhaust unaffected by direction of wind.
(c) Penthouse eliminated.
(d) A powerful positive exhaust at no cost when wind driven.
(e) Low power cost and high efficiency when electrically driven.
(f) No backdraft when power is off.
(g) Low cost per cubic foot of air exhausted.

ALLEN MULTI-VANE TURBINE VENTILATOR

The Allen Multi-Vane Turbine Ventilator (Patent No. 1,702,120) is the embodiment of the finest in design, workmanship and materials, and represents the experience of a quarter of a century of operations by the manufacturers of the original turbine ventilator as covered by Allen patents dated 1911. Constructed of prime extra "tite-cote" galvanized sheets, die cut and jig fabricated, the Allen Turbine is not to be confused with hand-made imperfect imitations. The interior displacement cone with multi-vanes attached is a patented development exclusive with Allen.

RATED DISPLACEMENT CAPACITIES ALLEN TURBINE VENTILATORS

Size, in. (throat diam.)	Free air displacement, cu. ft. per hr. Stack height 20 ft. Temp. diff. 20° F.		
	Wind vel. = 4 m.p.h.	Wind vel. = 8 m.p.h.	Electrically driven
6	9,100	11,100	.....
8	17,300	21,600	.....
10	26,500	32,500	.....
12	38,600	46,200	76,000
15	54,000	69,000	105,000
18	85,200	102,100	170,000
20	105,100	125,600	210,000
24	149,000	185,000	278,500
30	225,000	272,000	420,200
36	281,000	330,000	540,000
42	324,000	414,000	680,000
48	360,000	473,000	780,000

Allen Electro-Wind Turbine Ventilator
(With motor and speed reduction unit cover cut away)

ALLEN TURBINE VENTILATORS

Allen Multi-Vane Turbine Ventilator
(Interior of Allen Multi-Vane Turbine Ventilator illustrating the displacement cone with Multi-Vanes attached)

ESTABLISHED 1909

BABCOCK-DAVIS CORPORATION

Iron, Steel, Mechanical and Electrical Specialists

474 Dorchester Avenue

BOSTON, MASS.

PRODUCTS AND SERVICES

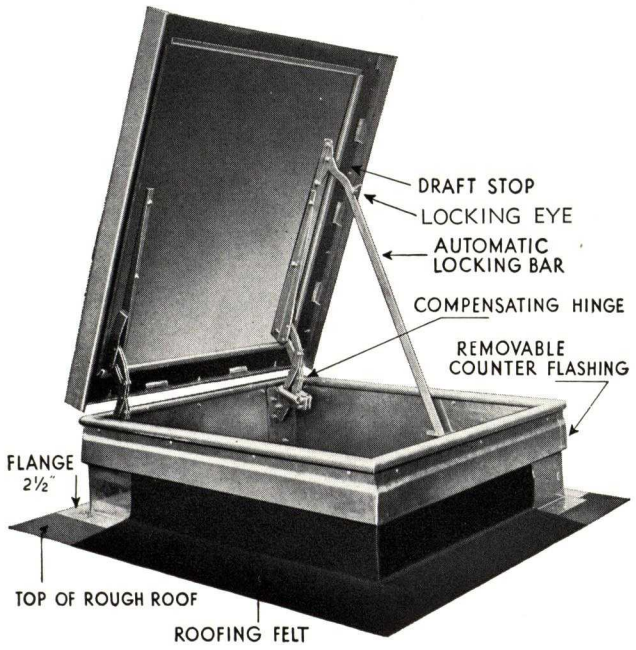
ALUMINUM SELF-CONTAINED ROOF HATCH COVERS.

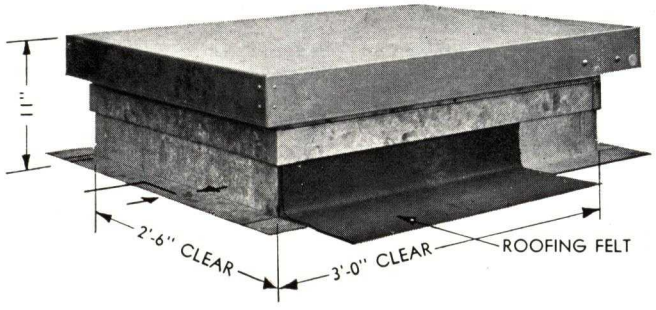
Our Engineering Department is always ready to furnish layouts, preliminary estimates and specifications where any of our equipment is to be used. It is imperative that we be advised of a project in its early stages so that the proper clearance, framing and surrounding Architectural Details may be studied and designed before construction is started to insure complete and satisfactory installations.

Specialists in Motor Operating Blackboards, Lightproof Curtains, Doors, Windows, Walls, Ceilings, Floors, Roofs, Stages, Curtains, Platforms, Gates, Drawbridges, Bleachers, and any other movable parts or structures.

For Motor Operated Door Drives, Flagpoles, Motor Operated Curtains, see File Index.

B-D EASY ACCESS ROOF HATCHWAY OR SCUTTLE

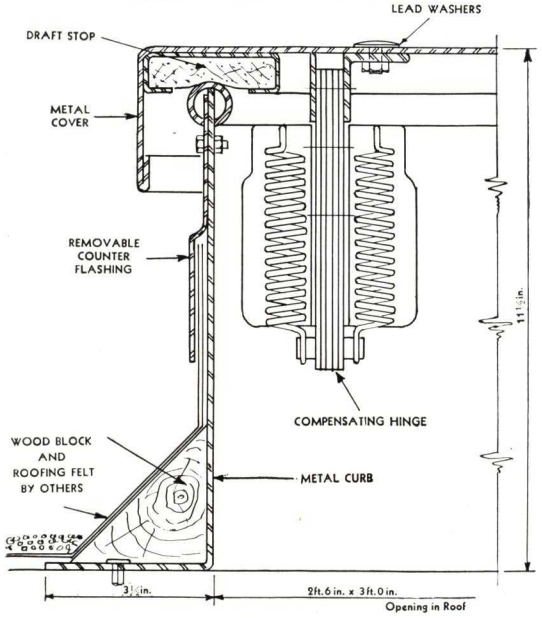




B-D Easy Access Roof Hatchway Covers and Curbs are specified by architects because they answer all requirements for a perfect scuttle. Cover is of aluminum and swings on special compensating hinges which allow it to be raised with practically no exertion on the part of users. When closed, they exert pressure on the draft seal which prevents wind from entering hatch and it can be locked in closed position. Hatch curb is made of galvanized Armco iron, aluminum or bronze. Sides have removable counterflashing strip ready to take either copper flashing or roofing paper, and covers are weatherstripped on all four sides. This weatherstripping has the added advantage of preventing any possibility of galvanic action taking place.

Installation of curb is accomplished by nailing or bolting to roof. Opening made in roof is 2 ft. 6 in. x 3 ft.

Detail of Cover and Curb



Specifications

Furnish and install Standard B-D Easy Access Roof Hatchway on roof opening 2 ft. 6 in. x 3 ft. Cover to be made of aluminum operated with special compensating hinges and equipped with locking bar, hatch curb is to be made of ——, as manufactured by BABCOCK-DAVIS CORPORATION, 474 Dorchester avenue, Boston, Mass.

Prices

The following prices are f.o.b. Boston:

	Price	Weight
Aluminum cover, Armco galvanized iron curb	$ 84.00	134 lbs.
Aluminum cover and curb	111.00	83 lbs.
Aluminum cover, bronze curb	126.00	140 lbs.
Stainless steel cover and curb	157.00	140 lbs.
Armco galvanized iron cover and curb	74.00	155 lbs.

BURT MANUFACTURING COMPANY

Manufacturing Engineers for Roof Ventilation
600 Main Street
AKRON, OHIO

BURT ROOF VENTILATORS FOR EVERY CONDITION

Nation Wide Service

The BURT MANUFACTURING COMPANY has over 75 factory representatives in the principal cities of the United States and Canada. The name and address of your nearest representative will be supplied upon request. He is prepared to assist in solving your ventilation problems—ask him.

Several Types — Good Workmanship

Nearly forty years' experience has definitely proved that no one type of roof ventilator can properly meet all requirements. Accordingly the BURT line consists of several types. Each type is designed and constructed to best meet the work it is to do—using only the best of materials and with workmanship that can be produced only after long experience. Each ventilator is guaranteed against defects in material and workmanship.

Materials

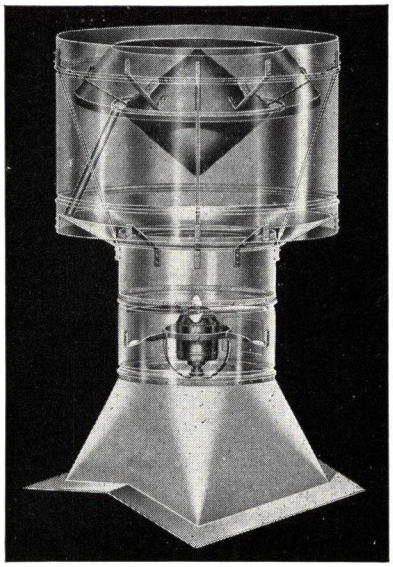
The standard material is high grade, prime open-hearth galvanized steel.

To meet unusual conditions, any Burt ventilator or base may be constructed of any of the following materials.

Copper Bearing Steel	Aluminum
Toncan	Monel
Armco Ingot Iron	Stainless Steel
Cold Rolled Copper	Corten Steel
Lead Coated Copper	Feltcote Asbestos Protected Steel
Zinc	Other Special Metals

See page 4 for description of Felt-Cote, Asbestos Protected Steel, a special surface protected metal, which is recommended for many special uses.

BURT FREE-FLOW FAN VENTILATOR



Efficient Ventilation

The BURT Free Flow Fan Ventilator is completely new-engineered from Burt's experience as originators of the Direct Connected Fan Ventilator. Designed to move the largest possible quantity of air with a given reasonable horsepower input and to serve also as an efficient gravity ventilator when the motor is not in operation.

Features

(1) Free-Flow Head allows unrestricted passage of air with extremely low internal static loss.
(2) Entire discharge vertically upward, away from roof.
(3) Highly efficient as a gravity ventilator.
(4) Motor mountings rigid yet provide for vibration damping.
(5) Fan Barrels in larger sizes equipped with angle rings and stiffners to assure proper alignment.
(6) Fan Wheels especially designed so that constant air delivery is secured with a given horsepower motor in 60 cycle, 25 cycle and D. C. speeds.
(7) Motors totally enclosed, fan duty, ball bearing type rated at 55° C. temperature rise.
(8) Motors available for nearly any power supply in Single Speed; Class 1, Group D Explosion Resisting and Multi-speed types.

Complete Details in Bulletin SPV-10

Dampers

Can be equipped with either Divided Butterfly or Louvre Dampers.

NOTE: There is also available the BURT Standard Fan Ventilator, using the same Fan Barrel and Base as the Free-Flow, but equipped with the Standard Head. Its air deliveries are considerably lower as also is its price. *Complete details are given in Bulletin SPV-11.*

PERFORMANCE AND DIMENSION DATA

Vent Size—Inches**	12	18	24	36	48	60	72	84	96
Fan Diam.—Inches	10.5	16.5	22.5	34.5	46	58	69	81	93
Motor H. P.	1/10	1/8	1/6	1/2	3/4	1.5	3	5	7.5
Motor RPM — 60 Cy and DC	1725	1140	1140	850	675	388	337	282	246
Motor RPM — 25 Cycle	1425	1425	1425	710	710	389	332	285	251
Free Air Delivery—CFM 60 CY, 25 CY and DC	1220	3080	5280	10400	17400	26000	42100	70000	105000
Overall Diam.—Inches	22	32½	43½	64½	85½	108	130	150	171
Overall Height—Inches*	45	62	70	93	111	143	167	183	206
Net Weight—lbs.*	72	127	205	501	884	1741	2649	3729	4880
Shipping Weight—lbs.*	167	259	391	867	1358	2559	3709	4900	6329

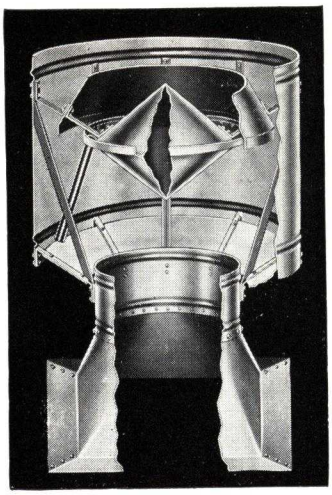
*Including Square to Round Base

**Also made in intermediate sizes: 14, 16, 20, 30, 42, 54, 66 inch

BURT "FREE FLOW" GRAVITY VENTILATOR

Efficient Ventilation

The BURT "Free-Flow Gravity Ventilator is the simplest, most trouble-free type of roof ventilator. It meets the requirement of reasonable price with a ventilator best described as having a "super-capacity".



"Free-Flow" Gravity Ventilator

Features

(1) Upward vertical discharge—(a) Eliminates abrupt changes in direction of air within ventilator head which cause loss of energy and consequently reduction of velocity and discharge. (b) Eliminates condensation of moisture on roof directly below ventilator which deteriorates roofing material.

(2) A constantly increasing free discharge area within the ventilator head assures the unrestricted passage of air and more than compensates for what very slight air direction change is present.

(3) The upper airflow baffle, located between the top and windband renders the unit stormproof and effectively prevents any back-drafts, without in any way retarding the air flow.

(4) The lower airflow baffle causes upward flowing wind currents to rise through the ventilator head adjacent to the windband, thereby increasing the syphonage action. Sufficient drain opening is provided between air shaft, and baffle to allow the free passage of all rain, snow or trash.

(5) The airflow director cone eliminates the trap caused by the conventional ventilator top, prevents turbulence in the head, and provides an easy egress for the outflowing air with slight change of direction.

(6) The unusually large windband creates a lower pressure area than is present in most other stationary ventilators, and creates a suction effect which increases the capacity of the unit.

Complete Details in Bulletin SPV-7

Dampers

Accommodates dampers of the Single Disc or Divided Butterfly and the Louvre Type. See page 4 for description of these dampers.

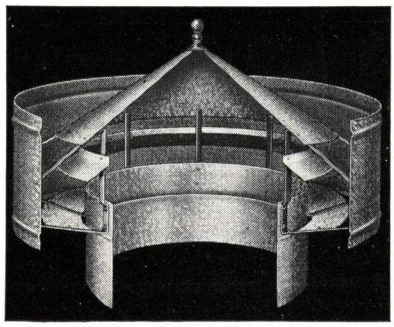
Size, inches	8	10	12	14	16	18	20	24	30	36	42	48	54	60	66	72	84	96
Ga. galv.....	24	24	24	24	24	22	22	23	20	20	20–18	20–18	20–18	18–16	18–16	18–16	18–16	18–16
Oz. copper.....	16	16	16	16	16	18	18	18	20	20	20	24	28	28–30	28–30	32–36	32–36	32–36
Net wt., lbs.....	13	17	25	31	38	50	63	97	153	237	352	460	582	902	1113	1352	1766	2284
Over-all diam., in.	14½	18	22	25½	28½	32½	36	43½	54	64½	75	85½	96½	108	119	130	150	171
Over-all ht., in.*..	16½	18½	25	27	30	36	39	43	51	59	68	75	86	94	102	110	125	141
Cap. c.f.m.**.....	296	464	669	911	1192	1504	1844	2619	4036	5688	7591	9763	11996	14373	17035	19590	24820	29750

*Exclusive of base. **Temperature difference 20° F., stack height, 40 ft., wind velocity 10 m.p.h. Where two gauges are shown, heavier is for air shaft only.

BURT STANDARD GRAVITY VENTILATOR

Efficient Ventilation

The BURT Standard Gravity Ventilator is a moderately priced unit built to the BURT quality standards and with a capacity which, while not quite as high as the "Free-Flow", is still higher than would normally be expected.



Standard Gravity Ventilator

Features

(1) Protected free outlet area in excess of 150% of the air shaft area assures an unrestricted passage through the ventilator head.

(2) The exclusive Burt Inverted Lower Louvre efficiently directs any upward flowing air currents through the ventilator head, thereby increasing its siphonage action and preventing back-drafts.

(3) The generous overhang of the ventilator top assures stormproofness.

(4) An amply proportioned windband assures a large suction area and consequently excellent air moving capacities.

(5) Internal bracing is more than sufficient to render the unit entirely rigid under any possible condition of wind or snow loading. Braces in galvanized ventilators are made from galvanized band iron.

(6) Copper construction is copper **throughout**—using solid copper busbar braces and rivets. All exposed row edges are well hemmed.

(7) Aluminum construction is likewise entirely from aluminum—sheets, braces and rivets.

(8) When construction employs asbestos protected steel, all cut edges are taped and hot rolled in an especially developed compound. Braces are also compound treated. All bolt and rivet heads, upon completion, are coated with a special asbestos paint.

Complete Details in Bulletin SPV-8

Dampers

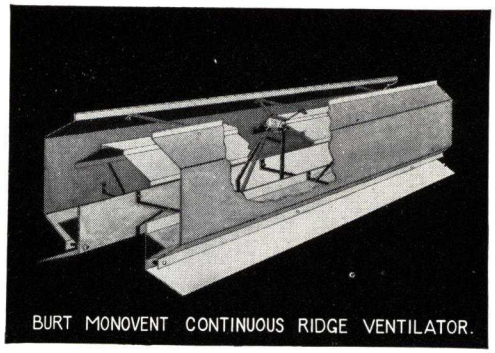
The Standard Gravity Ventilator accommodates four types of dampers. When equipped with a Sliding Cone Damper and fusible link it becomes a fire-retarding unit, approved by the Underwriters' Laboratories, Inc. The Sliding Sleeve offers an automatic opening damper. Butterfly and Round Louvre Dampers are also furnished. See page 4 for description of these dampers.

Size, inches	8	10	12	14	16	18	20	24	30	36	42	48	54	60	66	72	84	96
Ga. galv.....	24	24	24	24	24	22	22	23	20	20	20	20	20	18	18	18–16	18–16	18–16
Oz. copper.....	16	16	16	16	16	18	18	18	20	20	20	20	24	24	24	32–34	32–34	32–34
Net wt., lbs.....	7	9	12	15	18	23	28	39	69	97	148	205	263	388	464	610	837	1053
Over-all diam., in..	14½	16½	20½	23½	26	30½	31½	38	47	57	66½	76	85	95	105	114	133	152
Over-all ht., in.*..	12	14½	18½	19½	21	25½	26	31	36½	40	47	55	57½	65	68½	75	85	99
Cap., c.f.m.**.....	207	323	465	625	821	1035	1260	1800	2760	3860	5125	6466	7831	9297	10880	12540	16390	20820

*Exclusive of base. **Temperature difference 20° F., stack height, 40 ft., wind velocity 10 m.p.h. Where two gauges are shown, heavier is for air shaft only.

BURT MANUFACTURING COMPANY

BURT MONOVENT CONTINUOUS RIDGE VENTILATOR



BURT MONOVENT CONTINUOUS RIDGE VENTILATOR.

Efficient Ventilation

Knowing that a great part of the time a wind will be blowing across the ridge, the Monovent Continuous Ridge Ventilator has been designed so that the windband and inner baffles will take advantage of the wind effect. As the tables are based only on stack action, however, the ratings are exceedingly conservative.

Suitable for All Types of Construction

Designed primarily for ridge installation, its simple construction is adaptable to a roof of any pitch. It can also be applied to slopes, decks and to built-up curbs with the same ease and speed of installation.

Vent size, inches*		3	4	6	9	12	18	24
Ga. galv. / Oz. Copper		24 / 16	24 / 16	24 / 16	24 / 16	22 / 18	20 / 18	18 / 20
Dimensions, inches	A	3	4	6	9	12	18	24
	B	6¾	8¾	13¼	19½	26	36¾	46½
	C	4⅛	5½	7½	10	12	18½	23¼
	D	6½	8¾	12¼	16¼	21	30⅛	36½
Net wt., lbs. per 10 ft.	Galv.	48	60	91	124	188	330	497
	Copper	44	54	83	103	160	249	328
Ship'g. wt., lbs. per 10 ft.	Galv.	92	106	142	195	280	440	631
	Copper	88	100	134	174	252	359	462
Temp. diff., deg. F.	Stack ht. feet	Capacity per 10-ft. section, c.f.m.						
10	10	362	478	725	1090	1450	2180	2900
	20	513	677	1025	1538	2050	3075	4100
	30	628	828	1250	1880	2510	3760	5020
	40	725	957	1450	2170	2900	4350	5800
	50	813	1080	1625	2440	3250	4880	6500
20	10	513	677	1025	1538	2050	3075	4100
	20	725	957	1450	2170	2900	4350	5800
	30	888	1172	1775	2660	3550	5320	7100
	40	1025	1360	2050	3070	4100	6140	8200
	50	1150	1530	2300	3430	4580	6860	9160
30	10	628	828	1250	1880	2510	3760	5020
	20	888	1172	1775	2660	3550	5320	7100
	30	1090	1436	2180	3260	4350	6520	8700
	40	1250	1657	2510	3760	5020	7530	10040
	50	1400	1855	2800	4210	5620	8420	11240
40	10	725	957	1450	2170	2900	4350	5800
	20	1025	1360	2030	3070	4100	6140	8200
	30	1250	1657	2510	3760	5020	7530	10040
	40	1450	1914	2900	4350	5800	8700	11600
	50	1620	2140	3240	4860	6480	9720	12960

*Built in larger sizes on special order. Data supplied on request.

Features

(1) Harmonizes architecturally with the building design.

(2) Avoids the broken roof line of the unit type ventilator.

(3) Provides a large protected outlet area and offers the least possible restriction to the natural flow of air through it.

(4) No pockets or traps to cause air turbulence and restrict capacity.

(5) Constructed in 10-ft. sections; each section is absolutely uniform, avoiding the necessity of identifying marks for erection purposes.

(6) The ends of sections are so constructed that sections fit together uniformly without alteration in the field. End fittings are universal and fit either end of section without any drilling.

(7) Engineers have endorsed Monovent design as efficient, strong and practical. Architects have accepted and approved the Monovent from the standpoint of appearance and its adaptability.

Complete Details in Bulletin SPV-6

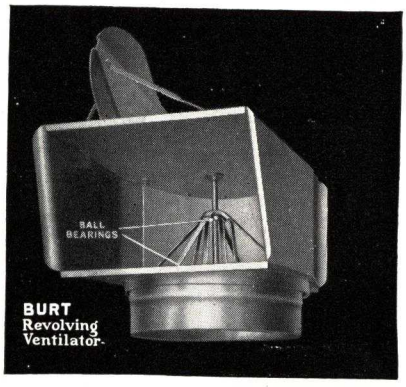
Dampers

The Monovent is equipped with a simple, troubleproof damper. The operating sections are separated by damper junction baffles which are installed quickly and easily without any changes in the ventilator construction.

Damper connecting bars are uniform in length in each 10-ft. section causing no erection difficulties due to mixing sections.

When an operating damper is not required, the damper is riveted in the full open position, becoming a fixed top.

BURT BALL BEARING REVOLVING VENTILATOR



Efficient Ventilation

The BURT Ball Bearing Revolving Ventilator is a reasonably priced unit in which normal stack action is greatly supplemented by wind action resulting in exceptionally high air movement capacity.

Features

(1) Finely balanced thus eliminating friction.
(2) Equipped with two sets of ball bearings (or two sets of Timken roller bearings) which gives positive assurance of free turning.
(3) A patented open back acts as a stabilizer in eddying winds.
(4) Has a large top overhang to assure stormproofness even in driving gales.
(5) The large outlet opening provides an unrestricted air passage.
(6) Strong head support tube and braces are sufficient to withstand great wind pressures.

Complete Details in Bulletin SPV-9.

Size, inches	8	10	12	14	16	18	20	24	30	36	48	60
Ga. galv.	22	22	22	22	22	20	20	20	18	18	18	16
Oz. copper	16	16	16	16	16	18	18	18	20	24	24	28
Net wt., lbs.	7	8	24	34	46	51	60	81	132	178	387	642
Over-all lgth., in....	18¼	23½	28¼	30¾	35	40½	43¼	49½	56½	61½	89	110
Over-all ht., in.	20	25	30½	34½	35	36	38½	44	54	52¼	74¼	90½
Cap., c.f.m.*	242	372	546	735	965	1207	1465	2071	3116	4218	6603	8797

*Temperature difference 20° F. Stack height 40 ft. Wind velocity, 10 m.p.h.

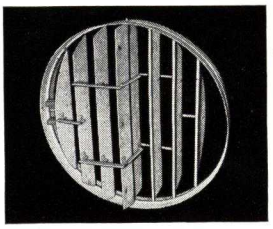
Dampers

Two types are available; the Butterfly and Louvre. Either is installed in the ventilator air shaft below the head supporting members, assuring full operation of damper control cables.

BURT VENTILATOR DAMPERS AND DAMPER CONTROL

Louvre Dampers

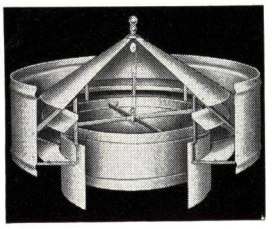
Louvre dampers provide the finest possible control of air flow. They offer but small air resistance and in partially open position create but little turbulence. Their compactness allows their use in any type of BURT ventilator. Can be controlled by hand chain, roof quadrant or by damper motor.



Louvre Damper

Sleeve Dampers

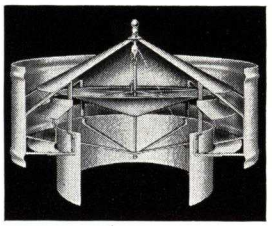
Sliding sleeve dampers are close fitting, occupy almost no space in the air shaft and cause no turbulence in any position. Furnished on Standard Gravity Ventilators only. Operates by hand chain which can be equipped with a fusible link.



Sleeve Damper

Sliding Cone Dampers

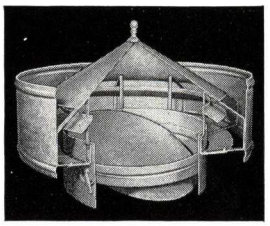
This type damper directs the air stream to the outlet openings, lessening turbulence and increases capacity. Controlled by hand chain only and can be used on Standard Fan and Standard Gravity Ventilators. When used with a fusible link, it is approved by the Underwriters' Laboratories, Inc.



Sliding Cone Damper

Single Disc Dampers

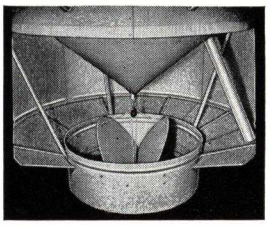
A simple type damper consisting of centrally pivoted disc for Standard and Free-Flow Gravity Ventilators up to sizes as large as it is possible to swing them. Normally operated by hand but can be controlled by damper motor. Can be furnished in asbestos protected steel.



Single Disc Butterfly Damper

Divided Butterfly Dampers

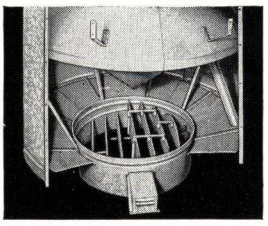
These are used in sizes which prevent the use of the single disc due to interference in the ventilator head or base. Both wings are operated by a single hand chain. Can be furnished in asbestos protected steel.



Divided Butterfly Damper

Damper Control Motors

May be either of the electric or compressed air type. Are housed in a ventilated but weathertight housing outside the ventilator air shaft. When used with fan ventilators, the control can be interconnected with the fan motor.



Damper Control Motor

Complete Details of all Dampers in Bulletin SPV-14

BURT VENTILATOR BASES

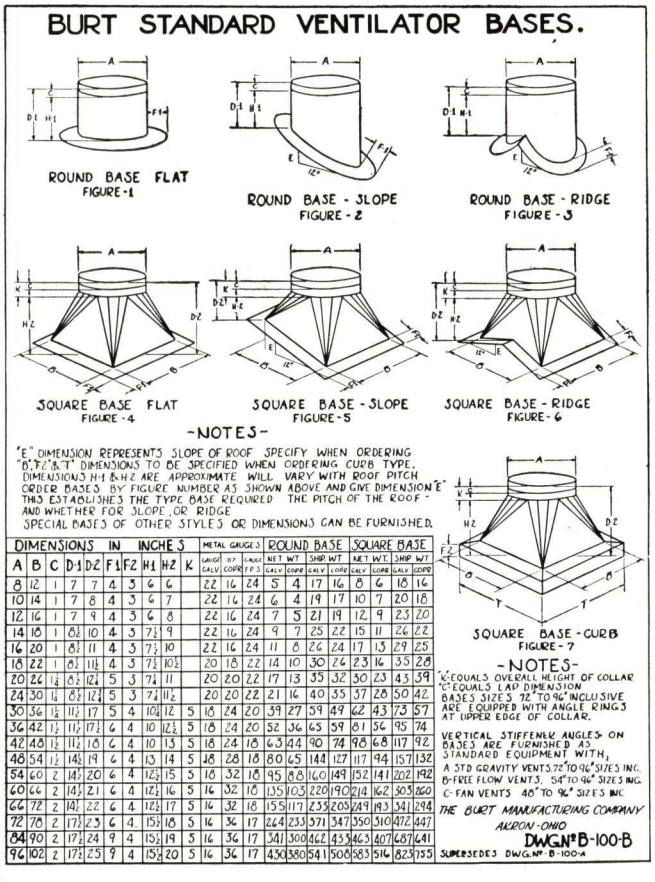
Heavy Gauge Metal—All Burt Ventilator Bases are substantially made using a thickness of metal sufficient not only to carry the weight of the ventilator but to also withstand severe strains due to wind and snow loads.

Condensate Gutter—A condensate gutter placed around the perimeter is available when specified. These drain to the roof outside the ventilator all moisture which may condense in the ventilator head or air shaft.

Roof Flange—The mounting roof flange is made sufficiently wide to insure rigid mounting and a weathertight joint.

Special Bases—The sketches show only standard type base but high quality can be built into bases to any specifications and dimensions for any size or shape of roof.

Complete Details of all Bases in Bulletin SPV-15



DIMENSIONS IN INCHES										METAL GAUGES		ROUND BASE			SQUARE BASE		
A	B	C	D-1	D-2	F-1	F-2	H-1	H-2	K	GAUGE OF GALV	GAUGE OF COPPER	NET WT GALV	NET WT COPPER	SHIP WT GALV	NET WT GALV	NET WT COPPER	SHIP WT GALV	SHIP WT COPPER
8	12	1	7	7	4	3	6	6		22	16	24	5	4	17	16	6	18	16
10	14	1	7	8	4	3	6	7		22	16	24	6	4	19	17	10	7	20	18
12	16	1	7	9	4	3	6	8		22	16	24	7	5	21	19	12	9	23	20
14	18	1	8½	10	4	3	7½	9		22	16	24	9	7	25	22	15	11	26	22
16	20	1	8½	11	4	3	7½	10		22	16	24	11	8	26	24	17	13	29	25
18	22	1	8½	11½	4	3	7½	10½		20	18	22	14	10	30	24	23	16	35	28
20	24	1¼	8½	12¼	5	3	7¼	11		20	20	22	17	13	35	32	30	23	43	39
24	30	1¼	8½	12¼	5	3	7¼	11½		20	20	22	21	16	40	35	37	28	50	42
30	36	1¼	11½	17	5	4	10¼	12	5	18	24	20	39	27	59	49	62	43	73	57
36	42	1½	11½	17½	6	4	10	12½	5	18	24	20	52	36	65	59	81	56	95	74
42	48	1½	11½	18	6	4	10	13	5	18	24	18	63	44	90	74	98	68	117	92
48	54	1½	14½	19	6	4	13	14	5	18	28	18	80	65	144	127	117	94	157	132
54	60	2	14½	20	6	4	12½	15	5	18	32	18	95	88	160	149	152	141	202	192
60	66	2	14½	21	6	4	12½	16	5	14	32	18	135	103	220	190	214	162	303	260
66	72	2	14½	22	6	4	12½	17	5	14	32	18	155	117	235	205	249	193	341	294
72	78	2	17½	23	6	4	15½	18	5	14	36	17	264	233	371	347	350	310	472	447
84	90	2	17½	24	9	4	15½	19	5	16	36	17	341	300	462	453	463	407	687	641
96	102	2	17½	25	9	4	15½	20	5	16	36	17	450	380	541	508	583	514	823	755

BURT VENTILATORS AND BASES OF FELT-COTE

Felt-Cote Asbestos Protected Steel is constructed of steel sheets to which long fibered asbestos felt has been applied by use of hot asphalt. The felt is then weatherproofed by a special compound applied at the factory and a final outside coat of bituminous fibrated composition.

Felt-Cote ventilators and bases are especially recommended in all cases where severe corrosive conditions are present.

Where this material is used great precaution is taken during manufacture to see that all edges are sealed so that there is no exposed metal. Seams, rivet and bolt heads are thoroughly compounded after fabrication.

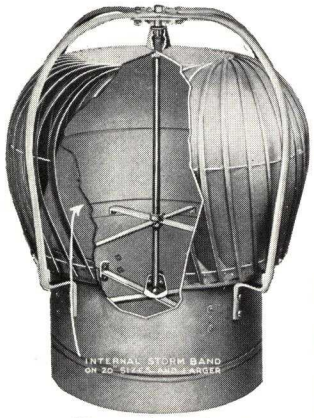
CENTURY FAN & VENTILATOR COMPANY

Manufacturers of Roof Ventilators

FACTORY
Cedar and Stone Streets
STAMFORD, CONN.

WAREHOUSE AND SALES OFFICE
312 East 39th Street
NEW YORK, N. Y.

HIGH GRADE GRAVITY AND POWER VENTILATORS AT LOW COST



(Patent Applied for)

Century Turbine Rotary Ball Bearing Ventilator

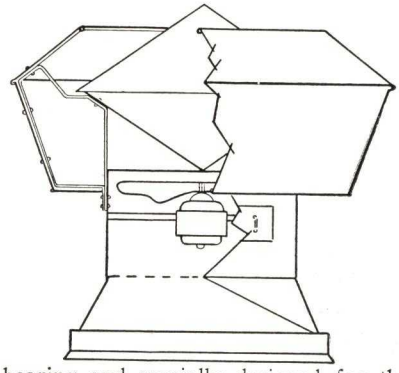
The Century Turbine Rotary Ball Bearing Ventilator is the most constant exhauster for general purposes as it rotates with a one-mile wind and exhausts air while other types are idle. The bearings are designed for high speed, silent rotation.

The Century Turbine is symmetrical in design and low in height. It is usually specified for schools and similar buildings because of its very pleasing appearance. Twenty-inch sizes and larger are equipped with internal baffle or storm band for absolute weatherproofness.

DATA—CENTURY TURBINE ROTARY VENTILATOR

Neck diam., in.	Over-all, in.		Gauge, galvanized painted	Oz. copper	Exhaust cap. 5-mile wind 20° temp. diff. c.f.m.
	Width	Height			
12	20	17	28 and 22	16 and 20	650
18	28	23	28 and 22	16 and 20	1450
24	38	32	28 and 22	16 and 24	2150
30	48	38	24 and 20	16 and 24	3400
36	54	42	24 and 20	18 and 24	4250
42	60	51	24 and 20	18 and 24	4900
48	66	58	24 and 20	18 and 24	5500

Made in all sizes from 6 to 60-in. diameter.



Century Fan Ventilator

A combination power and gravity ventilator. When motor is off it can be used as a plain gravity ventilator. This unit is ideal for industrial buildings and conditions requiring mechanical ventilation, also lodge rooms where a large volume of exhaust is occasionally required. Motors are fully enclosed, ball bearing and specially designed for this application. Equipped with the most efficient type of cast aluminum fan.

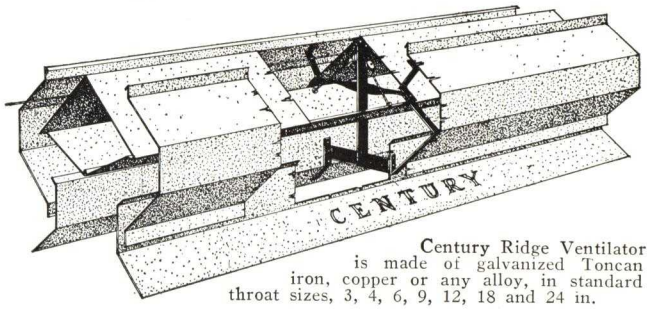
Stack diam., in.	Fan speed, r.p.m.	Hp.	Exhaust capacity c.f.m.			Overall, in.		Height without base	
			⅛ in. s.p.	¼ in. s.p.	⅜ in. s.p.	Width	Height without base	Gauge, galvanized	Oz. copper
12	1750 1160	1/20	800 600	400 200		20	24	24	16
14	1160	1/20	800	500	300	24	18	24	16
18	1750 1160 860	¼ ⅙ 1/20	2900 2000 1300	2000 1400 1000	1150 800 600	29	18	22	18
20	1750 1160 860	¼ ⅙ ⅛	3800 2900 2200	2500 1800 1400	1600 1000 800	36	26	22	20
24	1750 1160 860	¾ ¼ ¼	5200 4100 3300	4000 3000 1800	3200 2000 1200	40	30	22	20
30	1140 860 690	½ ¼ ¼	6200 4200 4000	4500 3700 3400	3000 2600 2400	46	36	22	24
36	860 690	½ ½	7800 6700	6200 5000	5300 3900	54	38	20	24

Century Ridge Ventilator

Made in rigid 10-ft. sections and installed in one continuous length. Ventilation of large areas is efficiently accomplished with the Century Ridge Ventilator as entire ridge of roof can be opened, preventing accumulation of heat and fumes.

The inverted cone eliminates pockets and directs flow of air continuously upward with the least possible resistance. The inverted cone also serves as shut-off damper which completely closes roof opening by releasing damper cable.

Entire unit is designed to prevent snow, dirt or leaves from accumulating in drainage openings. Bird or insect screen furnished when required.



Century Ridge Ventilator is made of galvanized Toncan iron, copper or any alloy, in standard throat sizes, 3, 4, 6, 9, 12, 18 and 24 in.

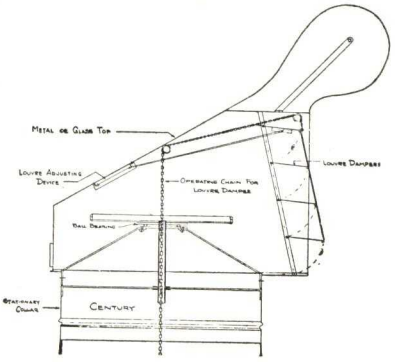
The Century Syphon Stationary Ventilator

This ventilator is of the highest efficiency. Its design utilizes every wind current to create a powerful suction through the stack. It is exceptionally sturdy in construction and will withstand the severest wind pressure. Furnished in any size or alloy metal.

Neck diam., in.	Width, in.	Height, in.	Gauge, galvanized	Oz. copper	Exhaust cap. 5-mile wind 10° temp. diff. c.f.m.
12	20	22	24	16	350
18	28	32	24	18	825
24	38	42	22	20	1200
30	48	50	22	24	1975
36	54	60	20	24	2600

Century Rotary Syphon Ball Bearing Ventilator

Of unusually heavy construction this unit is particularly suited for industrial buildings. The entire stack area is away from the wind at all times and the air is exhausted with the least possible resistance. The Century Rotary Syphon is equipped with the finest precision oversized bearings which last indefinitely and require no attention or relubrication. Equipped with adjustable louvers.



Roof Ventilators and Auxiliary Equipment

Architects Manual JV

W. F. Hirschman Co. Inc.
BUFFALO
N.Y.

HIGH GRADE ROOF VENTILATORS

and Auxiliary Equipment

ELECTRIC VENTILATORS

Effico Wind-Electric
"F" Electric
Isolated Electrics
LeRoy Electric
Hercules Power
Lornate Electric
Modified Hercules
Silent Church

ROTARY VENTILATORS

Effico Rotary Ball-bearing
Effico Skylight base ventilator

LOUVER UNIT VENTILATORS

Effico Louver Unit Rotary
L. U. (Louver Unit) Stationary
LeRoy Louver Units Stationary

STATIONARY VENTILATOR COWLS

Firma
Super Firma
Lornate
S. E. (syphon exhaust)

STANDARDIZED ROOF BASES FOR VENTILATORS

HIRSCHMAN STEEL VENTILATOR CURBS

Style A Double shell
Mineral wool packed
Style B Single shell
Satisfactory for Industrial use and warm climates where condensation is not a problem

AUXILIARY EQUIPMENT

Self closing dampers
Circular Louver dampers
Intake and re-circulating dampers
Self locking dampers
Skylights
Fans

ELECTRIC DAMPER AND MOTOR CONTROL

Over Twelve Types of Controls for the remote control by Thermostat, hydrostat, or by manual switch.

A HIGH STANDARD

The W. F. Hirschman Co., Inc., has an established niche in the ventilator field for unusual high quality. Years of consistent study of the ventilating problems, together with the extensive continuous research enables this company to offer a full line of Roof Ventilators each carefully designed to give satisfactory service. Our auxiliary equipment also shows advanced design.

Each type of Hirschman Ventilator has many merits. Hirschman Co. equipment is developed with the firm conviction that ungainly, clumsy appearing ventilators are not necessary to obtain high exhaust capacity, weather proofness, etc. Thus we offer apparatus of symmetrical lines that radiate high class workmanship.

We are originators of High-Grade "Thru the Roof" ventilating equipment. We do not Imitate!

Design

Our equipment is extensively used for ventilating public and semi-public buildings because appearance is given first consideration in all our designs, thus making our ventilators desirable for buildings of architectural beauty. Our requisites besides high efficiency are: very low height, symmetrical contour, careful layout to permit nice finish, good workmanship, etc.

Access doors of ample size are built in all ventilators containing louver dampers, air or electric motors, fans, etc.

Controls (Our Own Manufacture)

Electric damper and Motor Control—We built and installed the first electric damper control ever put in a ventilator, likewise the first combined damper and fan motor control. Our line of controls are unequalled.

Materials

Only the highest grade materials are used. Iron sheets, both black and galvanized and reinforcing members are made of specially selected alloy for our requirements, for rust resisting and for forming. All rivets have burrs under the burred end of the rivets. This applies to iron, copper or other metal. Iron members are rust proofed by sand blasting and specially prepared rust proofing finish.

Exhaust Capacity

We give careful consideration in design to obtain high exhaust capacity at very low wind and moderate increase during very high winds, a requisite very valuable for cold climates as a fuel saver.

Wind Direction

There is no front or back to any Hirschman ventilator, the wind always helping, never interfering.

W. F. HIRSCHMAN CO., INC.
BUFFALO . . . NEW YORK
Works—LE ROY . . . NEW YORK

BRANCH OFFICES
New York City, 202 East 44th Street Boston, Mass., 143 Federal Street

EFFICO WIND-ELECTRIC VENTILATOR

Rotary Ball-Bearing—Fully Automatic

Exhausts, Wind or No Wind

When the wind is blowing sufficiently to drive the wind turbine, and remove the desired amount of air from the building being ventilated, the electric motor in ventilator is still. Instantly, when the wind turbine moves below previously determined revolutions, the electric fan carries the load, starting automatically and runs until the wind again drives the wind turbine.

The *electric motor is cut off and on automatically.*

Static Pressure—Motor and fan can be supplied to pull against 1/8-in. static resistance by the employment of motor only, or motor and wind turbine. This will have no deteriorating effect on using apparatus for regular ventilating purposes.

Many Valuable Features

This ventilator has every feature possessed by the Effico Wind-Driven Head, and the Effico Internal Louver Unit Ventilator, *also* possessing the added wonderful requisite of exhausting a given volume of air continuously. (*Wind or no wind.*)

Master Ventilator (Hirschman Method)

An installation need only comprise one Automatic Ventilator. The other ventilators may all be controlled by this Master Ventilator. Fresh air, and recirculating dampers, supply fans, etc., can be controlled automatically by this Master Ventilator, and is adjustable to other capacities after installation.

Self-contained Unit Construction

The Effico Wind-Electric Ventilator comprises the wind turbine, electric motor, fan, and roof base forming a complete exhaust unit.

Selecting A Ventilator

When in need of a ventilating apparatus it is best to choose one that does not depend upon mechanical exhausting only, for a good roof ventilator is acknowledged to be superior to an arrangement that closes entirely unless the motor is running.

Dampers

Effico Wind-Electric Ventilators are supplied with tight fitting, carefully balanced dampers. The larger sizes are furnished with Effico Multiple Circular Louver Dampers. *See page* 4.

All dampers are operated by chain, electrically, by Hirschman electric damper control or by air diaphragm motor in connection with thermostatic controlled heating and ventilating systems.

Hirschman electric damper control may be installed in the ventilator, coordinating damper and fan motor, if desired, *see page* 10.

Specifications *See page* 11 *for specifications of Wind-Electric and Wind Electric Master Control.*

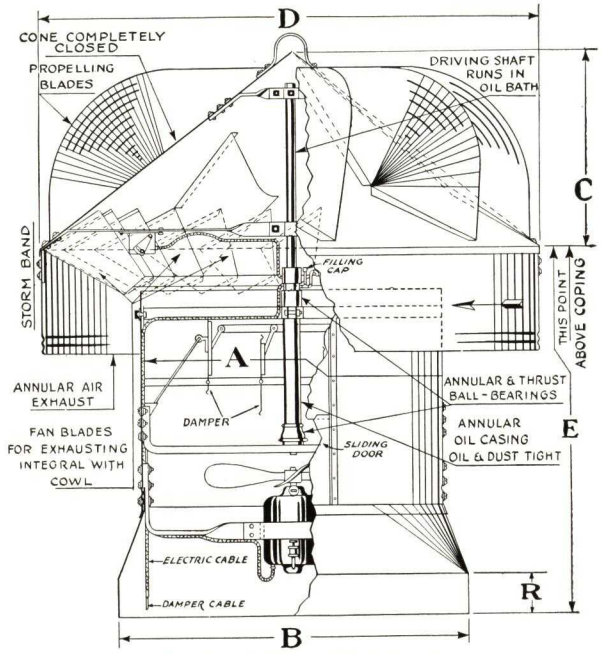
Painting All Galvanized Effico Wind-Electric Ventilators are finished in Gray Enamel or other color if desired.

Isolated Ventilator The motor in this ventilator may be had in the isolated motor drum section as shown on page 7.

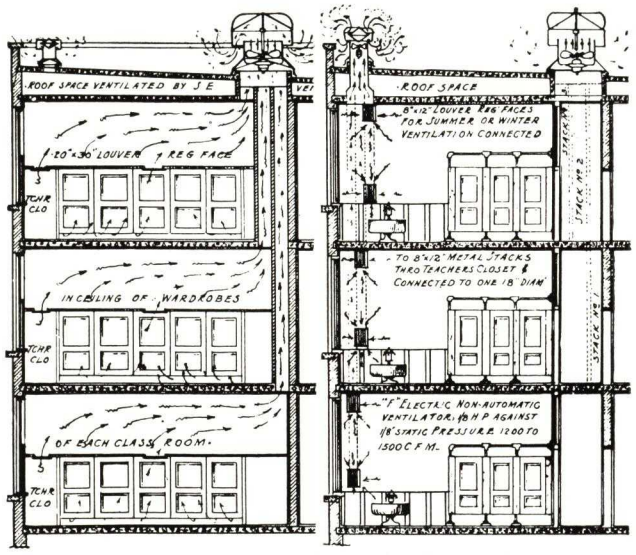
DIMENSIONS AND CAPACITIES OF EFFICO WIND-ELECTRIC VENTILATORS

Nomina ventilator size in inches	Dimensions in inches (see diagram) A-Actual size of ventilator	B—Base	C—Height of blades	D—Dia. of storm band	E—Height to blades	Thickness of metal Gage G. I. Cowl	Base	Oz. copper Cowl	Base	Motor H.P.	Cubic feet of air exhausted per minute at 0-5 miles per hour wind velocity. Temperature difference in degree. Fahr. between air in building and outside air 0°-10°	10°-20°	20°-30°
12	14	20	8	21¾	32	24	22	14	16		440	515	560
18	19	26	10	28½	32	24	22	16	18	1/30	850	950	1040
24	25	38	14	40	35	24	20	16	18		1600	1780	1900
30	31	40	14	50	37	24	20	18	20		2300	2690	2900
36	37	44	18	60	40	22	18	18	24	1/6	3400	3810	4100
42	43	50	22	68	46	22	18	20	24		4500	5010	5500
48	49	56	24	76	46	22	18	20	24	¼	5900	6700	7400
54	55	62	24	86	46	22	18	24	24		7300	8450	9500
60	60	66	24	98	50	22	18	24	24	½	9300	10600	11900
72	72	80	30	114	50	20	16	24	24		13500	14600	16000
84	84	92	40	130	50	20	16	24	32		18000	21000	23000
96	96	116	45	153	50	20	16	24	32	1	22500	27000	29000

R dimension—5 in. on all sizes. C dimension should be above coping.
For Wind Driven Rotaries, see two pages following.

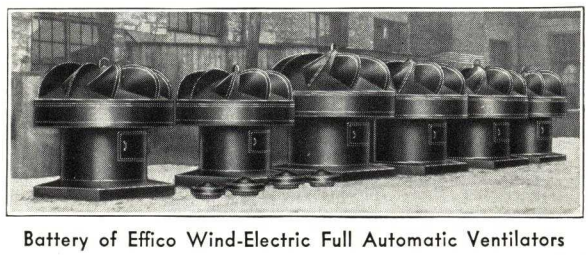


Details of Effiico Wind-Electric Rotary Ball-Bearing Ventilator, Patented



Sections Showing Typical Arrangement

Effico Wind-Electric Ventilators exhausting from classrooms, F electric ventilators exhausting from toilet rooms and S-E Ventilators exhausting from attic spaces.



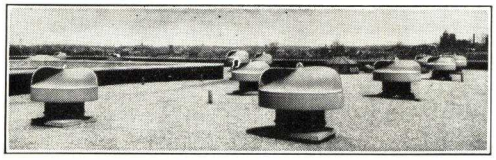
Battery of Effico Wind-Electric Full Automatic Ventilators

This battery of three 48-in., two 42-in., and one 36-in. Effico Wind-Electric Full Automatic Ventilators was photographed before installing. Note size by contrast with the background. They have a combined exhausting capacity of 31,500 c. f. m., regardless of wind velocity or temperature difference and can be adjusted to a 25% increase if necessary. Combined motors have only 2 hp. consumption. Now installed in a Massachusetts school.

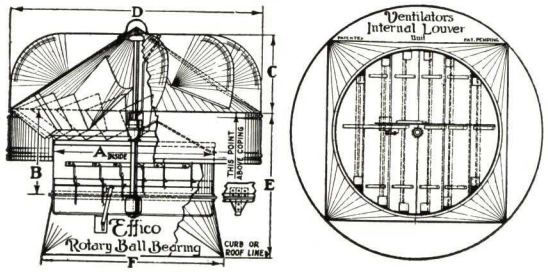
W. F. Hirschman Co. Inc. Buffalo, N.Y.

EFFICO INTERNAL LOUVER UNIT VENTILATOR

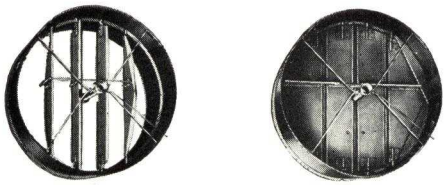
Containing Circular Louver Damper, For Thermostatic Control



Typical Effico Louver Unit Installation



Effico Internal Louver Unit Ventilator Patented



Open Closed

Multiple Circular Louver Damper in Neck of Ventilator

EFFICO INTERNAL LOUVER UNIT VENTILATOR DIMENSIONS AND CAPACITIES

Guaranteed and Conservative

Dimensions in inches						Ga. Gal.		Net weight lb.	Oz. Cop. per		Cubic feet of air exhausted per minute 5 MPH. Wind velocity				
											Temperature difference in degrees Fahr. in building and outside				
A	B	C	D	E	F	Cowl	Neck & base		Cowl	Neck & base	0	10	20	30	Telegraph Code Gal. Toncan Vents
12	11	8	21¾	23	. . .	24	24	. . . .	14	14	350	440	515	560	Veil
18	11½	10	28½	23	22	24	24	90	16	18	600	850	950	1040	Vale
24	16	14	40	26	30	24	22	140	18	20	1020	1600	1780	1900	Valet
30	22	14	50	28	36	24	20	190	20	20	1560	2300	2690	2900	Vive
36	24	18	60	30	42	22	18	225	24	24	2300	3400	3810	4100	Varve
42	33	22	68	38	48	22	18	350	24	24	3150	4500	5010	5500	Vetch
48	34	24	76	38	54	22	18	400	24	24	4000	5900	6700	7400	Vax
54	35	24	86	38	60	22	18	600	24	24	5100	7300	8450	9500	Vaid
60	37	24	98	38	66	20	18	710	24	24	6500	9300	10600	11900	Valor
66	43	30	103½	44	72	20	18	800	24	24	8100	11200	12250	13400	Vamp
72	50	30	114	48	80	20	18	880	24	32	9800	13500	14600	16000	Vane
84	54	40	130	48	92	18	16	1050	24	32	12500	18000	21000	23000	Vang

For round bases, "E" dimension remains the same. Dimensions "C" should be above coping.

The Effico Internal Louver Unit

This comprises the Effico Rotary Ball Bearing Ventilator head constructed with a special short base, and neck. In the base is built a circular multiple blade Louver damper. The damper is carefully balanced and heavily constructed of stretcher leveled sheets. The blades lap and are fitted in a circular frame. It is adaptable for manual control, but is intended for a thermostatic control-system. The roof base is very low and is a part of the Unit. It is supplied in either the square or round type.

Damper Control

Hirschman Electric Damper Control or air diaphragm motor can be installed by us before shipment.

Each ventilator neck has also a tight fitting door to give free access to the Louvers and to the operating motor. The object of the specially low base and the low roof base is to make the entire Unit as low on the roof as possible.

Low Height Construction

The Effico Rotary Ball Bearing Ventilator head is already lower in height by 50% than any other rotary type of ventilator. By using the construction as outlined above, the entire Unit is brought as low to the roof as is permissable to still allow the air free exhausting, and to maintain the outlets above the snowline. By adopting the circular multiple louvers, of which we are the inventors, we can standardize on sizes and build the round louver for considerably less than the square or rectangular styles.

By installing same in the neck of the ventilator at our shop, we not only give a perfect fit, but also eliminate all indefiniteness as to the correct location and size of the damper and cut the installing cost at least 80%. It is also easier to install the operating motor and makes it more accessible. The size of the damper is the full size of the stack, and yet it is about 40% smaller in area than those heretofore used in the square or rectangular damper, again reducing the cost considerably.

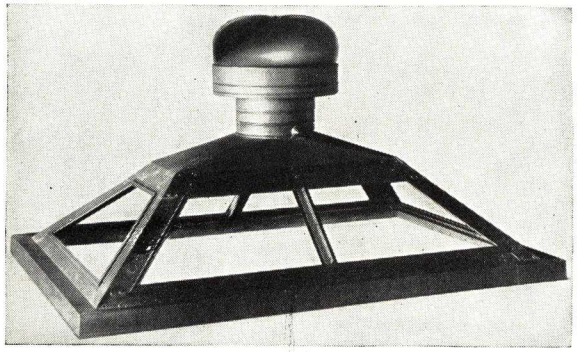
Advantage of a Complete Unit

By supplying the contractor with the complete EFFICO INTERNAL LOUVER UNIT VENTILATOR the builder is assured of a well designed, uniform and complete Unit.

Heretofore, the contractor purchased the ventilator from one manufacturer, probably built the roof base himself, and purchased the dampers elsewhere, or even the dampers were supplied and installed by another contractor. This added materially to the cost.

Specifications on page 11.

EFFICO SKYLIGHT VENTILATOR BASE



Puttyless Construction

The Effico Skylight Ventilator Bases have a glass area which is at least equivalent to their roof area. "Rain in" and "blow in" are entirely eliminated. There is no swinging sash to operate, and the ventilation is perfect, serving the dual purpose of giving real ventilation and allowing daylight into the building, one opening in the roof serving both purposes.

Standard Skylight Curb Dimensions—3x3 ft.; 3x4 ft.; 3x6 ft.; 4x4 ft.; 4x6 ft.; 4x8 ft.; 4x10 ft.; 6x6 ft.; 6x8 ft.; 6x10 ft.; 6x12 ft.

Application—Any Hirschman Company Ventilator can be fitted to our Skylight Base.

Specifications on page 11.

EFFICO ROTARY BALL-BEARING VENTILATOR

Wind Driven — High Capacity in Low Winds

Construction and Principle of Operation

The Effico rotating cowl exterior is covered by wind propelled blades; interior by suction blades. There are no moving parts. Effico shaft rotates on ball bearings, fitted with clock precision in solidly enclosed dust-tight and oil-tight housings, and is flooded in inches of non-freezing oil (furnished by us); no oiling is required for years (proven), but we oil-flood them as an extra precaution. The Effico is absolutely noiseless. No drip pans or bird screens are needed.

Great Air Volume Exhaust at Low Wind

All Efficos will draw considerable air at a 1-mile breeze (an apparent calm) without stack or heat assistance. The 30-in. size will rotate (standing start) at a ½-mile breeze. Cowl outlet is over 50% larger than its stack area, which is ample, as no wind enters ventilator to gain the so-called siphonage effect. Suction fan is same size as rotating cowl (note dimension chart). Thus each Effico is equipped with fan over 50% greater in diameter than its stack area. Fan pulls air up stack at even the slowest turning movement and wind blowing across the outlet adds to its efficiency.

The wind has the same syphonage effect on the Effico as on ventilators depending on spyhonage only.

The combination of the carefully designed fan, perfectly made bearings, and the wind-syphonage principles has resulted in the highly efficient Effico.

During high winds, namely, fifteen miles and over, the Effico remains constant, and will not exhaust unreasonable volumes of air which endangers the equilibrium of the ventilating system.

Percentage of Constancy

With United States Weather Bureau reports as a basis, and their findings that the wind at line of ventilators (over roof) is three miles slower than the tower records, shows the Effico Wind-Driven Head during July and August to be 96% constant in New York City, Philadelphia, Boston, Buffalo, Cleveland, Detroit, Galveston, Kansas City, San Francisco, Chicago, Jacksonville, 90% constant in Columbus, Toronto, Louisville, St. Louis; 80% constant in New Orleans, Milwaukee, Cincinnati and Baltimore.

Symmetry

The Effico has artistic lines and pleasing appearance. Lowest in height of rotary ventilators by over 50% average. Note dimension chart.

Cost

Effico Ventilators exhaust more air per-dollar-cost of installation. The wind (only) driven heads exhaust greater volumes and during lower winds, thus a greater capacity within a given period. Effico Wind-Electrics, of course, are 100% constant. See page 3 of our catalogue.

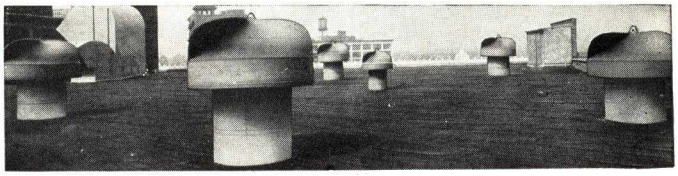
CAPACITIES OF EFFICO ROTARY BALL BEARING VENTILATORS

Guaranteed and Conservative
Cubic Feet of Air Exhausted Per Minute

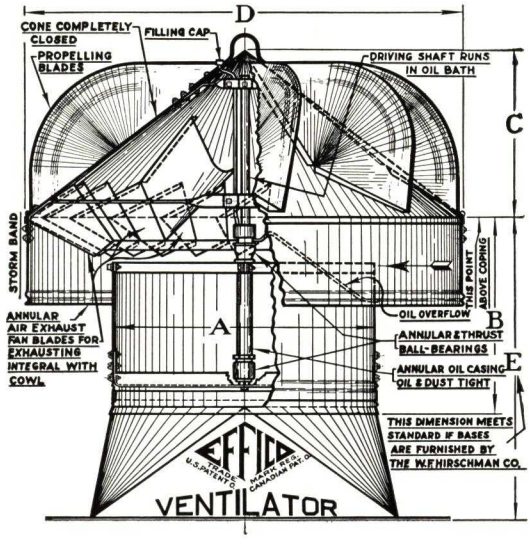
Wind velocity, miles per hour	Temperature difference in degrees Fahrenheit in building and outside											
	0	10	20	30	0	10	20	30	0	10	20	30
	12-in. Ventilator				18-in. Ventilator				24-in. Ventilator			
5	350	440	515	560	600	850	950	1040	1020	1600	1780	1900
10	430	525	600	625	910	1050	1200	1300	1490	1900	2100	2300
	30-in. Ventilator				36-in. Ventilator				42-in. Ventilator			
5	1560	2300	2690	2900	2300	3400	3810	4100	3150	4500	5010	5500
10	2300	3210	3490	3600	3250	4200	4720	5050	4390	5700	6300	6800
	48-in. Ventilator				54-in. Ventilator				60-in. Ventilator			
5	4000	5900	6700	7400	5100	7300	8450	9500	6500	9300	10600	11900
10	5900	7900	8900	9050	7850	9900	11000	11500	9200	12500	14000	14500
	72-in. Ventilator				84-in. Ventilator				96-in. Ventilator			
5	9800	13500	14600	16000	12500	18000	21000	23000	16000	22500	27000	29000
10	13000	17000	19000	20000	18000	24000	27000	28000	22800	30000	33500	35500

ELECTRIC DAMPER CONTROL

Where required, our Hirschman Electric Remote Control Damper device can be supplied with any Hirschman Ventilator. See page 10.



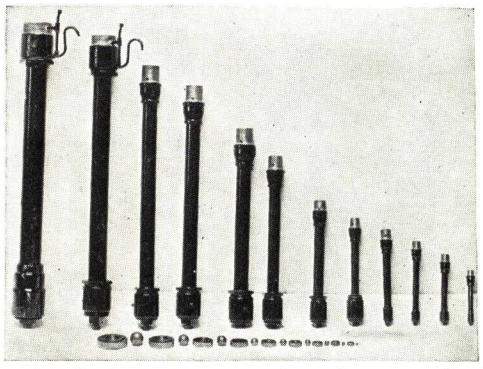
Effico Rotary Ball-Bearing Ventilator Installation



Patented

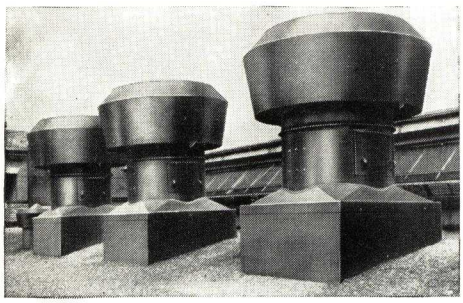
EFFICO STANDARDIZED VENTILATORS

Dimensions in inches					Galvanized Steel Gauge			Copper, oz.		Telegraph code, gal. toncan vents
A	B	C	D	E	Cowl	Neck and Base	Net weight, lb.	Cowl	Neck and Base	
6	9	9	13	....	26	26	10	14	14	scheck
10	9	9	16	....	26	26	18	14	14	sachem
12	11	8	21¾	23	24	24	25	14	14	scene
18	11½	10	28½	24	24	24	38	16	16	saturn
24	16	14	42	26	24	22	95	16	18	shake
30	22	14	52	28	22	20	140	16	20	sank
36	24	18	62	30	22	18	180	18	24	sargeant
42	33	22	68	39	22	18	300	18	24	serpent
48	34	24	74	40	22	18	370	18	24	serve
54	35	24	86	41	22	18	525	20	24	sham
60	37	24	98	43	20	18	650	20	24	shawl
66	43	30	103½	49	20	18	700	20	32	sunk
72	50	30	114	56	20	18	750	20	32	shop
84	54	40	130	60	18	16	900	24	32	slave
96	54	45	153	60	18	16	1025	24	32	shekel



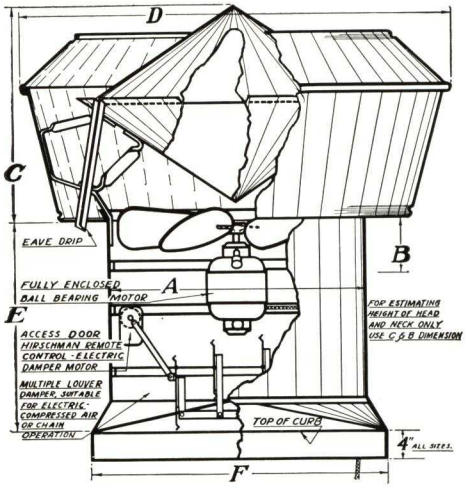
Effico Oil Flooded Dust and Acid Proof Bearing Housings

HIRSCHMAN F (Fan) VENTILATOR NON-AUTOMATIC



Philadelphia Electric Transformer Station.

Three 48" Hirschman "F" Electric Ventilators installed, each exhausting 21,-900 C.F.M. With 2 H.P. Motor Ventilators absolutely dry inside after cloudburst.



F Fan Ventilator (Electric) Showing Electric Damper Control (Patented)

DIMENSIONS OF HIRSCHMAN F VENTILATORS AND GRAVITY CAPACITIES OF F, S-E and L-U VENTILATORS

in inches Dimensions		Thickness of metal				Capacities at 10M.p.h. wind velocity Temperature difference inside and outside		
		Ga. galvan.		Oz. copper				
A	C + E	Head	Base	Head	Base	10°	20°	30°
12	33 1/2	24	24	16	16	360	460	525
18	38	24	24	16	16	717	950	1050
24	48	24	22	16	18	1400	1675	1800
30	52 1/2	22	20	18	20	2200	2600	2800
36	57	22	18	20	24	3160	3700	3900
42	62	20	18	20	24	4300	5000	5300
48	72	18	18	20	24	5390	6500	7000
54	76	18	18	20	24	7200	8300	8800
60	81	18	16	24	24	8000	9200	10000
66	88	18	16	24	32	10600	11500	12100
72	96	18	16	24	32	12700	14000	15000
84	101	18	16	24	32	17400	19000	22000

Recommendation

Where a high class ventilator with a high exhaust velocity against resistance is required, and where the Effico Rotary Head, or the Effico Wind-Electric Automatic Ventilator, due to obstructed locations or moderate even capacity, is not adaptable, then we recommend the F Fan Ventilator.

Adaptable for Public Lavatories, Bakeries, Hotel and Restaurant Dining Rooms and Kitchens, Chemical Laboratories, Industrial Plants, Projection Rooms in theatres and in all places for the exhausting of fumes, dust, gases, excessive heat or steam.

The Motor in this ventilator may be had in the ISOLATED MOTOR DRUM SECTION as shown on page 7.

Design — Appearance — Construction

Sturdy construction, weatherproofness, and appearance are given consideration in the design of this ventilator. For free air or as a pressure blower this is decidedly an apparatus of high merit.

Exhaust Head

The design is such that air driven 1200 ft. velocity through the head, registers only .032-in. water gauge static pressure. Thus for a fan or exhaust head, it is very desirable. When so used and the fan is cut off the ventilator still ventilates as a syphon ventilator. There are no shutters to blow or freeze shut. *Head only* may be purchased for use as outlet for large fan discharge.

Specifications on page 11.

CAPACITIES HIRSCHMAN F ELECTRIC VENTILATORS

Size of stack, in.	Fan speed, r.p.m.	Horse-power	Capacities—c.f.m. static pressure in inches of water				Type of motor	Shipping weight, lbs.	O-quiet X-silent *
			1/8 in. or less	1/4 in.	3/8 in.	1/2 in.			
10	1750	1/50	250				S.D.	100	X
12	1750	1/20	725	400			S.D.	100	O
	1150	1/50	250				S.D.		X
18	1750	1/8	1500	900			S.D.		O
	1100	1/6	1500	900	520	200	S.D.		X
	850	1/20	820				S.T.D.		X
24	1100	1/4	3000	2200	1600	1000	S.D.		O
	1700	1	4800	4200	3800	3000	S.D.	270	—
	1100	1/2	4000	3200	2350	1700	S.D.	225	—
	825	1/4	2600	1500	920		S.T.D.		
30	1080	1/2	5000	4000	2700		S.D.	300	—
	720	1/2	4800	3800	2700	1900	T.		O
	900	1	6700	5600	4100	3100	S.		O
36	1080	2	8500	7600	6600	5400	S.D.	475	—
	900	1 1/2	7300	6000	5000	3900	S.D.		O
	680	1/2	5000	3500			S.T.D.		X
42	680	1 1/2	8000	6250	4800	3500	S.D.	525	O
	780	1 1/2	7800	6500	5400	4000	T.		O
	1080	2 1/2	10700	9700	8650	7700	S.D.		—
	465	1	7700	4800	2600		S.T.D.		X
48	365	1	10000	7000			S.T.D.	700	X
	680	1 1/2	10000	8000	6400	4500	S.T.D.	700	O
54	365	1 1/2	14000	7800			S.T.D.	780	X
	465	2	16000	12000	7500		S.T.D.		O
60	520	5	22000	18000	16000	13000	S.T.D.	860	—
	440	2	16000	12000			S.T.D.	800	O

*These capacities marked O and X are not maximum, but are based on silent requirements for public and semi-public buildings.

All capacities based strictly on A.S.H.V.E. code.

Prefix letters in motor column indicate kind of current for which the motors are available.

Alternating—S, single-phase, two or three-phase, 60 cycle. T, single-phase, two or three-phase, 25 cycle. D, direct-current.

The low speeds are suitable for schools, theatres, auditoriums and other quiet running requirements.

HIRSCHMAN S-E and L-U VENTILATOR

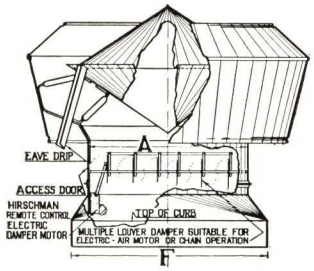


Diagram of L-U Ventilator

Patented

Two apparatus in one. Illustration shows electric control in position

S-E Ventilator

The S-E is a very high grade stationary type syphon ventilator. It starts exhausting at slightly over a two-mile wind without any temperature difference. Capacities shown in chart in dimension table above, left, are conservative.

L-U Ventilator

L-U Ventilator consists of an S-E Ventilator Head constructed with a specially short base and neck. In this neck is built a circular multiple blade louver damper.

S-E and L-U Ventilators are in general appearance similar to the "F" Electric Cowl, but the design is such, to give a greater syphonage exhaust capacity.

Specifications on page 11 of our Catalogue.

HIRSCHMAN ISOLATED ELECTRIC VENTILATORS

Hirschman Isolated Electric *Motor Sections*

These isolated sections can be supplied with any of our Electric Ventilators. These isolated sections can be used horizontally as shown below or vertically as shown at right.

Hirschman Isolated design gives the best known motor protection for any requirement. The Motor is well ventilated by outside air.

For Extreme Heat Protection

For extreme conditions or code requirements the isolated walls may be double shell asbestos or mineral wool packed as shown at right, or air space, or triple shell can be supplied.

Isolated construction is recommended for exhausting vapors, heat, acid fumes, dust, grease, paint spray booths, industrial conditions of all kinds, etc.

A remedy for bad draft in heating plants, chimneys, also for sluggish gravity heating air supply ducts.

Typical Applications

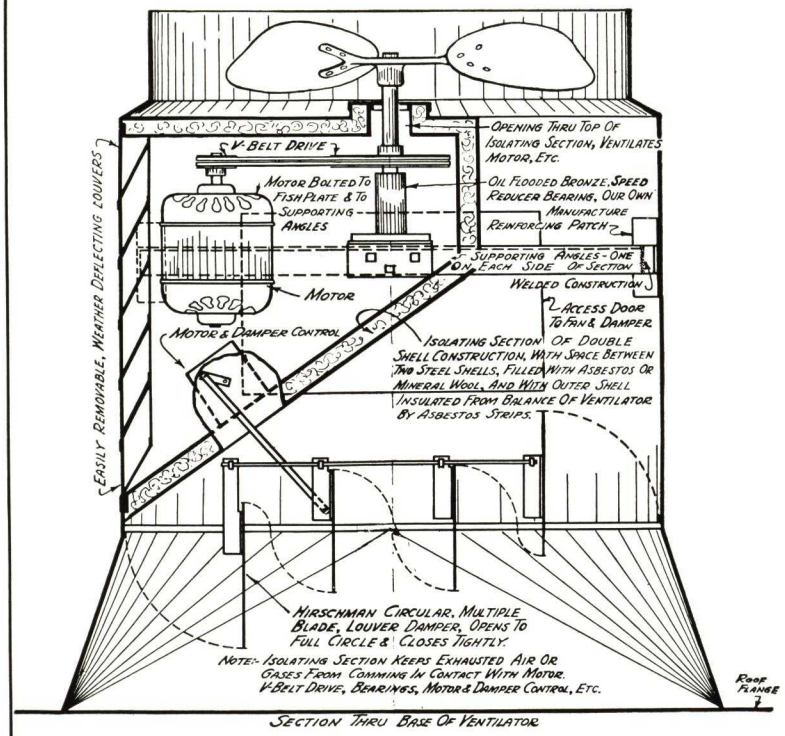
Motion Picture Booths — Laundries
Chemical Laboratories — Paint Spraying Rooms
Kitchens — Acid Conditions
Sand Blasting Rooms

Extreme Heat Applications

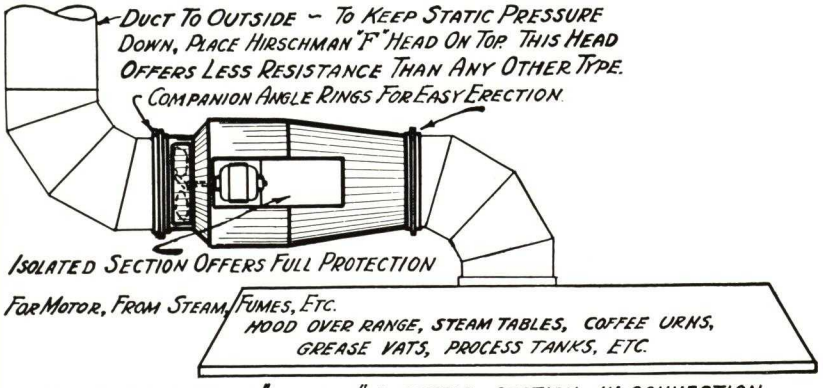
Heat Treating Ovens — Foundries
Hoods over Electric Furnaces — Porcelain Enamel Works
Bakery Ovens — Hoods over Coffee Urns and Ranges

Hirschman Isolated Electric Motor Sections form a perfect protection for motors and are easy to clean. Made in sizes up to 96 inches diameter and to exhaust 90,000 C.F.M.

For specifications see page 11.



Section Thru Base Of Ventilator



Elevation Showing "Isolated" Electric Section In Connection With Exhaust Hood

HIRSCHMAN "LEROY" ELECTRIC VENTILATOR

Design — Appearance — Construction

This ventilator has been manufactured by us for over 15 years. It is a low priced electric ventilator and is 75% as efficient as our "F" Electric Ventilator.

The LeRoy Ventilator is constructed of high grade materials only and workmanship is first class like all other Hirschman products.

Capacities

For power capacities use "F" Electric capacities as shown on page 6 less 25%. For capacities as a syphon ventilator without motor running use our Firma capacities as given on page 8.

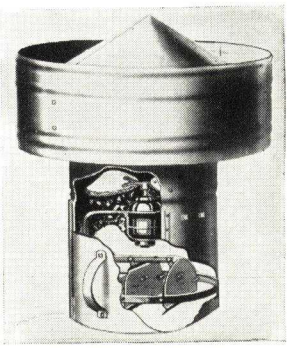
For a pressure exhauster of over ¼-in. static we recommend our "F" Electric and Hercules Power Ventilators, as described on the following and preceding pages. For industrial applications where noise is not the determining factor, considerably increased capacities can be furnished.

This ventilator may be furnished with or without base or damper, and damper, if furnished, may be controlled by chain or by our electric damper control, also controlling fan motor, etc. These controls are all described on page 10.

LeRoy Isolated Electric Ventilator

The motor in this ventilator may be had in the isolated motor drum section as shown above.

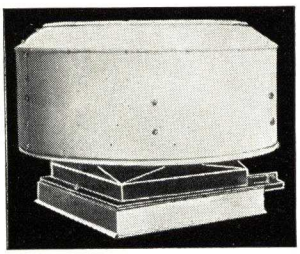
Specifications—see page 11.



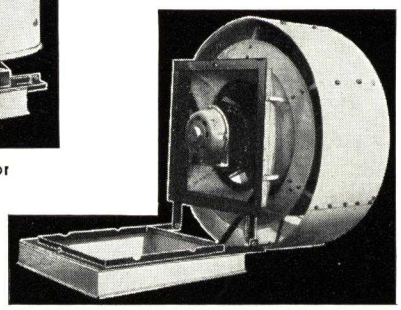
LeRoy Electric Ventilator
Pat.

HIRSCHMAN "HERCULES" POWER VENTILATORS

A Pressure Exhauster—Using Non-Overloading Design of Ventilating Fan



Hercules Power Ventilator
Patent pending



Hercules Ventilator Open for Servicing
Electric motor may be oiled, however, without opening head

The HERCULES POWER VENTILATOR has a fan that does not overload motor at any static pressure. The HERCULES POWER VENTILATOR blast wheel is the conventional backward curved type blade, recognized by Fan Engineers as the proper design for straight (FLAT) horse power curve.

The HERCULES POWER VENTILATOR is highly satisfactory for any ventilating problem, especially for exhausting air where static pressure is encountered, of one quarter inch water gauge and upward.

Its efficiency is at least equal to any centrifugal blower with this design of blast wheel.

Design and Construction

The cowl design is similar to our Super-Firma Syphon ventlator, which is the most efficient stationary ventilator that we manufacture. A ventilator tested by the Case School of Applied Science at Cleveland Ohio, for its weather-proofness and capacities, and now considered one of the highest grade of Roof Ventilators, with an unusually high syphon and gravity efficiency.

The Hercules is designed, as shown above, for very easy accessibility to the motor and fan. The motor and fan do not tilt over on the larger sizes but a very convenient service door is provided. The construction throughout is typical Hirschman Co. rugged design, compactness and the usual Hirschman symmetrical outline will be noted.

Bases

Bases to fit Hirschman steel curbs as described on page 12 (or to fit any curb) flashing over curb and downward four inches are a part of this apparatus. Where required a flat flaring flange, which will require no curb, can be furnished.

CAPACITIES OF HERCULES POWER VENTILATORS

Unit No.	Tip speed of fan	R.p.m. of fan	H.p. of motor	Curb dimension recommended. See note*	C.f.m. capacities at s.p. in inches of water *				Telegraphic code
					¼ in.	⅜ in.	½ in.	¾ in.	
1	6800	1700	⅙	24 x 24	1100	900	800		hed
		1700	¼		1300	1050	900		haunt
2	5200	1100	⅙	24 x 24	1250	1100	1000		heal
		1100	¼		1700	1500	1400	1000	hawk
3	4300	850	¼	28 x 28	2000	1800	1700		helth
	5500	1100	½		2800	2600	2400	2000	hermit
4	4000	640	½	32 x 32	3200	2800			hero
	5350	850	¾		4000	3500	3000		heap
	6900	1100	¾					2500	hew
5	4000	550	½	32 x 32	3600	3200			higgle
	5000	680	¾		4300	3800	3300		hearn
	6250	850	1		5800	5300	4800	3900	hiss
6	3850	460	1	38 x 38	6500	6000	5500	4300	heven
	5700	680	1½		8000	7400	7000	5800	hive
7	3700	370	1	44 x 44	8000	7200	6400	5600	hoard
	4500	450	1½		11000	10100	9200	8300	heath
	5000	500	2		12500	13100	12200	11300	hoax
8	4000	375	¾	44 x 44	8000	7100	6000		hobo
	5000	480	1½		11000	10300	9300	7000	heave
	6000	575	2		13000	12000	11000	9000	hone
9	3600	320	2	50 x 50	14000	13000	11700	10000	hevy
	4200	360	3		19500	18500	17400	16000	hoof
10	3250	260	2	56 x 56	15500	14500	13500	12000	horde
	4000	330	3		17500	16500	15500	14000	heber
	5250	420	5		23000	22000	20500	19000	horny
11	3700	260	2	56 x 56	19000	16500	14000	11000	host
	4000	285	3		23000	20000	16600	14000	heckle
	4550	320	5		28000	24500	21000	16000	huff
	5100	360	7½		34000	30500	27000	23000	hunk

*See next column for capacity notes.

*These capacities are not based on maximum quantities but on quiet operation suitable for schools, etc. All capacities based on standard air at 29.92 in. Barometer, 70° Fahr., and a 50% relative humidity. Tests on A. S. H. & V. E. Code set-up.
Low speed fans are driven by V-belt drive. Motors are constant duty type.
Entire apparatus is isolated from building construction with best sound-proofing materials.
Curb dimensions given in table are based on using Hirschman Double Shell Steel Curbs and allow full area for air entering ventilator.
Allowances must be made for thicker types of construction.
See specifications on Page 11.

HIRSCHMAN "FIRMA" STATIONARY VENTILATORS

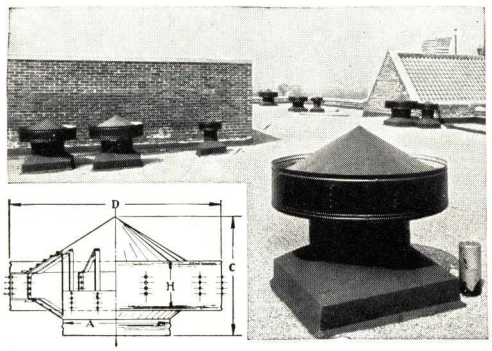


Diagram of Firma Ventilator

Equipment that can answer today's insistent demand for "lowest first cost" engages every alert Engineer and Contractor as never before, particularly if it answers a need for better service and longer life. The Firma Ventilator reflects these facts.

It is a high-grade ventilator, low in cost, highly efficient, correct in design and properly manufactured. A tested product of eighteen years' standing.

A ventilator designed to give exhaust efficiency at low wind velocities. Heavy gauges of metal are used. All steel bracing irons are rustproofed. All rivets have washers on burred side. Its automatic exhaust capacity is effective at a wind velocity of two miles per hour or more. For exhausting excessive heat, fumes, etc., Firma Ventilators have proven their worth. Installed on public buildings and industrial plants, etc., in most every state in the Union, and has the approval of all United States Departments, and of leading engineers and architects.

FIRMA VENTILATOR CAPACITIES AND SIZES (Certified Capacities)

Size, in. A	Capacities at 5 m.p.h.		Dimen., in.		Oz. copper		Gauge galv.	
	Wind. 10° F. temp. diff.	Wind. 30° F. temp. diff.	C	D	Neck	Storm band and cone	Neck	Storm band and cone
10	170	225	9	17	14	14	26	26
12	260	325	11	21	16	14	24	26
14	335	440	14	25	16	14	24	26
16	440	580	18	30	18	14	24	24
18	555	730	18	30	18	14	22	24
20	685	900	20	36	18	16	22	24
24	985	1300	21	43	18	16	22	24
30	1540	2030	25	52	20	16	20	22
36	2215	2930	30	60	24	16	18	22
42	3015	3980	38	72	24	18	18	22
48	3940	5200	38	82	24	18	18	22
54	4985	6585	44	82	24	18	18	22
60	6155	8130	58	102	24	20	18	20
66	7400	9900	60	102	24	24	18	18
72	8900	12000	60	120	24	24	18	18
84	12000	16000	72	144	32	24	18	18
96	16000	21000	78	168	32	24	18	18

W. F. Hirschman Co. Inc. Buffalo, N.Y.

HIRSCHMAN "LORNATE" CONCEALED VENTILATOR

For Syphon or Electric Exhaust

This is a most conventional air exhaust outlet. It is suitable for any type of architecture, and is strictly weatherproof. Available as a syphon head or as an electric ventilator. It is made in any size; square, rectangular, or round. For brick or stone flue, we supply metal waterproof concealed head. For all metal flue, the head and stack above roof is furnished by us.

Write for booklet describing many designs and their applications.

"Lornate" Electric Attachment

All designs are furnished as electrics if required. Motor housing is supplied in *vertical* and *horizontal* drives, complete with special quiet running motors. Motors are either rubber or spring mounted. Canvas duct connections are supplied if required. Large sizes have V-belted fan reduction drives.

Exhaust Capacity and Static Pressure

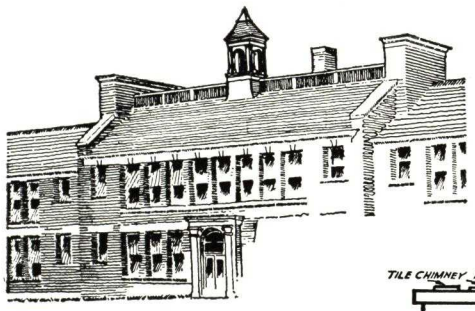
The "Lornate" Syphon Ventilator in 10° temperature difference, five (5) mile wind, for two-story building, exhausts 200 f.p.m. flue velocity.

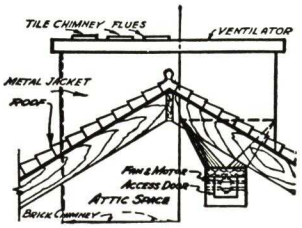
The "Lornate" Head when used as an exhaust head for fan discharge develops .125-in. water resistance at 800 ft. flue velocity. A. S. H. & V. E. Code.

Capacities (Quiet Operation)

The "Lornate" Electric Ventilator for silent operation (sleeping rooms). Engineers please estimate 600 f.p.m. flue velocity. Quiet operation (schools, hospitals) 750 f.p.m. Other requirements (institutions, attics, isolated location) 800-1000 flue velocity. Capacities are based upon quiet operation, not maximum possibilities.

Specifications—*See page* 11 *of our catalogue.*





LORNATE ELECTRIC VENTILATOR CAPACITIES

Please select flue velocity to determine sizes

Hp.	Static pressure in inches of water			X—Silent O—Quiet
	⅛ in.	¼ in	½ in.	
	Capacities in cubic feet per minute			
1/30	400	200		O
1/20	500	250		X
1/6	1000	800		O
1/6	1500	900		O
¼	2000	1400	1000	X
¼	3000	2200	1000	O
½	4000	3200	2200	O
½	5000	3500		X
¾	6000	5000	2900	O
1½	8000	6000	3400	O
2	10000	7000	4500	O
2	12000	9000	7000	O
3	15000	12000	6000	O

HIRSCHMAN DAMPERS—LOUVERS

Dampers—All Hirschman Company Dampers, installed in ventilator or otherwise used, may be operated by chain, by Hirschman Electric or Pneumatic Controls, manual or thermostatically, if desired.

Self-Closing Damper (Non-Electric) may be installed in the following ventilators only; "F" Electric, LeRoy Electric, Lornate and Isolated "F" Electric Ventilators.

Self Locking Device—Any Ventilator may be equipped with Hirschman Self-locking Device if desired. Locks damper closed. (Only one chain needed.)

Fire Dampers—Fusing link can be supplied with any damper to open or close in case of fire.

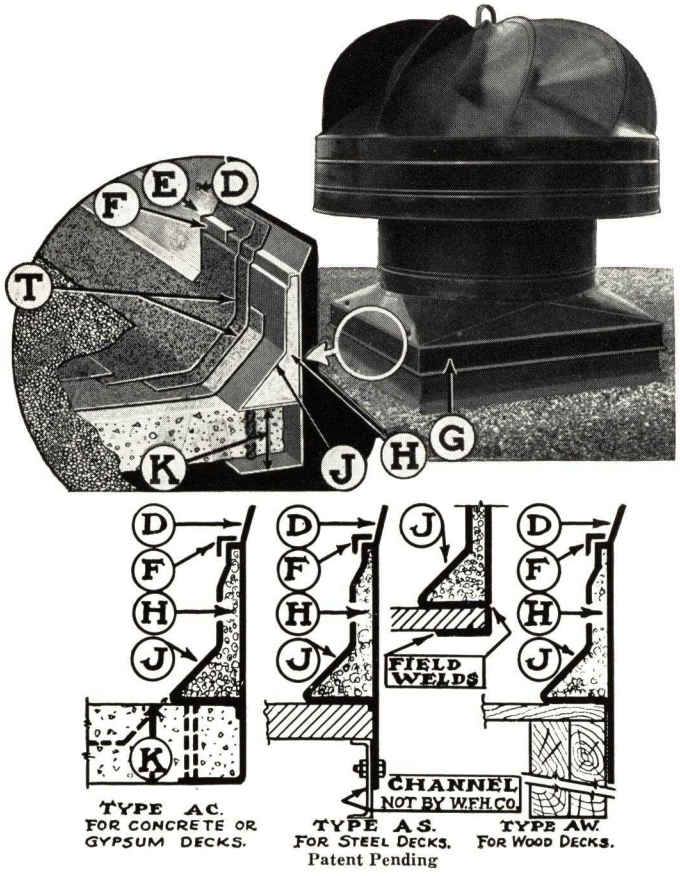
Louver Dampers—We are manufacturers and patentees of the Circular Multiple Louvers as installed in our Louver Unit Ventilators. See pages 4 and 6.

We also manufacture intake, recirculating, mixing dampers, fixed louvers, etc. We make intake louvers, fixed and movable, single units and in combinations in one frame; also, sun-ray deflecting louvers operating with or without our Hirschman Electric Control; also in coordination with fans supplying or exhausting air. Wiring information and diagrams are given when requested. Our controlled Louver (electrically) may be controlled by thermostat or by switch control, all manufactured by us.

Hirschman Anti-back-draft Damper—Micrometer adjustment on damper permits very delicate balancing. Suitable for gravity or power exhaust. Recommended for troublesome air ducts.

HIRSCHMAN STEEL CURBS for VENTILATORS and SKYLIGHTS

Double and Single Shell—For All Types of Roof Deck Construction



Patent Pending

HIRSCHMAN DOUBLE and SINGLE SHELL Steel Ventilator Curbs are built for decks of concrete, gypsum, steel and wood. Their light weight reduces load on concrete roofs by many tons. They serve as a reinforcing frame for roof opening and for ventilator base, reducing cost of roof and also cost of ventilators because the Hirschman Double Shell Steel Curb side walls are 1" thick whereas concrete curbs, especially for larger curbs (36" upwards) are six to eight inches thick, thus material and labor cost of ventilator base is greatly reduced. The smaller dimension of base enhances appearance of installation considerably.

The lower end of curb being a form for concrete roof slab, being left in place after concrete is poured, leaves a solid and nicely finished opening. The top end forms a real anchor for ventilator or skylight (D) and a lock for roofing felt or flashing (F.)

(E) Offset in ventilator base forms very rigid construction.

(J) "Cant" strip is integral part of curb.

(K) This standard dimension is 4". It can be modified.

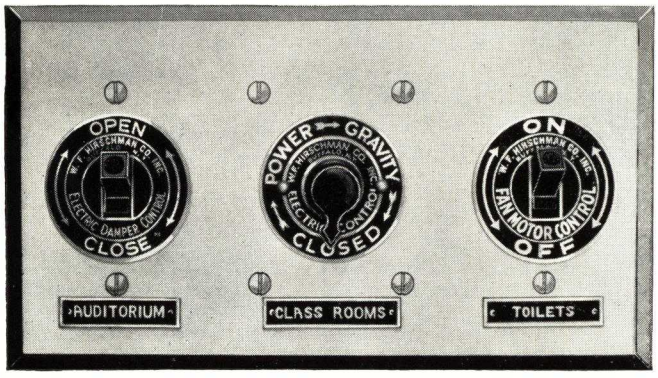
COST—Lower cost than concrete due to saving in ventilator installation cost, forms, concrete, additional metals, labor, cant strips form removals, etc.

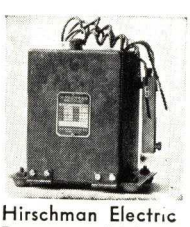
DIMENSIONS AND GAUGES FOR VENTILATOR CURBS

Ventilator size "A"	12	18	24	30	36	42	48	54	60	72	96
Curb size BxB actual opening	16x16	22x22	30x30	36x36	42x42	48x48	54x54	60x60	66x66	80x80	116x116
Gauge steel	22	22	22	22	22	22	22	18	18	18	16
Gauge steel in channel section					18	18	18	18	18	16	16

Style B (single shell) not illustrated, is available for industrial use and for sections of the country not subject to intense cold. See specifications page 11.

HIRSCHMAN ELECTRIC DAMPER and MOTOR CONTROL





Hirschman Electric Damper and Motor Fan Control

HIRSCHMAN ELECTRIC CONTROLS will operate any type of damper or louver, round, square, rectangular, or multiblade in either vertical or horizontal position. Will control motor, louvers, etc., in any part of the building.

They require no attention or oiling and are totally enclosed. These electric controls are absolutely positive and hold the subject rigid in desired position and also coordinate with fan so motor cannot be operated when dampers are closed, and other essentials, such as opening damper with or without operating motor.

HIRSCHMAN CONTROLS are Manual, Thermostat, or Hydrostat operated. They operate on any voltage or current available. Some are universal and interchangeable. Specify or order by number, and give designation plate wording.

Flush plates are available in standard and special finishes.

Engraved aluminum designating plates are available in single or gang combinations with any HIRSCHMAN CONTROL with following words: *See Specifications page* 11.

AUDITORIUM	CLASS ROOM ( ) Give No.	LOCKER ROOM
GYMNASIUM		CAFETERIA
BOYS' TOILET	LABORATORY	RESTAURANT
GIRLS' TOILET	MEN'S ROOM	KITCHEN
TOILET	WOMEN'S ROOM	LAVATORY
TEACHERS' ROOM	SHOWER ROOM	EXHAUST SYSTEMS

Control number manual operation	Position engraved on flush or surface switches	Operation of control	Control number thermostat operation	Number wires from switch to control
M2 AM2S	Open: Closed Electric Damper Control	Opens and closes Controls damper only	T2 AT2S	3 2
MF2 AMF2S	On: Off Fan Motor Control	On; fan on damper open Off; fan off damper closed	TF2 ATF2S	3 2
M3	Open: ½ Open: Closed Electric Control	Open; damper open ½ open; damper ½ open Closed; damper closed	—	4
MF3	Power: Gravity: Closed Electric Control	Power; damper open, fan on Gravity; damper open, fan off Closed; damper closed, fan off	TF3	4

Groups of damper motors of same type may be operated from one switch where desired.

SPECIFICATIONS FOR HIRSCHMAN PRODUCTS

EFFICO FULL AUTOMATIC WIND-ELECTRIC VENTILATORS *(see page 3 of our catalogue)*. The roof ventilators to exhaust from (....) shall be of the sizes and capacities as shown on plans and shall be automatic wind and electric driven Rotary Ball Bearing ventilators. Each ventilator shall contain the Hirschman Adjustable Wind Actuated Automatic Electric Circuit Breaker. The design of the ventilators shall be such that automatically the electric driven fan shall exhaust the specified volume of air when the wind driven section of ventilator is not exhausting the required specified volume of air.

The electric motors utilized in these ventilators shall be of....cycle....phase.... volts, shall be fully enclosed, resilient mounted, constant duty, silent operating motors. They shall be as manufactured by (....). These shall be installed in the ventilators in an approved manner, and the entire apparatus shall operate efficiently and silently.

(For Isolated motor design see specification on Isolated Ventilators.)

Each ventilator shall contain a Circular Multiple Louver Damper *(for operating device of dampers, see control data on page 10)*. Dampers for these ventilators shall be operated by (Hirschman Electric Damper Control). *Note: (See Ventilator Electric Control Specification)* (Pneumatic motors as specified under temperature regulation) (Chain) controlled from location as selected by the architect.

These ventilators shall be of (Galvanized....Iron) (Copper) of manufacturer's standard gauges. Galvanized ventilators to be painted gray enamel.

These ventilators shall be the EFFICO Full Automatic WIND-ELECTRIC Ventilators as manufactured by the W. F. Hirschman Company of Buffalo, N. Y. *(Special sound deadening mounting is not needed for this ventilator.)*

EFFICO FULL AUTOMATIC WIND-ELECTRIC VENTILATOR HIRSCHMAN MASTER CONTROL specification *(see page 3 of our catalogue)*. The roof ventilators to exhaust from (....) shall be Rotary Ball Bearing of sizes and capacities shown on plans, consists of the following group of controlled ventilators *(Class Room No. 1-3-7-8-9-gymnasium)*. Each ventilator to contain an electric motor driven fan of required size and horse power motor to exhaust the required volume of air as indicated on the plans. These electric motor driven fans shall be controlled by one Master Automatic WIND-ELECTRIC Ventilator. This Automatic Ventilator designated on the plans shall contain the Hirschman Adjustable Wind Actuated Automatic Electric Circuit Breaker. The design of the ventilators shall be such that automatically the electric driven fan shall exhaust the specified volume of air when the wind driven part of the ventilator is not exhausting the required specified volume. The Master Control shall control the energizing and de-energizing. These ventilators shall be the EFFICO WIND-ELECTRIC Non-Automatic Ventilators and one EFFICO WIND-ELECTRIC Full Automatic Ventilator so designed as a master control ventilator.

The electric motors utilized in these ventilators shall be of....cycle....phase.... volts, shall be fully enclosed, resilient mounted, constant duty, silent operating motors. They shall be as manufactured by (....). These shall be installed in the ventilators in an approved manner, and the entire apparatus shall operate efficiently and silently.

(For Isolated motor design see specification on Isolated Ventilators.)

Each ventilator shall contain a Circular Multiple Louver Damper. *(Specification writer:—For operating device of dampers, see control data on page 10.)*

Dampers for these ventilators shall be operated by (Hirschman Electric Damper Control). *Note: (See Ventilator Electric Control Specification)* (Pneumatic motors as specified under temperature regulation) (Chain) controlled from location as selected by the architect.

These ventilators shall be of (Galvanized....Iron) (Copper) of manufacturer's standard gauges. Galvanized ventilators to be painted gray enamel.

These ventilators shall be the EFFICO WIND-ELECTRIC Non-Automatic Ventilators and one EFFICO WIND-ELECTRIC FULL Automatic Ventilator as manufactured by the W. F. Hirschman Company of Buffalo, N. Y. *(Special sound deadening mounting is not needed for this ventilator.)*

"F" FAN VENTILATORS *(see page 6 of our catalogue)*. The fan ventilators shall be of the sizes as shown on the plans, and shall have (round) (square) style bases. They are to be of (Gal. Iron) (Copper) of manufacturer's standard gauges. Exhaust area between cones and storm band to be 60% greater than neck area. Galvanized Ventilators to be painted with gray (....) enamel. The motors of....r.p.m.....hp. shall handle....c.f.m., and operate on....volts....cycles....phase current. *For Isolated motor design see specification on Isolated Ventilators.* They shall be the Hirschman (F Fan Ventilator) as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y. Dampers for these ventilators shall be operated by (Hirschman Electric Damper Controls. *Note: See page 10 for type.)* (Pneumatic motors as specified under temperature regulation) (Chains).

HERCULES POWER VENTILATORS *(see page 8 of our catalogue)*. The power ventilator apparatus exhausting from (....) shall have capacity of....at....S. P. and powered by....H. P. Motor. Apparatus exhausting from (....) shall have capacity of ....at S. P. and powered by....H. P. motor. Shall be of the sizes as shown on the plans and shall have manufacturer's standard (square) style bases. They are to be of (Galv. ....Iron) (Copper) of manufacturer's standard gauges. Galvanized ventilators to be painted gray enamel.

The Fan Wheel shall be of the multiblade, backward curved, no-overload-horsepower at any static pressure type. Fan tip speed shall not exceed (....) F. P. M. and shall operate quietly and free from vibration at specified capacities. The electric current for motor is (....) cycle, (....) volts, (....) phase. Motor shall be ball bearing, constant duty of (....) manufacture. Control switch.....

Ventilator design shall be such as to give quick and free access to electric motor and fan. Each entire apparatus shall be mounted on sound deadening (prepared cork) (rubber impregnated felt) and no noises or vibration shall be transmitted into building, all as approved by the architect.

This apparatus shall contain all the essential requisites of the Hirschman Hercules Power Ventilator as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y.

LEROY ELECTRIC FAN VENTILATORS *(see page 7 of our catalogue)*. The fan ventilators shall be of the sizes as shown on the plans, and shall have (round) (square) style bases. They are to be of (Gal....Iron) (Copper) of manufacturer's standard gauges. Galvanized ventilators to be painted gray enamel. The motors of....r.p.m..... hp. shall handle....c.f.m. and operate on....volts....cycles....phase current. *For Isolated motor design see specifications on Isolated ventilators.* They shall be the Hirschman (LeRoy Electric Fan Ventilator) as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y. Dampers for these ventilators shall be operated by (Hirschman Electric Damper Control. *Note: See page 10 for type.)* (Pneumatic motors as specified under temperature regulation.) (Chains.)

LORNATE FAN VENTILATOR *(see page 9 of our catalogue)*. The ventilators shall be of the sizes as shown on the plans, and as detailed in the drawings. They are to be of (Gal.....Iron) (Copper). They are to operate absolutely silent, and handle.... c.f.m. at fan speed of....r.p.m. Motors shall operate on....volts....cycle...phase current. They shall be the Lornate Fan Ventilators as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y. Damper for these ventilators shall be operated by (Hirschman Electric Damper Control. *Note: See page 10 for type.)* (Pneumatic motors as specified under temperature regulation.)

HIRSCHMAN ISOLATED ELECTRIC MOTOR SECTION *(see page 7 of our catalogue)*. The electric motors exhausting from (....) shall have the electric motor, fan drive, bearings, control, etc., fully protected from all air being exhausted by means of an enclosing metal shell (mineral wool filled double shell) housing. This Isolated section shall be designed to maintain full and satisfactory ventilation and access to contained apparatus. This Isolated section shall become an integral part of the ventilating unit covered in this specification.

SILENT CHURCH VENTILATOR. Ventilating apparatus No. (....) exhausting from (....) shall discharge.....C.F.M. at....S.P. Shall be absolutely noiseless and vibrationless. Electric Damper and Motor Control shall be by one remote control switch, giving power, gravity and closed position and fan must not run on closed or gravity positions. This unit shall be made of heavy galvanized sheets; motor, damper control and unit mountings shall be of angles and channels, assembled by welding; motor shall be fully enclosed, resilient mounted, continuous duty type operating and driving fan at suitable speed and entire unit shall be resiliently mounted in a manner approved by architect. This ventilator unit shall comprise an electric motor, fan, louver damper. Electric damper and fan control self contained unit. It shall be the Hirschman Silent Church Ventilator and contain every feature and construction requisite of this Company's apparatus. It shall be manufactured by W. F. Hirschman Company or approved equal.

EFFICO INTERNAL LOUVER UNIT VENTILATORS *(see page 4 of our catalogue)*. The roof ventilators shall be of the sizes as shown on plans; shall be Rotary Ball Bearing Ventilators comprising fully enclosed conical rotating cowl, the exterior of which shall be covered with wind propelling blades and the interior with suction blades. They shall be constructed of (Galvanized....Iron) (Copper). Bases to be of (round) (square) style and the stack to be sufficiently high to elevate the propelling blades above the coping. The neck shall contain Multiple Blade Circular Louver Damper. These dampers to be operated by means of (Hirshman Electric Damper Control *(see page 10 of our catalogue for type)*; (pneumatic dampers as specified under temperature control); (Chain for manual operation).

They shall be the EFFICO Internal Louver Unit Ventilators comprising the head, base, Multiple Louver Damper, access door, etc., of all standard gauges and construction as manufactured by the W. F. Hirschman Company, Inc., of Buffalo, N. Y.

EFFICO ROTARY BALL BEARING Ventilators *(see page 5 of our catalogue)*. The roof ventilators of the sizes as shown on the plans shall be Rotary Ball Bearing Ventilators comprising fully enclosed conical cowl; the exterior of which is covered with wind propelling blades, the interior with suction blades. The bearings shall be fully ball bearing, oil flooded fully enclosed in oil and dust tight housing. The ventilators shall be mounted on necks and stacks sufficiently high so that the propelling blades shall be above coping. The bases of (square) (round) style of same gauge as ventilator neck. Each ventilator shall contain a well fitted chain operated butterfly damper. The ventilators shall be of (Galvanized....Iron) (Copper) of the manufacturer's standard gauges.

They shall be the EFFICO Rotary Ball Bearing Ventilators as manufactured by the W. F. Hirschman Company, Inc., of Buffalo, N. Y.

L-U LOUVER UNIT Ventilators *(see page 6 of our catalogue)*. The exhaust ventilator units for syphon exhaust shall be of sizes as shown on the plans. They shall be of the manufacturer's standard gauges of (Galvanized....Iron) (Copper). The ventilator cowl shall comprise an inverted cone which shall be larger and extend upward beyond the upper cone forming a weatherproof gutter. The storm band shall comprise an upper and lower frustrum shape. The exhaust area between the storm band and cones shall be at least 50% greater than neck area of the given size ventilator. The ventilators shall be strictly weatherproof. Each ventilator shall be equipped with Circular Multiple Blade Louver Damper installed in the neck of the ventilator by the manufacturer of the ventilator. The operation of these louver dampers shall be by (Hirschman Electric Damper Control) *(Note: See page 10 of our catalogue for type)*; (pneumatic motors as specified under temperature control specification); (chain). Heads, bases, dampers and damper motors shall all be completely assembled at the manufacturer's plant.

They are to be the Hirschman L-U LOUVER UNIT Ventilator as manufactured by the W. F. Hirschman Company of Buffalo, N. Y.

S-E VENTILATORS, Syphon Exhaust *(see page 6 of our catalogue)*. The roof ventilators of the sizes as shown on the plans are to be constructed of (Gal....Iron) (Copper) of manufacturer's standard gauges. They shall be Hirschman S-E ventilators as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y. They shall be mounted on (round) (square) style bases of same gauges of metal as the necks of the ventilators.

FIRMA STATIONARY VENTILATORS *(see page 8 of our catalogue)*. The roof ventilators of the sizes shown on the plans shall be of standard manufacturer's gauge of (Gal....Iron) (Copper). They shall be the Firma stationary Ventilators as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y., and shall be mounted on (round) (square) style bases of same metal gauges as the necks of the ventilators.

EFFICO SKYLIGHT BASES *(see page 4 of our catalogue)*. These ventilators to be equipped with Effico Skylight Bases of (Gal....Iron) (Copper) to fit over....curbs. These skylights are to be of puttyless construction and design as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y.

HIRSCHMAN STEEL CURBS *(see page 10 of our catalogue)*. (The roof ventilator) (skylight) curbs of sizes as shown on plans shall be of the (double shell) (single shell) steel construction. The double shell design shall have one inch thick hollow walls, which shall be filled with mineral wool. The curbs shall serve as a mounting for the roof ventilators; shall contain a 45 degree cant for the roofing felt; a lock for the roof flashing around the curb and an anchor for the roof ventilators. These curbs shall extend (8 inches above) (12 inches above the base roof line). *(If roof of poured concrete* the curb shall serve as a permanent form for pouring the concrete around the ventilator opening and shall be placed in position before the pouring of the concrete.)

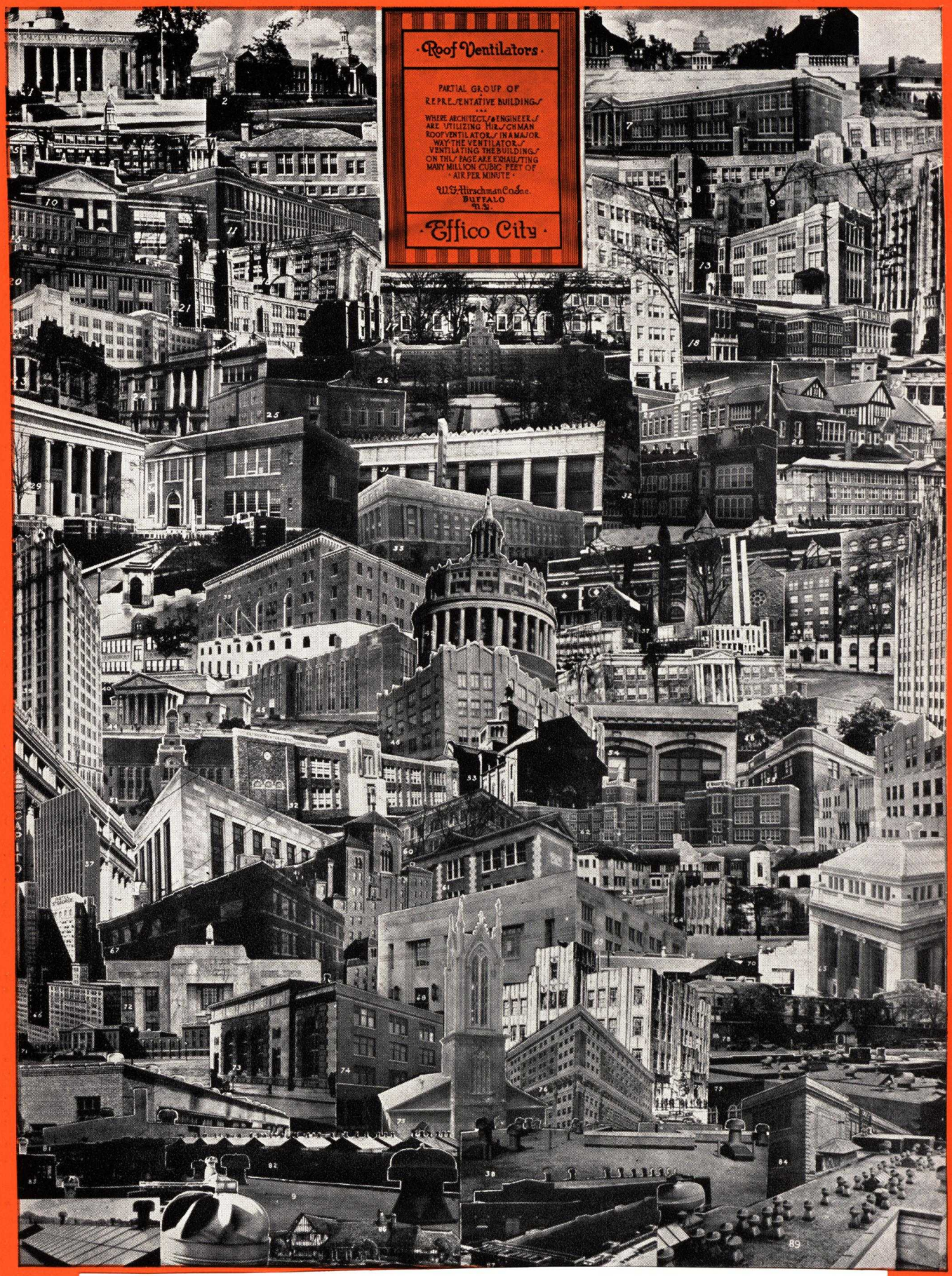
These above curbs shall be the type *(see data page 10)*. They shall be the Hirschman (double shell) (single shell) Steel Curbs type (....) (....) as manufactured by the W. F. Hirschman Company of Buffalo, N. Y.

HIRSCHMAN ELECTRIC CONTROL *(see page 10 of our catalogue)*. All (....) ventilator dampers (and electric ventilator fan motors) shall be controlled by remote (manual) (thermostat) operated electric controls. The control switch for (*auditorium*) shall be by one switch controlling damper and fan motor. The face plate showing operating positions etched on (same) ("Power," "Gravity," "Closed"). (*Specification writer see other position plates this bulletin*), also bearing the designating word (*Auditorium*). The switch shall be (flush mounted) type (*in gang with others* indicated elsewhere). Face plates of (brushed brass) (chromium) (brown bakelite). *(Specification writer see page 10 this bulletin)* as regularly furnished by the control manufacturer. Control shall operate on same current as fan motor.

These controls shall be installed by the manufacturer in the ventilators and properly tested before shipment to insure correct operation. All ventilator controls and switches shall be furnished by ventilator contractor and shall contain all the requisites of the W. F. Hirschman Company Electric Control, type (....).

All the above controls, switches and location plates, dampers and ventilators shall be manufactured and assembled by one manufacturer. They shall be as manufactured by W. F. Hirschman Company of Buffalo, N. Y.

Control for (....) ventilator shall be same as above but designating plate bearing word (....).



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ESTABLISHED 1905

KERNCHEN COMPANY

333 North Michigan Avenue (Sixth Floor)
CHICAGO, ILL.
AGENCIES IN PRINCIPAL CITIES

FACTORY
SOUTH GARY, IND.

Products

"K-S-V's" (Kernchen Siphonage Ventilators).
Economy Ventilators (Plain Type).

KERNCHEN SIPHONAGE VENTILATOR

MANF'D BY
KERNCHEN COMPANY
VENTILATING ENGINEERS
THE WORLD'S GREATEST VENTILATING ORGANIZATION

KERNCHEN SIPHONAGE VENTILATORS

"K-S-V's" Are Correct Siphons—The correct siphon is the most powerful pulling force known to this field of ventilation. It not only exhausts, but it pulls terrifically. Siphons harness the lightest air currents, compressing and compelling them to co-act in mightily increasing the suction of air out through ventilator.

Construction—Simplicity of construction and complete absence of the friction inevitably involved in old-style rotary mechanisms make the "K-S-V" (Kernchen Siphonage Ventilator) a troubleproof, lasting investment. Free area of outlet over 200% of pipe area. Nothing to choke or hinder. Friction at minimum, exhaust at maximum.

Eduction pipe is cylindrical with V-shaped notches or openings at top, each covered by a siphon tapered inwardly toward top, the total of four siphons being covered by a jacket of conical shape, whereby other siphons (four) are formed, greatly increasing the terrific pulling power. In addition, a top construction of two specially designed hoods is used, augmenting considerably the pulling force and making the unit stormproof.

Absence of friction, no revolving mechanism being present, means silent performance, nothing to wear out, nothing flopping around, no maintenance cost. A rotary requires a certain wind energy to swing it around *before it gets ready to ventilate. The "K-S-V" uses this wind energy to ventilate.*

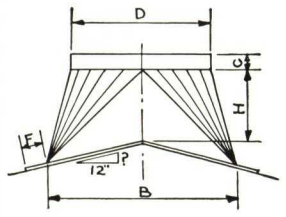
Specifications

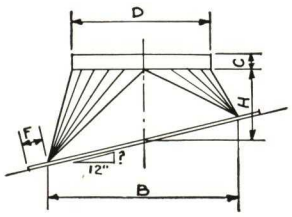
Roof ventilators and bases to be "K-S-V's" as manufactured by the Kernchen Company, 333 North Michigan Avenue (6th floor), Chicago, Illinois, in the following sizes (specify sizes by neck diameter and bases, by number, and roof patch in inches per foot).

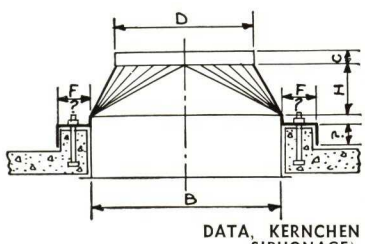
Caution—Beware of imitations and infringements; protect yourself by specifying "K-S-V's."

Special Ventilation Service

The Kernchen Company specializes in ventilation and its engineers are always available, gratis. Particular attention given to difficult or unusual problems involving great heat as well as temperatures below freezing point, steam conditions; elimination of condensation, moisture, fumes, gases or smudge, foul or vitiated air, in every type of building or room.







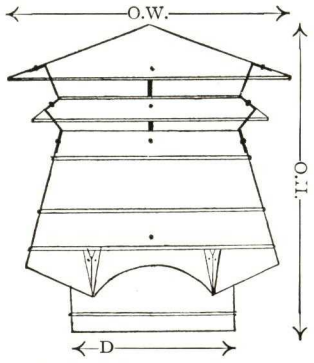
How to Order

Simply multiply cubical contents of room by number of air changes required per hour. The exhaust capacity table below will indicate the exact size of K-S-V's required

DATA, KERNCHEN (ORIGINAL SIPHONAGE) VENTILATORS

Principal dimensions, in.			Exhaust per hour, cu. ft., 5-mile wind	Gauge of ventilators		*Ship. wt., lb.
D	O. W.	O. H.		Galv. iron	Copper oz.	
12	18	24	21,840	24	16	28
14	21	28	29,532	24	18	38
16	24	32	38,640	24	18	54
18	27	36	48,852	24	18	68
20	30	40	60,180	22	18	93
24	36	48	86,640	22	20	130
30	45	60	135,000	22	20	225
36	54	72	194,820	20	24	405
42	63	84	269,100	20	24	475
48	72	96	346,560	20	28	620
54	81	108	400,500	20	32	800
60	90	120	510,540	18-20	36	910
66	99	132	640,620	18	36	1170
72	108	144	718,160	16-18	44	1450
84	126	168	984,125	16	48	2225

*Weights given are for ventilators only.



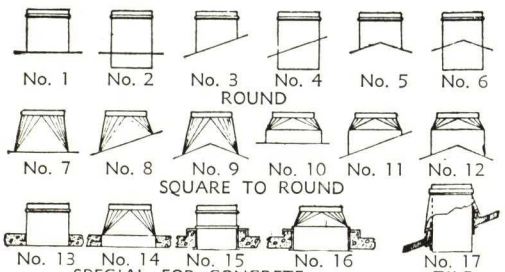
"K-S-V" Drawn to Exact Proportion

DATA, KERNCHEN (ORIGINAL SIPHONAGE) BASES

Dimensions of bases, in.				Gauge of bases	
B	H	F	C	Galv. iron	Copper, oz.
15 x 15	12	4	3	24	16
17½ x 17½	13	4	3	24	18
20 x 20	14	4	3	24	18
22½ x 22½	15	4	3	24	18
25 x 25	16	4	3	22	18
30 x 30	18	4	3	22	20
37½ x 37½	21	4	3	20	20
45 x 45	24	4	3	20	24
52½ x 52½	27	5	4	20	24
60 x 60	30	5	4	18	28
67½ x 67½	33	5	4	18	32
75 x 75	36	5	4	18	36
82½ x 82½	39	6	5	16	36
90 x 90	42	6	5	16	44
105 x 105	48	6	5	16	48

Shipping weight of bases is approximately one-third of that given for ventilators.

DETAILS AND DATA, "K-S-V" VENTILATORS AND BASES



Bases for Standard Installations of "K-S-V's" (Kernchen Siphonage Ventilators)

Materials—Furnished in all standard gauges and in any size. Made of any metal desired, such as galvanized steel, Keystone copper steel, Armco iron, Toncan metal, cold rolled copper, aluminum, zinc, monel, wrought iron, etc. Furnished with or without base damper or condensation arrestor.

ECONOMY ROOF VENTILATOR

This ventilator is designed to meet the demand for a ventilator at lowest possible cost, yet capable of solving any ordinary ventilating problem.

Economy Roof Ventilator

Manufactured in attractive proportional design of solid sturdy construction. Absolutely guaranteed stormproof. Furnished with or without damper or base. Made in same sizes and gauges as "K-S-V's." Workmanship and materials are of the same high quality.

Prompt shipment from large stock always on hand.

MEMORANDA

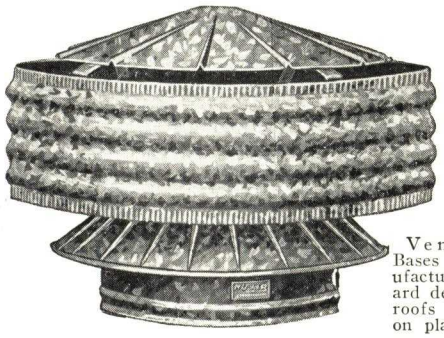
MILCOR STEEL COMPANY

MILWAUKEE, WIS. CANTON, OHIO

CHICAGO, ILL. KANSAS CITY, MO. LA CROSSE, WIS.

For Our Catalogs on Milcor Fireproof Products, Skylights, Access Doors and Steel Decks, see File Index

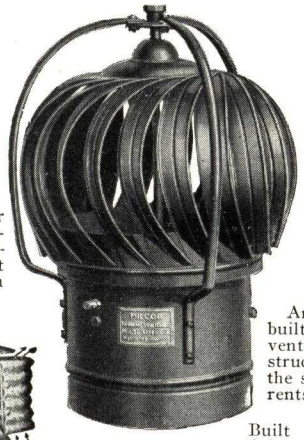
MILCOR VENTILATORS



Ventilator Bases to be manufacturer's standard design to fit roofs as shown on plans

Milcor Nu-Air

Construction of the Milcor Nu-Air Ventilator is shown in the smaller view at the right. Arrows indicate direction of air currents

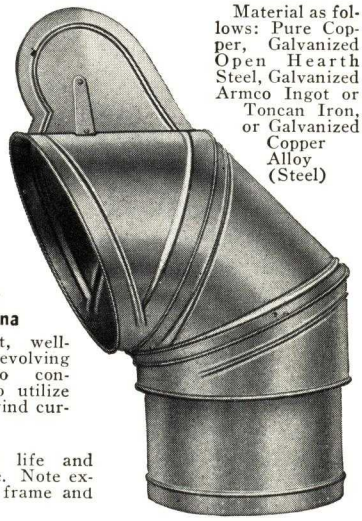


Milcor Turbine

Built for long life and satisfactory service. Note exceptionally strong frame and blade construction

Milcor Nu-Alpina

An efficient, well-built syphon revolving ventilator, so constructed as to utilize the slightest wind currents



Material as follows: Pure Copper, Galvanized Open Hearth Steel, Galvanized Armco Ingot or Toncan Iron, or Galvanized Copper Alloy (Steel)

Milcor Nu-Air Ventilator

Description—Rigidly built, scientifically designed to create upward suction of air within the flue regardless of wind direction. Outer air currents rush in between the weather band and curved deflector. Currents travel upward and outward, constantly discharging a full volume of impure air through the ventilator shaft. Furnished with steel or glass top. Suitable for factories, industrial plants, schools, hospitals, air ports, homes, etc.

Sizes, in.	Weights, lb.	Capacities
8	10	12,000
10	15	15,000
12	20	21,000
14	25	29,700
16	40	39,000
18	45	48,600
20	55	60,000
24	80	87,000
30	120	135,000
36	175	210,000
48	250	300,000

Milcor Turbine Ventilator

Description—The slightest motion of air is sufficient to operate the Milcor Turbine Ventilator. A vacuum is created as soon as the head begins to revolve because the air within the head is expelled by centrifugal force. Actually pulls out the impure air automatically, continuously and silently. Down drafts a mechanical impossibility.

Strong frame work. Equipped with Alemite fittings and when once installed requires no attention, care or adjusting.

Sizes, in.	Weights, lb.	Capacities
8	20	17,300
10	27	26,500
12	38	38,600
15	50	54,000
18	85	85,200
20	100	105,100
24	160	149,000
30	225	225,000
36	270	281,000
42	460	324,000
48	550	360,000

Milcor Nu-Alpina Ventilator

Description—Entire revolving head of this ventilator constantly faces away from the wind. A vacuum is thus created which adds to the syphonating power of the wind currents entering the opening at the bottom of the revolving head.

Staunchly constructed and rigidly braced. Nothing lighter than 26-gauge galvanized steel is used in fabrication. It has a cast bronze ball race with solid brass ball bearings, and is painted with a heavy coat of aluminum.

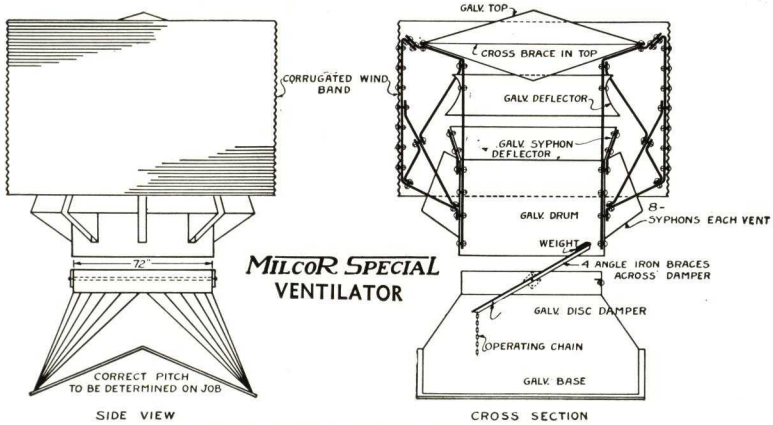
Sizes, in.	Weights, lb.	Capacities
8	25	12,500
10	27	15,000
12	40	17,500
14	50	23,500
16	60	32,000
18	75	41,000
20	125	51,000
24	175	70,000
30	300	107,000
36	400	160,000
48	550	280,000

Capacities Indicate Cubic Feet of Air Discharged per Hour; Wind Velocity 5 Miles per Hour

Write for further information

Milcor's Latest Ventilator Development

MILCOR Special



SIZES, GAUGES, WEIGHTS AND CAPACITIES

Capacities Indicate Cubic Feet of Air Discharged per Hour; Wind Velocity 5 Miles per Hour

Sizes, in.	8	10	12	14	16	18	20	24	30	36	48	60	72
Material, ga.	26	26	26	24	24	24	24	24	20	20	20	18	16
Weights, lb.	20	35	40	70	105	155	200	230	440	525	650	1000	3000
Exhaust capacity	18000	27000	38000	53000	70000	85000	106000	145000	220000	340000	610000	950000	1500000

PENN VENTILATING COMPANY

Manufacturers of Rotary—Ridge—Stationary—Power Ventilators

MAIN OFFICE AND WORKS
2810-2812 Richmond Street, PHILADELPHIA, PA.

NEW YORK SALES OFFICE: 132 Nassau Street

AGENTS IN ALL PRINCIPAL CITIES

LIBERTY SIPHONAGE VENTILATOR

Because of the ingenious, effective way in which it harnesses and utilizes outside air currents, the Liberty Ventilator represents the supreme achievement of modern engineering skill.

All of the air currents—upward, downward, horizontal or swirling—are brought under control and forced to perform their task of drawing heat, foul air, steam fumes, smoke or floating dust up and out of the building.

The Liberty Ventilator utilizes four principles of physical science: (1) air impingement; (2) positive and negative air action (pressure and vacuum); (3) siphonage; (4) stack action.

The following data was compiled by our Engineering Department and also under actual conditions while in competitive test.

LIBERTY VENTILATOR DATA

Size, in. A	Over-all, Ht. in. B	Width, in. C	Area, sq. in.	Discharge cap. per min., cu. ft.	Approx. ship'g weight, lb.	Gauge of metal	Wgts. of copper, oz.
12	24	21	113	490	26	24	18
18	36	31½	254	1259	65	24	20
24	48	42	452	2233	125	22	20
30	60	52½	707	3485	220	20	24
36	72	63	1018	5027	395	20	24
42	84	73½	1385	6841	460	20	24
48	96	84	1810	8896	600	20	32
54	108	94½	2290	11306	850	20	32
60	120	105	2827	13958	900	18-20	32

Liberty Ventilator Capacities—These figures are based on the following conditions: Wind velocity—10 miles per hour; difference in temperature of indoor and outdoor air—20° F.; height of ventilators above intake—30 ft.

PENN TURBINE VENTILATOR

Size, in.	Exhaust per hour, cu. ft. on 4 mile wind
6	14,363
7	15,500
8	17,420
9	22,500
10	26,200
12	38,375
14	43,325
15	46,800
16	50,550
18	76,800
20	109,500
24	150,000
30	230,500

The Penn Turbine Ventilator is a true rotary, air driven, suction turbine, that works automatically, continuously and silently—without maintenance or operating expense.

The slightest motion of air is sufficient to operate the turbine. A vacuum is created as soon as the head begins to revolve because the air within the head is expelled by centrifugal force. This ventilator, therefore, pulls out the impure air. The rotating turbine makes downdrafts a mechanical impossibility.

The turbine rotor is fitted into a ball bearing setting. This makes for ease of rotation so that the slightest breeze causes the turbine to spin—without noise, wobbling or effort. The ball bearing action prevents wear of moving parts and makes repairs and maintenance unnecessary. Lubrication is not required.

PUL-AIR VENTILATOR

The Pul-Air Ventilator has been designed to give the utmost of efficiency and it successfully meets in every particular the demand for a highly efficient weatherproof ventilator of a moderate price.

The Pul-Air Ventilator is staunchly built. It is weatherproof. It is well designed, architecturally as well as mechanically. It is a practical, efficient, dependable, and economical ventilator for schools, hospitals, institutions, theaters, factories, barns, foundries, train sheds, etc.; an invaluable auxiliary, too, to forced draft or mechanical ventilating systems, and for correcting faulty drafts in chimney flue stacks.

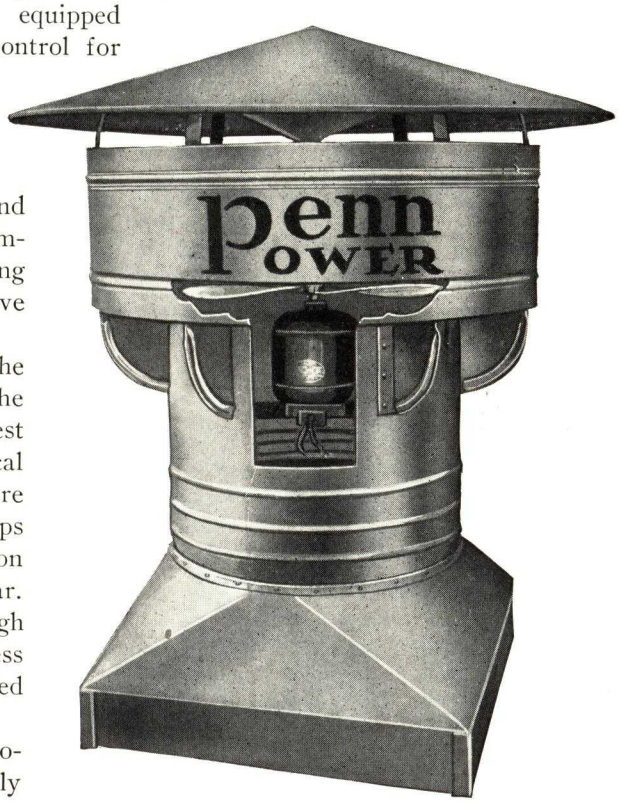
PENN POWER VENTILATOR

The power unit was developed by Penn Ventilating Engineers to meet adverse conditions in the ventilating field, where a fan motor is essential as an auxiliary. When dust, fumes, heat, smoke, etc., must be exhausted periodically, or when resistance to flow (static pressure) is encountered, we recommend the Penn Power Ventilator. When the motor is not in operation this unit is so constructed to give the same exhaust capacity as the Liberty Siphonage Ventilator.

This unit may be equipped with a temperature control for the operation of the motor fan at any desired temperature, irrespective of the varying outside wind velocity or outside temperature, thus assuring constant and positive ventilation.

Motors used in the construction of the power units are the best obtainable for vertical operation. Motors are fitted with grease cups and require attention once or twice a year. This can be done through the weatherproof access door, which is provided in the fan barrel.

Blades are of the propeller type scientifically designed and constructed of special lightweight element, cast aluminum alloy, balanced and finished to the highest degree of perfection to give a maximum capacity at a high efficiency.



CAPACITIES PENN POWER VENTILATORS

Size of Ventilator Duct, in.	Number of blades	Exhaust cubic feet per minute free air	Motor hp.	Fanspeed, r.p.m.
10	4	700	1/50	1750
12	4	1,200	1/20	1750
12	4	980	1/30	1140
16	4	3,100	1/8	1750
16	4	2,000	1/10	1140
18	4	3,600	1/6	1750
18	4	3,000	1/10	1150
18	4	2,700	1/10	860
24	4	5,700	1/4	1750
24	4	4,750	1/8	1150
24	4	4,300	1/8	860
30	4	7,000	1/3	1750
30	4	5,300	1/4	1150
30	4	4,400	1/6	860
36	2	14,000	1	1750
36	4	17,000	1½	1750
36	2	10,000	½	1150
36	4	11,500	¾	1150
36	2	6,700	⅓	860
36	4	7,500	½	860

MULTI-BLADE PRESSURE UNITS

Size, in.	Number of blades	C.f.m. free air	Static Pressure			Hp.	R.p.m.
			1/8 in.	1/4 in.	3/8 in.		
12	Multi	1600	1250	....	....	1/20	1150
16	Multi	2450	1950	1625	....	1/8	1150
18	Multi	3250	2600	2000	1350	1/4	1150
24	Multi	4800	4000	3200	2400	1/4	850
30	Multi	7500	6350	5200	4000	½	690

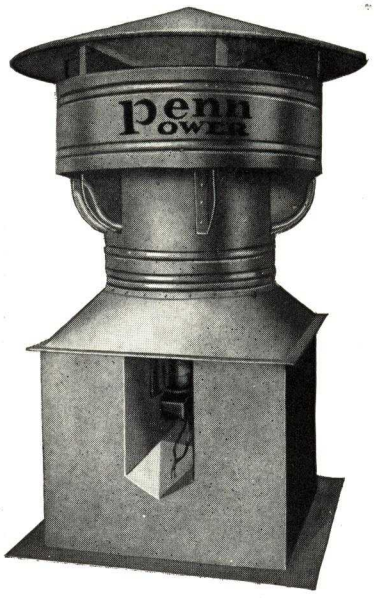
PENN POWER (Bifurcated)

The Penn (bifurcated) Power Unit was designed to meet conditions where acids, excess heat, etc., are detrimental to the motor. Direct passage of exhaust does not come in contact with the motor, which is cooled by outside temperature and installed in a weatherproof compartment, assuring all necessary protection.

Motors are of the ball bearing type and are accessible for greasing purposes from the outside, which requires lubrication once a year.

Penn Power Units can be supplied with explosion and vaporproof motors when required by fire underwriters.

Our new edition of the Ventilator Data Book will be of vital interest to the architects and engineers and can be had upon request.



H. H. ROBERTSON COMPANY

Robertson World-Wide Building System

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CANADA; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES, AGENCIES AND BRANCH OFFICES

ALLENTOWN, PA., H. N. Crowder, 446 Union St.
ATLANTA, GA., H. H. Robertson Company, 413 Bona Allen Bldg.
BALTIMORE, MD., H. H. Robertson Company, 1635 Baltimore Trust Bldg.
BIRMINGHAM, ALA., H. H. Robertson Company, 2019 Sixth Ave., No.
BOSTON, MASS., H. H. Robertson Company, 14 High School Ave. (Quincy, Mass.)
BUFFALO, N. Y., H. H. Robertson Company, 602 Jackson Bldg.
BUTTE, MONT., Archie W. Adams, 618 Metals Bank Bldg.
CHARLESTON, W. VA., Fireproof Products Co., 422 Professional Bldg.
CHARLOTTE, N. C., Edwin C. Boyette, Jr., 1025 Arosa Ave. (Box 27)
CHICAGO, ILL., H. H. Robertson Company, 360 No. Michigan Ave.
CINCINNATI, OHIO, H. H. Robertson Company, 1315 American Bldg.
CLEVELAND, OHIO, H. H. Robertson Company, 1526 Hanna Bldg.
DENVER, COLO., J. Q. Lalor, 1125 So. Vine St.
DETROIT, MICH., H. H. Robertson Company, 635 New Center Bldg.
EASTON, PA., H. N. Crowder, 103 No. Fourth St.
EAST ORANGE, N. J., H. H. Robertson Company, 25 No. Harrison St.
JACKSONVILLE, FLA., H. H. Robertson Company, P. O. Box 4523
KNOXVILLE, TENN., R. G. Jeffries, 409 W. Clinch Ave. (P. O. Box 2023)
LITTLE ROCK, ARK., Wherry & Company, 115 Center St.
LOS ANGELES, CALIF., H. H. Robertson Company, 816 W. Fifth St.
MARQUETTE, MICH., C. H. Cooper
MINNEAPOLIS, MINN., Hauenstein & Burmeister, 614 Third Ave., So.
NEW HAVEN, CONN., H. H. Robertson Company, 207 Orange St.
NEW ORLEANS, LA., H. H. Robertson Company, 736 Whitney Bank Bldg.
NEW YORK, N. Y., H. H. Robertson Company, 475 Fifth Ave.
PHILADELPHIA, PA., H. H. Robertson Company, 1307 Real Estate Trust Bldg.
PITTSBURGH, PA., H. H. Robertson Company, 2000 Grant Bldg.
PORTLAND, ME., W. O. Hutchins, 193 Middle St.
PORTLAND, ORE., Mercer Steel Company, 838 N. W. 13th Ave.
RICHMOND, VA., R. M. Nolting, 1103 E. Main St. (P. O. Box 1011)
ST. LOUIS, MO., H. H. Robertson Company, 1218 Olive St.
SALT LAKE CITY, UTAH, L. Brandenburger, 153 W. Second South St.
SAN FRANCISCO, CALIF., H. H. Robertson Company, 50 Hawthorne St.
SCRANTON, PA., F. H. Coffin, 210 Brooks Bldg.
SEATTLE, WASH., Arthur A. Dally, 332 Pioneer Bldg.
SOUTH BOSTON, MASS., Northeastern Metals Co., 307 Dorchester Ave.
SYRACUSE, N. Y., F. J. Ludwick, 1126 Chimes Bldg.
TULSA, OKLA., Murray R. Womble, 316 Atco Bldg.
WASHINGTON, D. C., J. R. Nichols, 428 Woodward Building

FOR ENGLAND: H. H. ROBERTSON COMPANY, MERSEY IRON WORKS, ELLESMERE PORT, CHESHIRE

FOR CANADA: H. H. ROBERTSON COMPANY, LTD.

TORONTO (MAIN OFFICE), 611 Metropolitan Bldg. MONTREAL OFFICE, 526 Confederation Bldg.

Products

ROBERTSON NATURAL DRAFT VENTILATORS; ROBERTSON RECTANGULAR VENTILATORS, ROBERTSON STREAMLINED VENTILATORS, ROBERTSON MONITOR VENTILATORS (auxiliary fan equipment available); ROBERTSON VENTILATOR BASES; HOODS and DUCTS; LOUVRES.

For Robertson Protected Metal (RPM), Protected Metal V-Beam Sheets, Robertson Floor Wiring Method, Weatherproof Skylights and Robertson Steel Floor, see File Index.

TRADE-MARK

Patents

Robertson Ventilators are protected by United States Patents No. 1,589,581; No. 1,785,540; No. 1,860,367; No. 1,985,880; No. 2,009,870, and No. 2,039,486; Canadian Patent No. 244,617. Other United States patents allowed and pending; also protected by patents in other countries.

ROBERTSON ROOF VENTILATORS

The Robertson Ventilator

Robertson Ventilator is a stationary type, of great capacity. Its height makes it possible to have free area outlets almost three and one-quarter times the stack area. This permits unobstructed passage of air. The ventilator is enclosed in a suction band which increases the area, displaces more air and causes a great Vacuum action from passing winds. Because of the area of the free air outlets and the suction band action, it is usually possible to obtain ample ventilation with a smaller number of Robertson Ventilators than with other types with a more standard rate of discharge. *This fact should be borne in mind when figuring costs on Robertson Ventilation installations.*

Importance of Ordering by Exhaust Capacities—Ventilators are sold by sizes expressed in inches. These sizes refer to width of stack opening and not to over-all width of ventilator. However, over-all width has a direct bearing on exhaust capacities because it affects air displacement. Two ventilators of the same rated size may be greatly different in actual size. The safe way to order ventilators is by exhaust capacities.

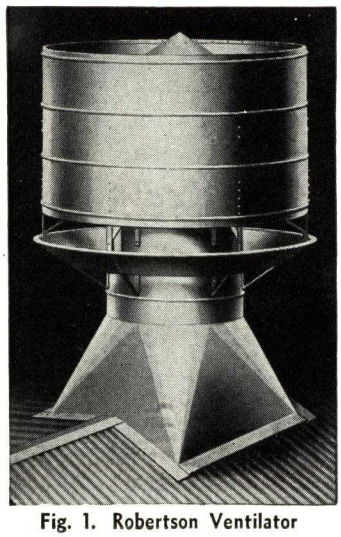


Fig. 1. Robertson Ventilator

Capacities of Robertson Ventilators (in actual field service) have been determined under 2250 sets of conditions. *These figures are published in a data book which will be sent on request.* Capacities of various sizes under one set of conditions are given at right.

Construction Details—Robertson Ventilators are made of Robertson Protected Metal (RPM) galvanized steel, copper, aluminum or any other suitable material. RPM is used in severely corrosive conditions. The parts are joined into a strong, rigid unit with system of bracings with bolts and lock washers. The ventilator withstands wind pressures equal to dead load of 30 lbs. per sq. ft.

Explosion Cap—For grain elevators and factories where dust explosions may occur, Robertson Ventilators may be equipped with explosion caps. They are hinged on both sides and open in the middle to make the full area of stack available. They withstand suction of 75 m.p.h. wind velocity without opening, but will open with explosion pressure inside of 4 lbs. per sq. ft.

TYPICAL ROBERTSON VENTILATOR CAPACITIES

Wind velocity: 8 m.p.h. Difference in temperature inside and outside: 20° F. Height of ventilators above air intakes: 50 ft.

Size, in.	Discharge cap., per min., cu. ft.*	Size, in.	Discharge cap., per min.,cu.ft.*	Size, in.	Discharge cap., per min.,cu.ft.*	Size, in.	Discharge cap., per min.,cu.ft.*
12	462	20	1499	42	5658	66	13872
14	665	24	1848	48	7398	72	16646
16	898	30	2882	54	9341	84	22472
18	1041	36	4160	60	11560	96	29358

*These figures represent *actual* measured exhaust capacities and not so-called "rated capacities."

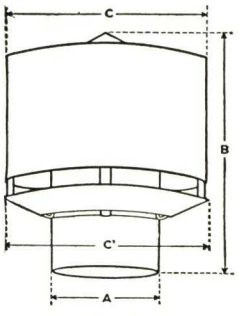


Fig. 2

Letters on diagram refer to accompanying table

DIMENSIONS, GAUGES AND WEIGHTS OF ROBERTSON VENTILATORS

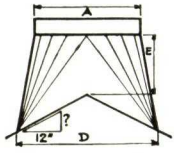
Letters here refer to accompanying diagram

Dimensions, in.				Gauge* galv. and RPM	App. net wt., lbs.		App. shpg. wt., lbs.	
A	B	C	C¹		Galv.	RPM	Galv.	RPM
12	22 5/8	22 3/4	24	24	31	46	64	81
14	27 1/16	26 1/2	28	24	40	59	77	99
16	29 3/4	30 1/8	32	24	48	70	96	125
18	32 7/8	34	36	24	57	87	138	172
20	38 7/8	37 1/2	40	24	71	103	166	209
24	45	45 3/8	48	22-24	110	160	299	357
30	55 3/8	57	60	20-22	191	247	443	529
36	67 3/4	67 1/2	72	20-22	275	358	545	647
**42	74 7/8	79 3/8	84	18-20	528	584	786	933
**48	89 3/8	91	96	18-20	635	782	1026	1219
**54	101 3/4	102	108	18-20	796	969	1219	1465
**60	108 5/8	113	120	18-20	1127	1395	1697	2052
**66	126 1/2	125	132	18-20	1360	1645	2182	2589
**72	129	136	144	18-20	1680	1995	2476	2932
**84	149 3/4	158 3/4	168	16-20	2314	2805	3146	3784
96	185 3/4	181 1/16	192	16-20	3890	4426	4568	5426

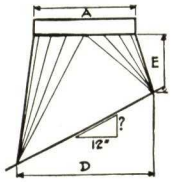
*Where two gauges are shown, heavier gauge is for stack only.
**Indicates that ventilator is shipped partially knocked down.

ROBERTSON VENTILATOR BASES

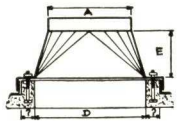
Can be furnished for any kind of roof. The types diagrammed below are commonly used. Round to square bases are strongest and are shipped unless otherwise ordered.



Type No. 1
To fit ridge of roof



Type No. 3
To fit slope of roof



Type No. 6
To fit over curb

Types 1 and 3 fit roofs of any slope. In ordering specify roof slope, type of base and kind of roof deck.

Type 6 fits concrete or wood curbs. Specify opening size and curb thickness.

DIMENSIONS, GAUGES AND WEIGHTS OF VENTILATOR BASES

Dimensions, in. Letters refer to diagrams			Gauges, RPM and galv.	App. net wt., lb.		App. shpg. wt., lb.	
Size A	Size D	Size E		Galv.	RPM	Galv.	RPM
12	16x 16	10	22	12	16	56	64
14	18x 18	10	22	18	23	63	73
16	21x 21	10	22	25	30	66	77
18	24x 24	10	22	35	40	79	90
20	28x 28	10	22	45	55	98	111
24	32x 32	10	22	55	75	106	120
30	38x 38	12	20	75	100	143	162
36	45x 45	14	20	110	140	173	200
*42	52x 52	**14	18	140	180	273	299
*48	60x 60	**15	18	190	230	432	495
*54	68x 68	**16	18	240	300	542	618
*60	78x 78	**20	18	300	380	539	627
*66	87x 87	**22	18	360	480	638	740
*72	96x 96	**24	18	460	580	841	968
*84	110x110	**26	16	660	770	1090	1221
*90	118x118	**28	16	785	920	1329	1485
*96	126x126	**30	16	935	1085	1514	1689

*Ventilator base in two pieces. **Dimension E for Type No. 6 bases, 42 in. and larger, is one-half of Dimension A.

ROBERTSON STREAMLINED VENTILATORS

Robertson Streamlined Ventilators not only provide a maximum opening for exhausting heat and fumes, where they are excessive, but also present a very pleasing appearance. This ventilator furnishes a continuous ventilating opening throughout its entire length. A patented damper is part of the ventilator. It can be made in any desirable length and has all the advantages of the round ventilator. It is especially desirable for mounting on Robertson Weatherproof Skylights.

Robertson Standard Rectangular Ventilators are furnished in smaller sizes.

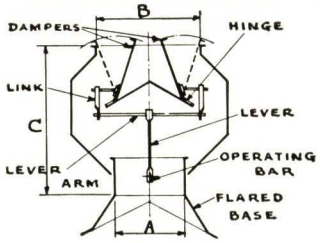


Fig. 3
Letters on diagram refer to accompanying table

DIMENSIONS, WEIGHTS, CAPACITIES OF ROBERTSON STREAMLINED VENTILATORS

Gauge of material	Dimensions, in. Letters refer to diagram			Net wt. per 1 ft. of length, lbs., (app.)	Capacities
	A	B	C		
22	6	9	12	35	90% of the total cubic foot per minute exhaust of the Robertson Standard round ventilator, per square foot of stack area.
22	12	18	24	50	
22	18	27	36	60	
22	20	30	40	75	
22	24	36	48	85	
22	36	54	72	140	
22	* 48	72	96	165	

*Shipped partially knocked down.

ROBERTSON FAN VENTILATORS

The standard Robertson Ventilator has long been known as one of the most efficient gravity-type ventilators on the market. To obtain greater flexibility for this ventilator under unfavorable atmospheric conditions and more positive ventilation at certain periods, an auxiliary power attachment may be incorporated in it. This combination is the Robertson Fan Ventilator.

Because of the scientific design of the free area outlets in the standard Robertson Ventilator, the auxiliary power attachment is able to set a new maximum for the number of cubic feet of air moved per minute per horsepower.

The power attachment is made in a separate unit and can be attached to any Robertson Ventilator, including those now installed. It can also be installed in the Robertson Rectangular Ventilator.

Motor Inside or Outside—For ordinary conditions, motor and fan are installed in the stack, as in Fig. 4. For severely corrosive conditions, the motor is installed on top of the ventilator cap as in Fig. 5. Automatic control, providing cut-in and cut-out of motor, furnished at extra charge. Explosion-proof type motors and variable speed motors can be furnished at an extra cost.

Damper Controls—Flat, butterfly or louvre dampers can be furnished in the ventilator stack. Damper control is either (a) *hand control,* by a simple chain or gear-operated shaft connected to rack and pinion and operated by hand wheel; or (b) *electric control,* by push button or thermostat.

Low Static Pressure—Static pressure loss due to velocity in Robertson Ventilators does not exceed ⅛ in. w.g. at a velocity of 1850 l.f.m. with air temperature 70° F. and barometric pressure 29.92 in. of mercury (sea level).

Lubricating Devices—Lubrication of motor and fan bearings by hand, from a convenient point near the floor of the building, for a single unit; or a centralized lubricating system for a series of units, can be furnished at an extra cost.

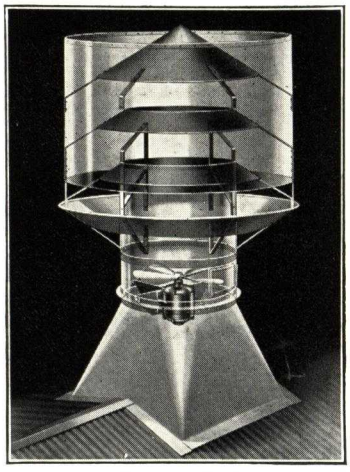


Fig. 4. Robertson Ventilator with Fan in Stack

TYPICAL CAPACITIES OF ROBERTSON FAN VENTILATORS

For complete tables write for Robertson Ventilation Data Book.

Wind velocity: 6 m.p.h. Difference in temperature inside and outside: 30° F. Stack action: 50 ft.

Vent diam., in.	Fan diam., in.	Number of fan blades	Motor hp. consumed	Total exhaust of fan and vent., cfm.	Shipping weight of fan, lb. (Fan, motor, mounting and collar)
12	8	4	1/20	576	80
14	10	4	1/40	788	95
16	12	4	1/40	1076	112
18	14	4	1/30	1485	140
20	16	4	1/20	1926	155
24	18	4	1/12	2592	175
30	24	4	1/10	4208	228
36	30	4	1/4	7236	270
42	30	4	1/4	8271	365
48	36	4	3/4	12492	415
54	42	6	1	16439	545
60	48	6	2	23558	795
66	54	6	2	26910	945
72	54	6	2	28395	1105
84	60	6	3	39182	1327

Table is for fans in ventilators where there is no duct in connection with installation. For static pressure data, write for Robertson Ventilator Data Book.

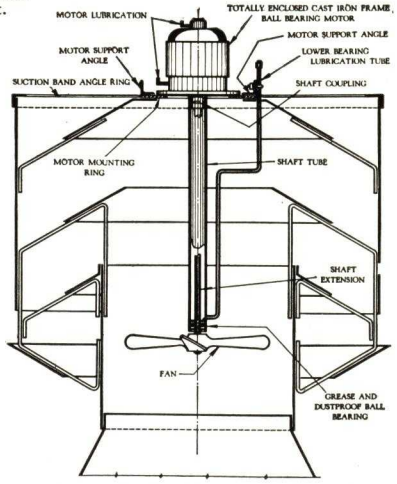


Fig. 5. Robertson Ventilator with Motor on Top of Cap

ROOSEVELT SHEET METAL WORKS

Manufacturers of Automatic Gravity Stage Ventilators

TELEPHONE
Havemeyer 4-5674

70-12 Roosevelt Avenue, WOODSIDE, N. Y.

CABLE ADDRESS
Kesswein—New York

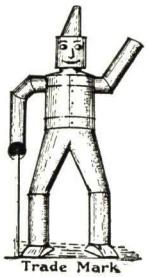
ROOSEVELT AUTOMATIC GRAVITY STAGE VENTILATOR—No. 37

Efficient and Reliable

The Roosevelt Automatic Gravity Stage Ventilator No. 37 is recognized for its excellence, efficiency and reliability for use over stages of theaters, schools, temples, auditoriums, etc.

Construction and Installation

The Roosevelt Automatic Gravity Stage Ventilator No. 37 is made to any specified dimensions in standard gauges of galvanized iron or copper. The ventilator is delivered or shipped knock-down, ready for quick assembly in any part of the United States, Canada or Europe. A complete set of erection details accompanies each shipment. When desired, we will be glad to supervise the installation.



Operation of Automatic Gravity Stage Ventilator No. 37

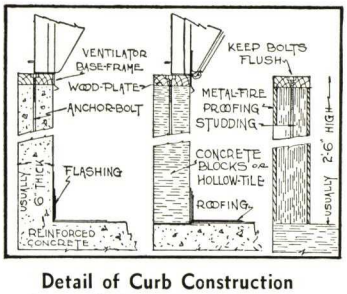
A series of reinforced metal sash controlled by an individual galvanized wire operating cable, attached to the top of each sash. The other end of the cables are connected through a turnbuckle to a fusible link designed to melt at 160° F. Thus, in case of fire, melting of the link automatically releases the sash permitting it to open by gravity long before the flames reach the ventilator. To simplify operation and to reduce the number of operating manila lines required, cables from the sash are grouped in a series of varying numbers (depending on the number of sash in the ventilator) and attached to steel adjustment plates, from each of which a single manila operating line passes to the building wall and thence to the stage level. At this point the manila operating lines are attached to a specially designed locking device plate, which in turn is joined to a single rope attached to a boat cleat on the stage floor. In emergency cutting, this single rope instantly releases and opens all sash in the ventilator. For ordinary ventilating purposes, one or all of these manila lines may be released manually at the locking device.

The locking device is designed to meet the requirements of the various State codes.

The top of the Roosevelt Automatic Gravity Stage Ventilator No. 37 is of hip skylight construction and is glazed with thin glass as prescribed by New York and other building codes. (This glass is frequently painted by the owner to exclude light.) Heat from a fire readily breaks this thin glass, the fragments falling on a U.S. No. 12 diamond wire (1-in.) mesh screen installed below the hip skylight. This feature protects those on the stage from injury and also provides additional through area for the quick escape of fumes and smoke.

The ventilator is easily mounted on a curb of ordinary construction (see detail below). The height of the curb should not be less than 2 ft. 6 in. from the finished roof so that snow drifts or other encumbrances will not interfere with the automatic outward openings by gravity of the ventilator sash. Bronze pivot type sash hinges are used to assure free action and freedom from corrosion.

Note: All dimensions of the ventilator should be outside-to-outside of the curb. Blue prints, showing detailed construction, planned to definite dimensions, furnished for architects' approval.



Detail of Curb Construction

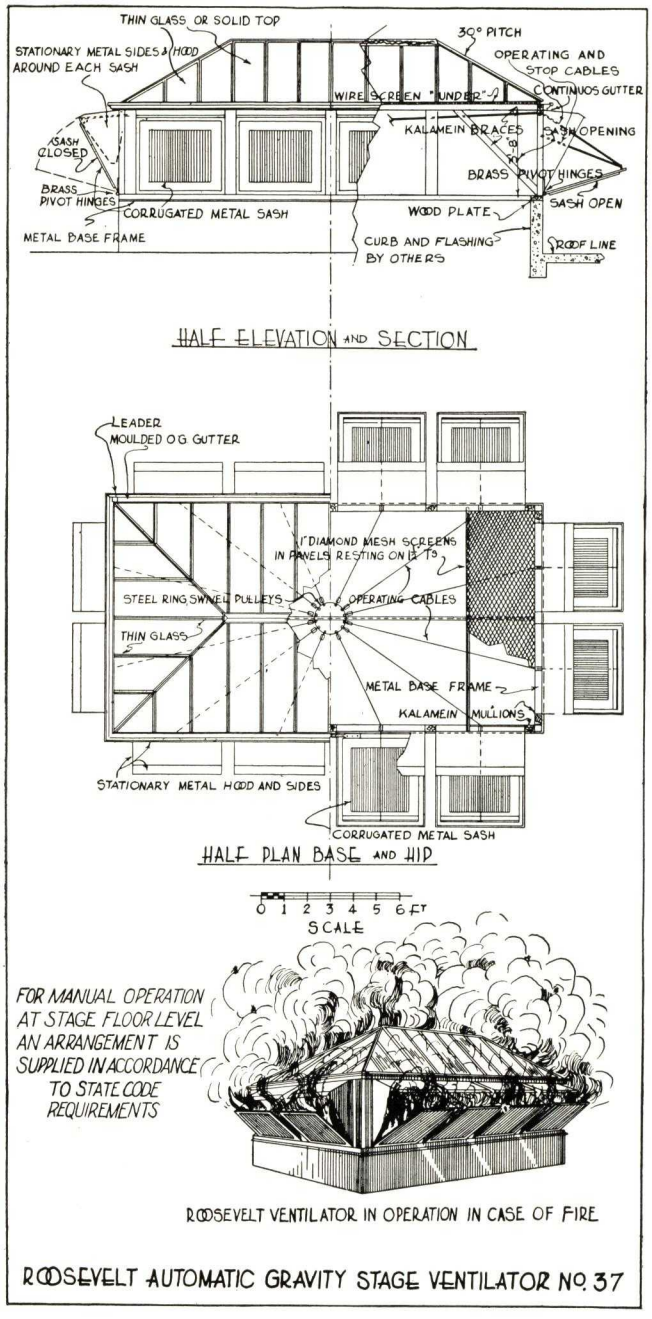
Note: Curbs, Plates, Bolts, Fireproofing Angles, Roofing and Flashing, not in "Roosevelt" contract.

Other Types

In addition to the No. 37 Automatic Gravity Ventilators, we manufacture a No. 37A which is identical in design, with the exception that all construction throughout is of steel.

Further Information

Additional information of Roosevelt Sheet Metal products gladly supplied on request.



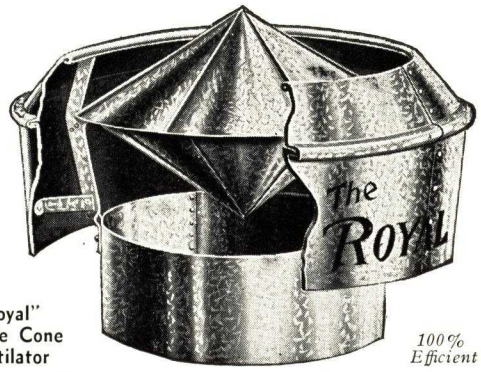
ROYAL VENTILATOR COMPANY

412 Locust Street, PHILADELPHIA, PA.

PRODUCTS

Manufacturers of "ROYAL" Double Cone Ventilators, Glass Top Ventilators, Rectangular and Square Ventilators with Fire Retarding Dampers, Insect and Bird Proof Ventilators, The "ROYAL" Fan Electric Ventilator, made of Galvanized Steel, Armco Iron, Copper, etc.

The ROYAL
TRADE-MARK
(Reg. U. S. Pat. Off.)



'Royal' Double Cone Ventilator

100% Efficient

"ROYAL" DOUBLE CONE VENTILATOR

The "Royal" is so designed that full advantage is taken of the wind to produce additional draft. Complete renewal of air is accomplished under the most difficult and unusual conditions by installing "Royal" Double Cone Ventilators. The many unique and original principles embodied in the design of the "Royal" make it 100% effective and insure positive ventilation under any weather condition. Tapered frustums deflect the outer air over and under the edges of the frustums resulting in a powerful suction in the tube; this means maximum exhausting capacity. Foul gases, etc., will readily pass out even when no wind is blowing. The inverted or bottom cone of the "Royal" avoids the creation of eddies, the outgoing air having a free outlet unimpeded by excess friction. The upward moving foul air, etc., strikes the inverted cone and is drawn directly upward and outward.

The "Royal" is not affected by down-drafts.

Construction—Superior and exclusive construction features include lapped seams, giving three thicknesses of metal at joints, usually the weakest point. Wired edges and galvanized malleable iron or copper stays so arranged that they cannot interfere with the passage of air currents. The double cone has standing seams and gives two thicknesses of metal instead of one.

Adapted for foundries, powerhouses, factories, as well as schools and other buildings.

Made in standard sizes 2 to 96 in.

Specification

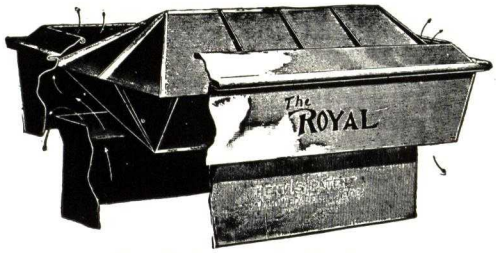
"Furnish and erect Royal Double Cone [Glass Top] Ventilators, manufactured by ROYAL VENTILATOR COMPANY, Philadelphia, Pa."

"ROYAL" DOUBLE CONE VENTILATOR DATA

Capacity Based on Test Made by Engineering Dept., University of Penna.

Size, in.	Cu. ft. exhaust per min., wind 5 miles per hour, Temp. dif. in bldg. and outside		Dimensions, in.			Area, sq. in.	Gage of iron	Weight of copper, oz.
	0°	20°	A	C	E			
10	141	186	12	16	10	78	24	16
12	159	317	13	19	12	113	24	16
16	388	512	17	26	16	201	24	16
18	490	832	18	29	18	255	24	16
20	606	911	21	31	20	314	24	16
22	709	1059	24	34	22	380	24	18
24	874	1373	24	39	24	453	22	18
26	1005	1631	24	42	26	527	22	18
28	1186	2080	26	45	28	615	20	18
30	1364	2390	26	45	30	707	20	18
32	1551	2700	25	47	32	804	20	18
34	1765	2987	28	50	34	908	20	18
36	1961	3361	28	56	36	1017	20	18
40	2424	4124	34	61	40	1257	18	18
42	2673	4680	32	68	42	1386	18	18
44	3124	5310	35	70	44	1620	18	18
48	3489	5987	39	75	48	1809	18	20
54	5414	8304	42	84	54	2390	18	20
60	6665	9721	47	94	60	2807	18	24
66	7851	13346	52	103	66	3504	18	24
72	10682	16910	50	108	72	4071	18	24

Bases made to fit any type or pitch of roof.



"Royal" Rectangular Ventilator

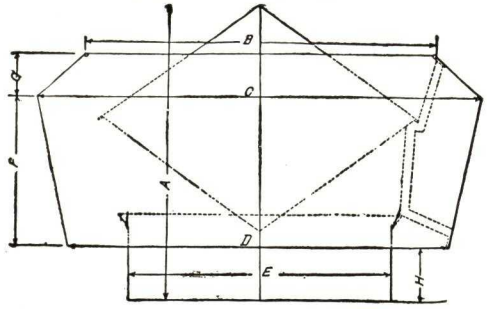
Designed to meet conditions where the maximum amount of ventilation is required at all times. Made in any desired size, with or without dampers, glass or metal top. Also made square

Cone Damper "Royal"

Used where low base is required. Lower cone is detached, slides on rod closing ventilator when lowered. Can be fitted with fusible link. Unobstructed air passage when damper is open

"Royal" Glass Top Ventilator

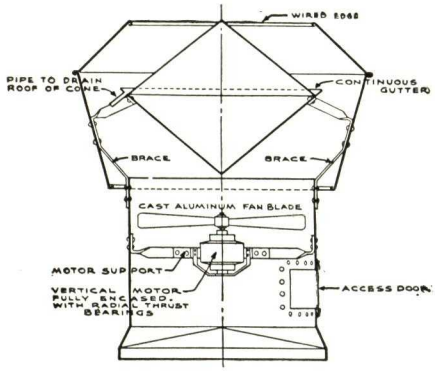
Contains a greater glass area, reflects more light, gives more ventilation. Can be fitted with damper that will not shut off light



Sectional Drawing "Royal" Double Cone Ventilator

Send for catalogue and detail card

"ROYAL" FAN VENTILATOR



The Royal Fan Ventilator is designed for buildings requiring immediate exhaust of hot air, fumes, smoke, steam, etc.

The head with Inverted Cone is similar in design to the Royal Double Cone Ventilator except that depth of cone has been increased and lower cone extended beyond upper cone. Friction is eliminated, a direct outward passage of air is assured: Upper and lower frustums have been extended to prevent outside air from entering ventilator, make same storm proof and increase capacity when motor is shut down.

Motors can be furnished for any combination of current specifications. Send for descriptive folder giving complete information

DATA ROYAL FAN VENTILATORS

Stack Size	Motor hp.	Fan speed r.p.m.	Capacity, fan and vent c.f.m.		Blade size	No. of blades
			Free air	⅛" S.P.		
12"	1/30	1650	1010	.....	12"	2
	1/30	1650	1110	.....	12"	4
16"	1/30	1150	1618	.....	14"	2
	1/20	1750	2308	1762	14"	2
18"	1/10	1150	2340	.....	16"	2
	1/10	1150	2490	1932	16"	4
	1/10	1750	3090	2632	16"	2
20"	1/10	1150	3486	1911	18"	2
	⅛	1750	3976	3211	18"	2
24"	⅛	1150	4374	.....	24"	2
	⅛	1150	5654	4473	24"	4
	⅙	1750	5924	5373	24"	2
	1/10	860	3474	.....	24"	2
30"	⅙	1750	6414	5990	24"	2
	¼	1750	8214	6964	27"	2
	⅛	1150	6024	.....	27"	2
36"	⅓	1150	9361	7961	32"	2
	½	1750	12011	.....	32"	2
	¾	850	7421	.....	32"	2
42"	1	1750	16773	16273	36"	2
	⅓	850	10423	.....	36"	2
48"	½	860	19789	.....	48"	2
	1	1150	25329	23489	48"	2

UNO VENTILATOR COMPANY

Manufacturers of Electric Welded Ventilators

OFFICE AND WORKS

CLIFTONDALE STATION, SAUGUS, MASS.

The Uno Company and Its Products

The UNO VENTILATOR COMPANY was established in 1906. During the life of the Company hundreds of Uno Ventilators have been manufactured and distributed through the prominent metal jobbers of the country, for installation on every type of building, including industrial plants, churches, theatres, restaurants, garages, etc.

No one ventilator can possibly be the satisfactory answer to every ventilating problem. Results desired and local conditions necessarily control the selection of proper equipment. For this reason UNO manufactures a complete line of ventilators as described below.

Standard Specifications for Uno Ventilators

The roof ventilators shall be Uno..... of standard construction as manufactured by the UNO VENTILATOR COMPANY, Cliftondale, Mass. Sizes shall be as shown on plans. All ventilators shall be of standard weights of galvanized iron (or copper) as used by the UNO VENTILATOR COMPANY. Metal bases supporting the ventilators shall incorporate drip gutters to carry off condensation.

A UNO VENTILATOR FOR EVERY REQUIREMENT

Uno Standard Turbine

The Uno Standard Turbine Ventilator is the original turbine.

The moving breeze, whirling the head at no operating cost, causes such a powerful upward lift to the air column below, as to raise solid matter.

The Uno Standard has the highest of duct velocities. Its guaranteed exhaustive capacities have been determined by the equipment of the foremost technical institute of the country, in conjunction with the services of outstanding engineers.

Every mechanical precaution has been taken to make the Uno Standard absolutely rigid in any gale. Extra strong steel braces, securely welded to steel reinforcing bands on the inside of the body, support the whirling head.

Patented bearings, needing no lubrication, give quiet, long life, like a high grade watch.

Sizes 18 in. and up carry extra inbuilt propellers, revolving with the head, to give added suction.

The Uno Standard is infallible in its exhaustion, whether the air be hot or cold, damp or dry, dirty or clean.

Available in galvanized iron or copper.

CAPACITIES

Diam. body, in.	Exhaustive cap. (cu. ft. per hr.) 4 Mi. Breeze	8 Mi. Breeze	Approx. weight packed, lbs.
4	8,000	10,000	7
6	10,400	14,100	9
7	13,500	17,400	10
8	16,800	20,500	25
9	22,400	28,300	27
10	26,500	32,500	30
12	39,000	47,000	33
14	41,000	48,100	45
15	52,500	67,500	50
16	60,000	72,000	55
18	87,000	103,000	72
20	105,100	125,600	88
21	115,000	128,000	100
24	151,000	187,000	120
30	225,000	272,000	275
36	285,000	332,000	325

Special gauges in any metal furnished on order.

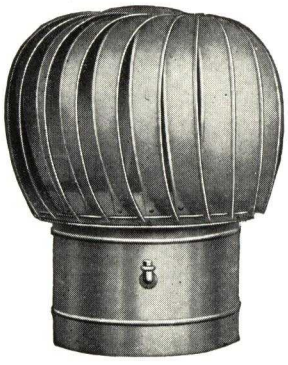
Uno Mototurb

Many ventilating problems demand the assured lifting power of a turbine, with guaranteed exhaustion, irrespective of wind velocity.

When there is a wind, the Uno Mototurb spins, with no operating cost. When there is a dead calm, switching on the motor fan spins the head, thus creating its own constant exhaustion. With no gears or complicated mechanical gadgets, this combination unit assures the user of quiet, guaranteed exhaustion under any wind conditions, at low cost.

Prices quoted depend on the local current, local voltage, and other operating conditions. Ask for further information.

Uno Flue Doctor Turbine



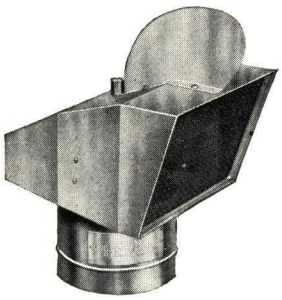
The Uno Flue Doctor is designed to fill the turbine demand where price is paramount. It creates drafts in poor chimneys, prevents downdrafts in flues, and affords protection to oil burners and gas pilots.

It is an excellent medium for ventilating all average spaces, such as poultry houses, garages, restaurants, stores, attics, etc.

A braceless unit of sturdy construction, it requires no lubrication. Sensitive to the lightest breeze.

Sizes 4 to 18 in.; capacities same as for these sizes in table above.

Uno Rotohood



The Uno Rotohood Ventilator, a swinging hood unit, operates efficiently and quietly at no cost.

Revolving on sensitive bearings, it always faces away from the wind, and moving air currents cause a continuous suction in the mouth, resulting in an upward flow of air through the duct. The opening is guarded with metal screening against ingress of birds, insects, flying snow, etc. Standard sizes to 60 in.

Uno Arrow Stationary

Especially suitable for skylights, stores, attics, factories, stables, dairies, garages, etc.

Uno Arrow Ventilator combines two unusual features—extreme merit and low price. Standard sizes to 60 in.

Through its siphoning principle, and its shield of triple cones, no downdrafts can possibly enter the duct. It is therefore especially efficient under poor local conditions, like obstructing buildings, neighboring walls, trees, etc., where the moving breeze cannot reach and spin a turbine.

THE SWARTWOUT COMPANY

Ventilation—Industrial and Commercial

18515 Euclid Avenue, CLEVELAND, OHIO

DISTRICT OFFICES

ATLANTA, GA., 1008 Norris Bldg.
BUFFALO, N. Y., Hawkins & Howlett, 243 Capen Blvd.
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CHICAGO, ILL., 549 W. Randolph St.
COLUMBUS, OHIO, 1085 E. 17th Ave.
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DETROIT, MICH., 600 Michigan Theatre Bldg.
HOUSTON, TEX., H. T. Rieley, Lamar Annex
KANSAS CITY, MO., 106 Carmen's Bldg.
MILWAUKEE, WIS., Arno N. Dietze, Security Bldg.
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WASHINGTON, D. C., H. H. Crowell, Mills Bldg.

AGENTS IN OTHER PRINCIPAL CITIES

Swartwout Ventilators

Three types of Industrial and Commercial Building roof ventilators are manufactured by THE SWARTWOUT COMPANY. (1) Swartwout Rotary Ventilator which has been a favorite with architects for over a quarter century. (2) Swartwout AirJector, a fan ventilator of correct design and large capacity, (3) Swartwout-Dexter Heat Valve, the original continuous-opening ventilator which has become extremely popular during the last two years. In one or the other of these types you will find the ventilator that will exactly meet requirements for economical satisfactory ventilation, for smoke or fume removal, or for any other ventilation needs.

Engineering Service

A staff of competent Ventilation Engineers is maintained in principal cities throughout the country. They offer you their personal services and experience without obligation on your part. Consult the one in your locality on ventilation problems and secure his recommendations and suggestions. Substantial savings are often effected in this manner, besides you have the assurance of the proper equipment for the most satisfactory performance.

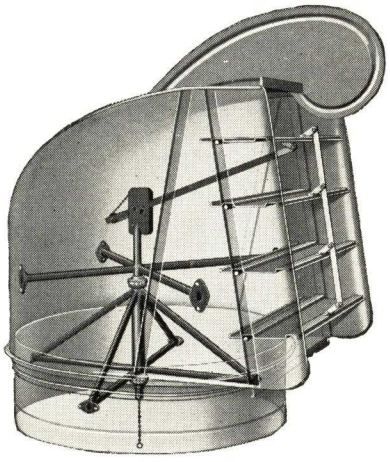
A line or telephone call to local office or direct to factory in Cleveland will bring complete data to you.

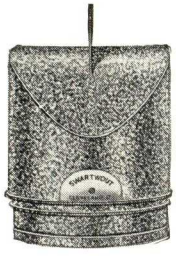
Swartwout ROTARY BALL BEARING VENTILATOR

Description

Constructed of heavy gauge galvanized copper bearing steel (or special material such as copper, aluminum, lead coated steel, etc. when required) over a welded steel tubing frame making the ventilator very strong and rigid. Turns freely on fully enclosed dust-tight stainless steel ball bearings, upper bearing taking the load, lower bearing the thrust. Outside louver dampers provide for tight closing or full capacity opening (with intermediate position on sizes above 24 in diameter). When dampers are closed accumulated dust is thrown *outside*. Low slung vane and modern lines give it an unusually attractive appearance and high individual capacity.

Write, wire or telephone for data with complete capacity tables.





Rear View

Front View

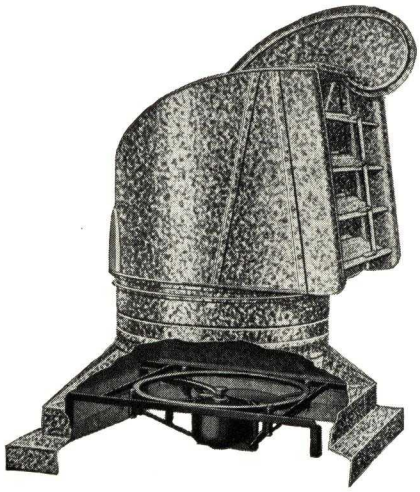
Side View

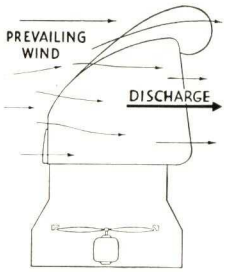
Where Used

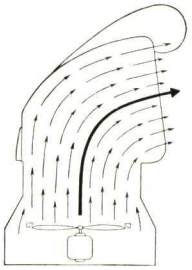
On all types of Industrial and Commercial Buildings wherever ventilation, smoke or fume removal is required—and where gravity ventilation can be used. Typical examples are: forge shops, steel mills, process plants, machine shops, pickling buildings, assembly buildings, stamping shops, laboratories, etc.

THE SWARTWOUT COMPANY

Swartwout AIRJECTOR







Design Superiority

Unlike other types of fan ventilators the discharge from the Swartwout AirJector is always with the wind as illustrated opposite. The revolving head turns with the slightest outside breeze to accomplish this. That practically eliminates static pressure, providing greater capacity per motor size and power consumed. Thus operating savings effected over a period of time are remarkable.

Description

In the base of the standard Swartwout Rotary Ventiilator a propeller type fan is inserted, which combination makes the Swartwout AirJector. Fan mounting supports extend below base to form anchor straps tying base to building when construction details and framing are provided therefore. Can be furnished for peak, slope, or flat roof curb installation in sizes from 18 to 72-in. ventilator diameter in various speeds and capacities indicated in table. Complete catalog and detail information sent on request.

Where Used

For all types of buildings where power ventilation is required—industrial, commercial, schools, hotels, etc. It is especially adapted in Industry for smoke and fume removal—on forge shops, galvanizing plants, over pickling tanks, in foundries, heat treating buildings, spray booths, welding shops, pump houses, and similar locations. Our Engineers will analyze your conditions without obligation and give you recommendations and suggestions for the most satisfactory results.

Features

(1) Discharge *always with the wind*—not against it—less static resistance.

(2) Greater capacity per power consumed.

(3) Lower operating cost.

(4) Greater capacity per size motor and ventilator.

(5) Furnished with base and head completely assembled. Easy and inexpensive to install.

(6) Fully enclosed ball bearing motors—with sealed-in lubrication if desired.

(7) Aluminum propeller blades are standard. Monel can be furnished for acid resistance.

(8) Ventilator and base standard construction galvanized copper bearing steel. Special metals and acid-resisting materials can be furnished when required.

(9) When fan is not operating, large capacity gravity ventilation is secured. Thus the AirJector performs double duty and power savings are possible at times when full fan capacity is not required.

(10) Standard ventilator dampers permit closing entirely when air movement is not desired.

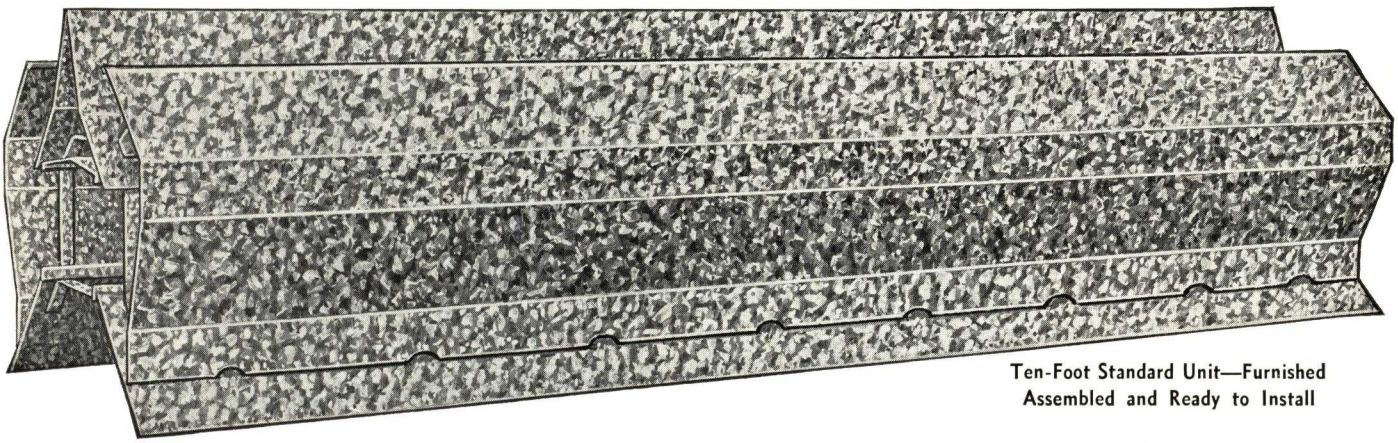
SIZES AND CAPACITIES OF SWARTWOUT AIRJECTORS

AirJector size, in.	Single Propeller Fans				Double Propeller Fans				Quiet Operating Fans			
	Fan size, in.	Capacity, c. f. m.	Speed, r. p. m.	Motor, h. p.	Fan size, in.	Capacity, c. f. m.	Speed, r. p. m.	Motor, h. p.	Fan size, in.	Capacity, c. f. m.	Speed, r. p. m.	Motor, h. p.
20	16	2000	1750	1/20					17	2100	1125	1/20
24	19	4300	1750	¼	20	3600	1750	1/10	17	2500	1725	1/10
30	24	4800	1150	⅙	24	5100	1150	⅙	24	5500	1125	⅙
30	24	6100	1750	¼	24	7700	1750	½	24	6500	1725	¼
36	26	6200	1150	⅙	28	9000	1150	⅓	28	6600	1125	⅙
36	26	7500	1750	¼	28	9400	1725	½	26	7500	1725	¼
42	31	10000	1150	¼	31	11500	1125	½	31	9300	1150	¼
42	31	15000	1750	1	31	18500	1725	2	31	15000	1750	1
48	36	11500	1150	¼	36	14500	1150	½	36	14400	1125	½
48	36	17000	1750	1	36	20000	1750	2	36	16500	1725	1
54	*44	39000	1750	5	*44	30000	1125	2	*44	28500	1150	2
54									*44	32000	1725	3
60	*49	46000	1750	5	*44	36000	1150	3	*49	35000	1150	3
66	*55	43000	1150	3	*55	44000	850	3				
72	*55	50000	1150	5	*49	57500	1750	10				

*Furnished in A. C. 2-3 phase, 220-440-550 volts only. All others in 110-220 volts A. C. and D. C. also.

Swartwout—DEXTER HEAT VALVE

The Swartwout Co. Is Exclusive Licensee Under Pat. Nos. 1611005, 1917218 and Others Pending



Ten-Foot Standard Unit—Furnished Assembled and Ready to Install

The original continuous opening roof ventilator—the only "HEAT VALVE" *made—and is completely protected by patents*

Description

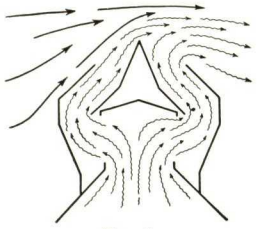


Fig. 1

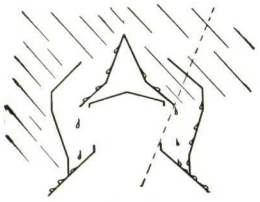


Fig. 2

The design of the "Heat Valve" as illustrated provides for the shortest possible travel of discharge air through ventilator *continuing the natural upward flow of warmer inside air,* thus reducing ventilator friction to the minimum and giving an exceptionally large capacity per square foot of opening. In addition, the contour of ridge cap and side baffles divert outside air currents *upward* thus providing a suction effect on ventilator which augments gravity flow and increases capacity.

Drainage is provided by weep holes as illustrated in Fig. 2. Ventilator is absolutely weathertight and stormproof.

A continuous damper permits tight closing, partial opening or full opening.

Furnished in heavy gauge galvanized copper bearing steel or in special materials if desired.

Advantages

(1) Provides greatest roof opening at least cost.
(2) Can be installed on ridge of peak roof or on flat roof with curb.
(3) Provides more uniform ventilation—eliminating "spots."
(4) Extremely easy and inexpensive to erect—no separate base required.
(5) Can be installed in any length units desired—standard sections 10 ft. long.
(6) It is architecturally attractive. Its low design permits using with all styles of architecture without fear of unsightly appearance—in many instances it is entirely unnoticeable.
(7) Ideal for use on skylights—providing positive ventilation without light interference.

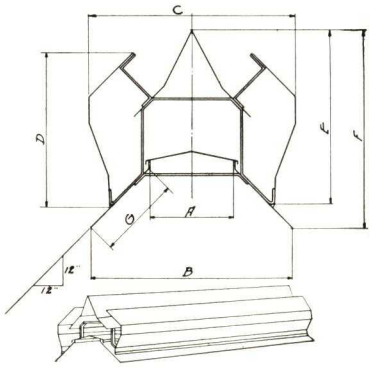
Where Used

On all types of single-story buildings and for top floors of multi-story buildings. It is especially adaptable where an excessive amount of heat, smoke, or fumes have to be removed, as it provides large area opening at comparatively small cost. Typical installations include steel mills, machine shops, heat treating shops, forge shops, galvanizing plants, annealing building, glass plants, paper mills, rubber plants over tire and tube molds, pump houses, compressor stations, etc.

Engineering service gladly rendered without obligation to you. Write, wire or telephone for complete details.

SIZES AND DIMENSIONS (INCHES) OF SWARTWOUT-DEXTER HEAT VALVES

Size	Gauge	A	B	C	D	E	F	G
4	24	4	11 3/4	11 1/2	8	10 1/4	12 1/4	5 1/2
6	24	6	17 7/8	14 1/2	10 7/8	12 7/8	16 1/2	8 3/8
9	24	9	22	22 3/4	15 3/4	18 1/2	21 1/2	8 7/8
12	22	12	29 1/8	29	21 1/2	24 3/8	27 1/2	12
18	20	18	38 1/2	43 3/4	29 1/2	34 3/4	37 7/8	14 1/2
24	18	24	53 3/4	58	38 3/4	46 1/4	51 1/4	21
36	18	36	73 1/2	87	59 1/4	66 1/2	70	26



WESTERN ROTARY VENTILATOR CO., INC.

HEAD OFFICE
1720 East 14th Street
LOS ANGELES, CALIF.

BRANCH OFFICE
401 North Peoria Street
CHICAGO, ILL.

DISTRIBUTORS

BEAUMONT, TEXAS., J. T. Booth Co., 990 Fannin St.
DALLAS, TEXAS, J. L. O'Hearn Co., 630 Wilson Bldg.
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SEATTLE, WASH., Puget Sound Sheet Metal Works

Products

WESTERN ROTARY (Turbine) VENTILATORS.
WESTERN FAN VENTILATORS.

Also Forbes Syphonaire (Stationary) Ventilators and Forbes Tri-Peller Exhaust Fans.

Western Rotary Ball Bearing Ventilators

Designed primarily to give the entire construction industry a turbine ventilator that is efficient at a very low wind velocity, symmetrical in design, absolutely silent in operation, and at a very reasonable cost.

The turbine revolves around a central support-shaft upon almost frictionless bearings, floating in a bath of oil and graphite and absolutely sealed against dust, dirt, steam and smoke.

The Western Rotary is in reality an exhaust fan which derives its power from wind at even two miles an hour. This creates a centrifugal action through its turbine construction, forcing a steady circulation and aiding natural action by the mechanical lift of this revolving head. Thus a maximum degree of venting efficiency is produced.

Specify—The Western Rotary Ventilator as manufactured by the WESTERN ROTARY VENTILATOR CO., INC., of Los Angeles, Calif.

Western Fan Ventilator

In this unit *forced draft* and *gravity* ventilation is obtained in one complete machine. By this we mean a ventilating unit that will operate efficiently at no cost whatever when the outside temperature is normal. However, an exhaust fan of high efficiency is at your service for the days when the wind velocity is low and the humidity and temperature high. This fan operates from light circuit at very low power cost. Any job that can use an exhaust fan can use this unit to advantage through a saving in power cost, flexible operation and cost of installation. No penthouse is necessary with this unit. An excellent exhaust is obtained at no power cost through the turbine head. Motors are fully enclosed with thrust bearing for vertical shaft mounting. Propellers are of cast aluminum, polished and carefully balanced.

Specify—Western Fan Ventilators as manufactured by WESTERN ROTARY VENTILATOR CO., INC., of Los Angeles, Calif.

DIMENSIONS, GAUGES, WEIGHTS WESTERN ROTARY

Stock sizes, in.	Height, in.	Gauge of iron	Air displacement cu. ft. per hour 4 mi. velocity	Weights, lb.	
				Net	Crated
6	12	26	14,360	7	12
8	12	26	17,400	9	15
10	15	26	26,100	12	20
12	18	26	38,300	17	26
14	22	24	43,200	25	35
16	24	24	50,000	30	45
18	28	24	76,310	35	53
20	31	24	109,200	42	63
24	36	24	149,000	70	105
30	42	22	230,000	94	150
36	52	22	300,000	161	210
42	62	20	376,000	200	250

Note: Prices and discounts on application.

DIMENSIONS, WEIGHTS, ETC., WESTERN FAN

Sizes, in.	Displacements, 60-cycle	R.p.m., 60-cycle	Motor hp.	Weights, lb.
12	1300 C.F.M.	1725	1/20	35
14	1530 C.F.M.	1725	1/20	40
16	1710 C.F.M.	1140	1/15	55
18	2070 C.F.M.	1140	1/15	60
20	2740 C.F.M.	1140	1/6	70
24	3540 C.F.M.	1140	1/8	125
30	5000 C.F.M.	1140	1/6	175

ATLANTIC STEEL COMPANY

Correct Ventilation for Underneath Buildings

ATLANTA, GA.

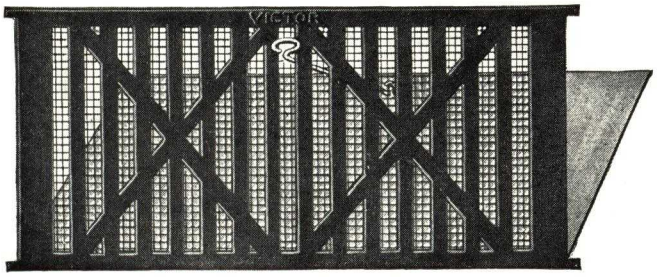
Distributors for New York, New Jersey and Connecticut: J. W. FISKE IRON WORKS, 78-80 Park Place, New York, N. Y.

VENTILATORS FOR FOUNDATIONS AND BRICK WALLS

Correct building ventilation will protect buildings against dry-rot. Ernest G. Blake, M.R.S.I., noted authority on timber, sums up dry-rot as follows:

"One of the greatest enemies of timber . . . a highly infectious fungoid disease caused by the action of a vegetable parasite operating under suitable conditions . . . the four conditions necessary for germination and development are dampness, stagnant air, warmth and darkness."

The Victor Vent is a complete unit offering building ventilation with safety — safety from the ravages of dry-rot, rodents, reptiles and insects.

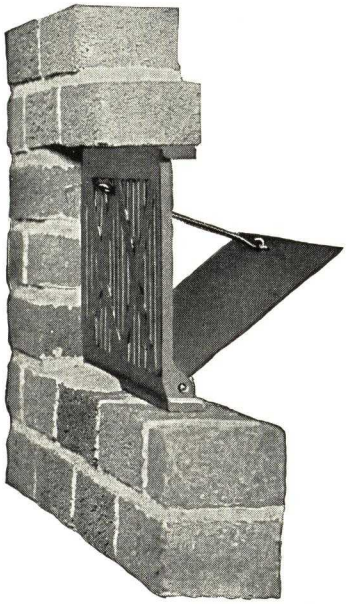


Victor Vent with Shutter Open

Victor Vent with Shutter Closed

Construction—The Victor Vent is neatly and strongly made of cast iron—a single casting, 9x16 in. over all, with an arch bar over an inch in width to provide sturdy support for brickwork above. The vent face is divided into two parts, each side carrying six ½-in. bars, spaced ½ in. apart, and reinforced with cross bars on each side, adding extreme reinforcement and lending ornament to design. All vents are dipped in black paint.

Protection against reptiles, rodents and larger insects is afforded to buildings equipped with the Victor Vent by a non-rust 8x8 mesh galvanized hardware screen riveted to back of vent.



Showing Method of Victor Vent Installation in Brick Wall

Operation — The novel feature of the Victor Vent is the shutter. Operating on a rolled hinge and made of sheet iron, the shutter is hinged to the bottom of the casting and attached to a push rod which extends through the frame. Ample ventilation is afforded by pushing in rod which causes the shutter to fall back. The shutter may be closed from the outside by simply pulling out the push rod and allowing it to hang down, its leverage and weight providing an efficient fastener.

Installation — The Victor Vent has been designed for neat and speedy installation. No unsightly seams, joints or cracks mar the appearance of your brick wall when installed. The top arch bar and two bottom lugs extending from the frame are the same thickness as the mortar joint. They are over an inch in width, of very strong construction and will support all necessary brickwork above.

The width and height of the ventilator frame have been carefully calculated by a practical architect and will permit its insertion into new buildings without any unnecessary brickwork.

Specification for the Victor Vent

All ventilators used below buildings shall be Victor Vents of the standard construction of the ATLANTIC STEEL COMPANY, Atlanta, Georgia.

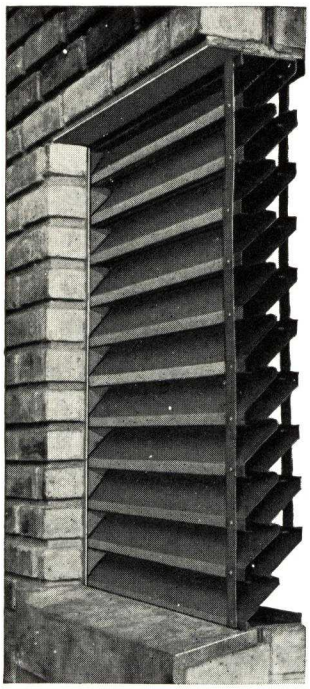
AMERICAN SHEET METAL WORKS

Manufacturers of Hoal's Louvers (Patented) ; Crescent Skylights, Hollow Metal Windows; Fire Doors and Shutters, Bronze and Aluminum Doors

331 North Alexander Street
NEW ORLEANS, LA.
TELEPHONE, GALVEZ 3191

132 Nassau Street
NEW YORK, N. Y.
TELEPHONE, BEEKman 3-3448

EASTERN OFFICE AND TERRITORY: 132 Nassau Street, NEW YORK, N. Y.

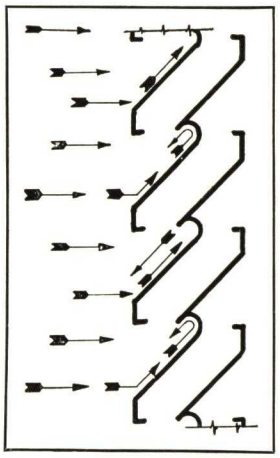


Section Through Louver Showing Leakproof Construction

HOAL'S ALL-METAL LOUVERS ARE RAIN AND SNOW PROOF

A louver that really keeps out the rain and, at the same time, gives proper ventilation, has been a dire need in building construction for many years. This need is now fully taken care of with Hoal's Leakproof Louver.

A moment's examination of the diagram at the right will explain the working principle of Hoal's Louver and show how it checkmates the rain perfectly. The arrows show the rain is driven against the louver, how it is caught and turned back to drain off the outside of the building. Like many other revolutionary devices, Hoal's Louver is as simple as it is efficient.



How Hoal's Leakproof Louver Checkmates Rain

Features of Hoal's Louver Construction:

(1) All-metal. No wooden frame.

(2) Hoal's Louver is made in a rigid manner. Blades riveted to frame eliminating solder and properly braced to withstand wind pressure of the severest kind.

(3) Buildings equipped with Hoal's Louvers can never be damaged even in the severest of rain or snow storm.

(4) Hoal's Louver is made of copper bearing galvanized steel, copper, aluminum, monel, stainless steel and acid-resisting alloy steel.

(5) Hoal's Louver is manufactured to fit any size wall opening and of architectural designs such as shown in diagram below.

(6) Jambs are made in any type to securely anchor louver to any type wall construction as shown in illustration.

(7) Standard Hoal's Louvers are made in 26-gauge copper bearing galvanized steel and 16-oz. cold rolled copper. Blade design and construction materially strengthens the slats, making it possible to use lighter material than that required for ordinary louvers. However, heavier materials can be furnished if so desired.

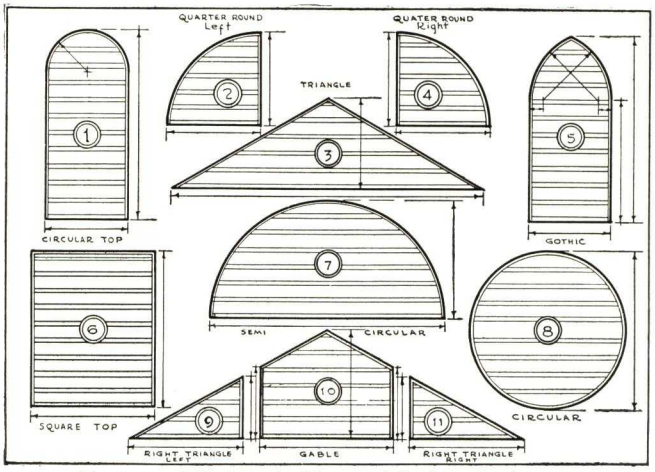
Engineering Service

Our Engineering Department is at your service in offering suggestions and in solving your problems of adapting louvers to any type of construction desired.

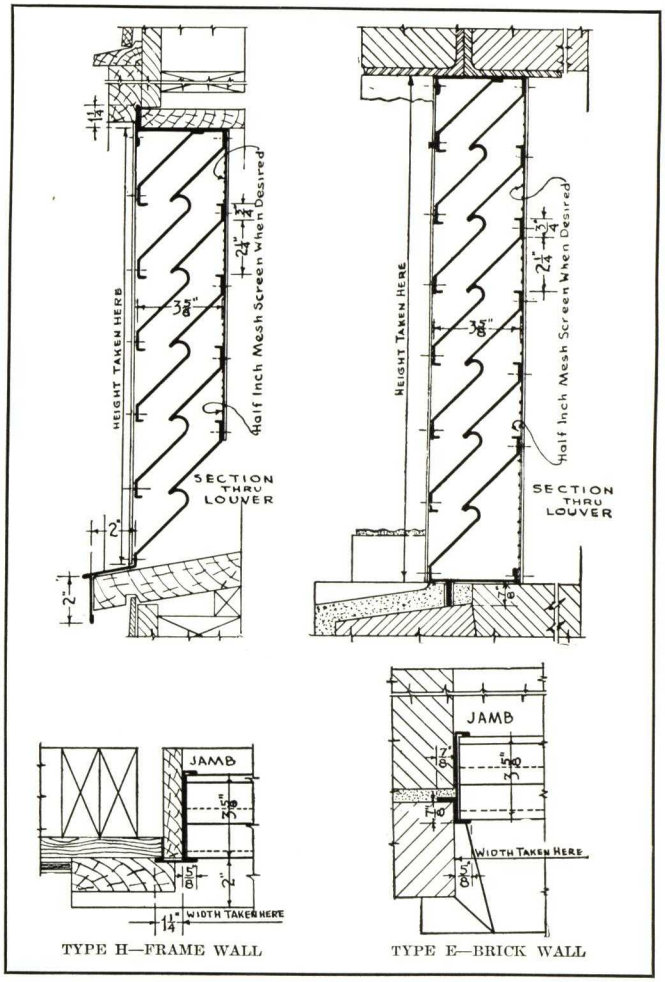
Shipments made promptly.

Specification (Insert in Masonry or Carpentry Contract)

Furnish and install, where shown on plans, Hoal's Louvres of size and design as indicated, manufactured by the AMERICAN SHEET METAL WORKS, New Orleans, La., and New York, N. Y. These louvers shall be made of (state kind of material). The louver frames shall be constructed in such a manner so as to insure a watertight connection between the frame and the wall.



Diagrams of Various Architectural Designs for Louvers



Sections Through Louvers—Suggested Jamb Constructions for Architects' Convenience

H. H. W. BERGMANN & CO.

ESTABLISHED 1908

Beco Adjustable Louvers–Hoal's Louvers–Ventilating Specialties

TELEPHONE:
BEEKman 3-3448

126-132 Nassau Street, NEW YORK, N. Y.

Products

Beco Adjustable Louvers	Temperature Control Dampers	Fan Louvers	Fire Retarding Registers
Hoal's Stationary Louvers	Aluminum Back Pressure Dampers	Air Diffusers	Roof Ventilators

BECO ADJUSTABLE STORMPROOF LOUVER

In ventilating all types of buildings, adequate provision must be made for controlled air-intake to operate any type of ventilating or air conditioning system. To meet these demands Beco Adjustable Stormproof Louver has been developed and perfected to produce a unit that is weatherproof under *all* conditions, and at the same time regulate amount of opening or volume of air-intake desired.

Unique design of hollow metal frame and louver blade mounting is such that a stormproof unit is obtained in one compact louver. In power houses and transmitting stations, *where the stormproof feature is essential,* the Beco Adjustable Stormproof Louver has been used successfully under all weather conditions.

Beco Adjustable Stormproof Louver
Illustrating two louvers with a vertical mullion made for large size wall openings

Architects and engineers designing *industrial buildings* can safely recommend this louver for either wall or monitor skylight installation as a most practical ventilating unit.

In *churches, schools,* and *public buildings* architects should value this louver not alone for controlled ventilating service, but also for protection of interior wall decorations against destructive weather elements.

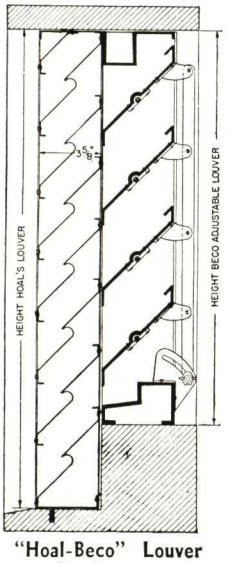
Features of Design and Construction

(1) Hollow metal frame of 18-gauge galvanized steel, with jambs for any type wall opening. Blades of 16-gauge galvanized steel. Also copper frames of 32-oz. and blades of 48-oz. cold rolled copper.

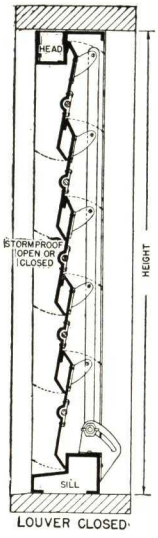
(2) Heavier gauge material can be furnished when required up to No. 10.

(3) Blades pressed into shape for rigidity, will not sag or buckle.

(4) Blades mounted and accurately balanced on brass bearings with bronze pivots.



"Hoal-Beco" Louver Combination
Recommended where a "Hoal's" Stationary Blade Louver on the exterior side of a building is desired



(5) Ball bearing blades are optional, furnished on special order.

(6) All blades operate in unison and do not protrude when in open position. Blades can be removed in case of emergency without removing frame from wall.

(7) Blades are easily operated and open to 45° with adjustable locking device.

(8) Fire retarding automatic closing device furnished when specified. Blades close by gravity.

(9) Louvers made of galvanized steel, cold rolled copper, aluminum, monel metal, stainless steel and acid-resisting alloy steel.

(10) Beco Adjustable Stormproof Louvers are made in single units and for large size wall openings, a series of mullioned units are made to fit any size opening.

(11) Wire mesh screens can be furnished on exterior of louver when required.

(12) Gear operators to regulate louvers in series for remote control are furnished on special order.

Engineering Service

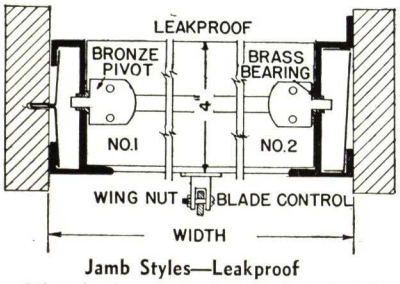
Our Engineering Department is at your service in offering suggestions and in solving your problems of adapting louvers to any type of construction desired.

Shipments made promptly.

Specification

(Insert in Masonry Contract)

Furnish and install where shown on plans Beco Adjustable Stormproof Wall Louvers of size and type as indicated, manufactured by H. H. W. Bergmann & Co., 132 Nassau Street, New York, N. Y. These louvers shall be made of (state kind of material) of the manufacturer's standard gauge or weight. The louver frames shall be constructed in such a manner so as to assure a watertight connection between the frame and the wall.

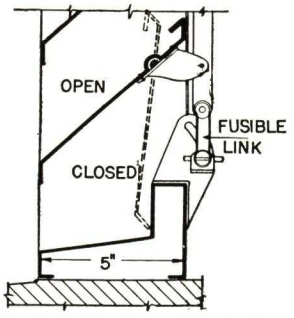


Jamb Styles—Leakproof
Other jambs can be furnished to install louver in any type wall structure and opening

A PARTIAL LIST OF STANDARD SIZES

Width, in.	12	18	24	30	36	42	48	54
Height of Louver (Inches)	12	12	12	12	12	18	24	24
	18	18	18	18	18	24	30	30
	24	24	24	24	24	30	36	36
	36	30	30	30	30	36	42	42
	48	36	36	36	36	42	48	48
	.....	48	42	42	42	48	60	60
	.....	.....	48	48	48	60	72	72
	.....	.....	60	60	60	72	84	84
	.....	.....	72	72	72	84	.....	.....
	.....	.....	.....	.....	84	.....	.....	.....

Beco Louvers can be furnished in any size.
Special Type for Glass Block Wall.



Beco Fire Retarding Wall Louver
Blades arranged for automatic closing in case of fire

BENJAMIN RIESNER

Manufacturer of the Riesner Ventilating Brick

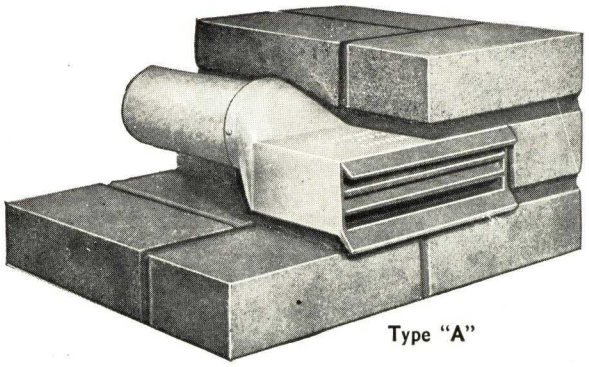
TELEPHONE
BUtterfield 8-8580

353 East 78th Street, NEW YORK, N. Y.

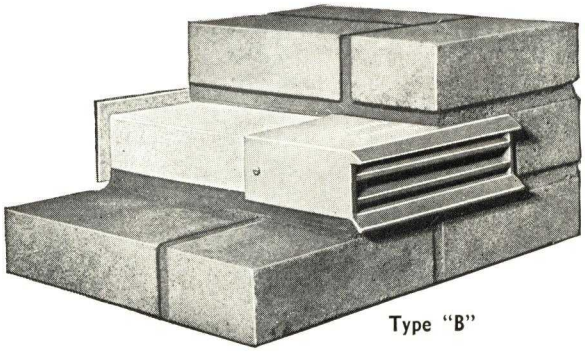
ARCHITECTURAL EXHIBITS IN PRINCIPAL CITIES

For Riesner Ventilating Brick for Venting Oil Tanks, see File Index

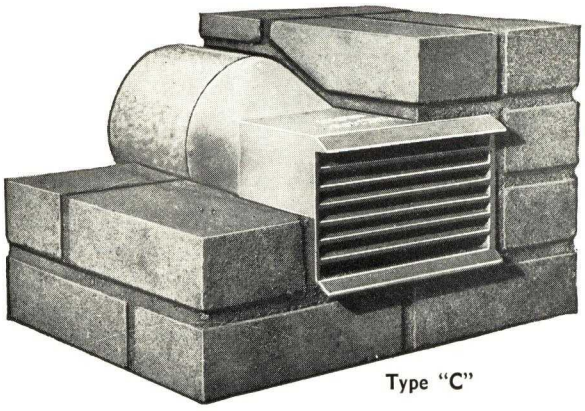
RIESNER VENTILATING BRICK—A LOUVERED WALL VENTILATOR



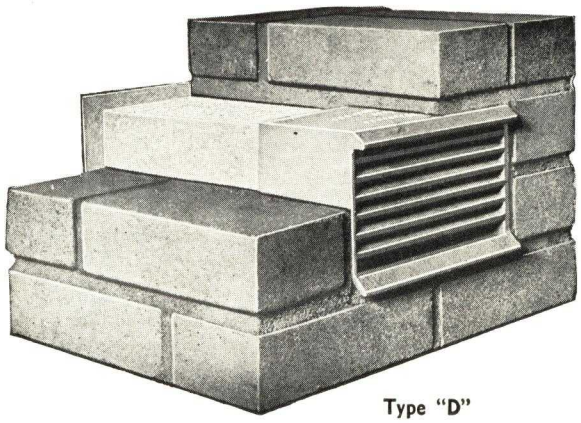
Type "A"



Type "B"



Type "C"



Type "D"

The Riesner Ventilating Brick is a hollow metal ventilating device which extends *through* the wall. It is the shape and size of one or two standard bricks and is constructed with a louvered face with waterdrip at top and bottom and an integral water stop in the casting.

Where Used

Riesner Ventilating Bricks are suitable for ventilating:

Air Spaces	Hung Ceilings	Attics
Kitchens	Transformer Rooms	Tunnels
Closets	Cellars	Mausoleums
Garbage Receivers	Cellar Rooms	Utility Rooms
Boiler Rooms	Cold Rooms	Gas Range Hoods

How Installed

The Riesner Ventilating Bricks are "bricked in" by the mason when building up the wall, at a point 6 in. below the ceiling, with the louvered face to the outer air and duct or flue in the room.

Construction, Types and Sizes

Riesner Ventilating Bricks are made of cast iron, or cast bronze, with galvanized iron or copper pipe or duct. They extend clear through the wall from the louvered face at the outside, to the brass flange or register face at the inside of the wall.

Made in four types as follows:

Type "A"—This type is the width and height of *one* standard brick (2¼x8 ins.) and transforms into a 3-in. diameter pipe which finishes with a brass flange at the inside of the wall.

Type "B"—Also the width and height of one standard brick (2¼x8 ins.) extends through the wall with a 2x8-in. duct and finishes with a 3x8¼ in. register face at the inside of the wall.

Type "C"—The width of *one* brick and the height of *two* bricks (4¾x8 ins.) and transforms into a 6-in. diameter pipe which finishes with a brass flange at inside of the wall.

Type "D"—The width of *one* brick and the height of *two* bricks (4¾x8 ins.). Type "D" extends through the wall with a 4½x8-in. duct and finishes with a 5⅞x9¼-in. register face at the inside of the wall.

Further Details—Types "B," "C" and "D" are furnished with bronze insect screen to prevent flies and insects from coming into the ventilated areas.

Ventilating bricks are carried in stock for 12-in. walls and measure 13 ins. from exterior louvered face to pipe flange or register face at inside of wall. They can, however, be made up for 8-in. walls or any other wall thickness required.

Ventilating bricks can also be made up with elbows for ducts to meet special conditions.

Color

Cast iron ventilating bricks are painted a buff color.

Advantages

Riesner Ventilating Bricks do not take up any extra space. *They are bricked into and become a part of the wall.*

Ventilating bricks can be built into frame construction, brick walls and concrete forms.

They are used to ventilate air spaces under buildings and special rooms in cellars and attics and can be furnished with elbows and offsets where the area to be ventilated is below grade.

Types "A" and "C" can readily be connected to gas range hoods. Ventilating bricks are particularly useful in kitchens where there is no room for vertical vent shafts. *They constantly ventilate and remove gas fumes, steam and cooking odors from the room.*

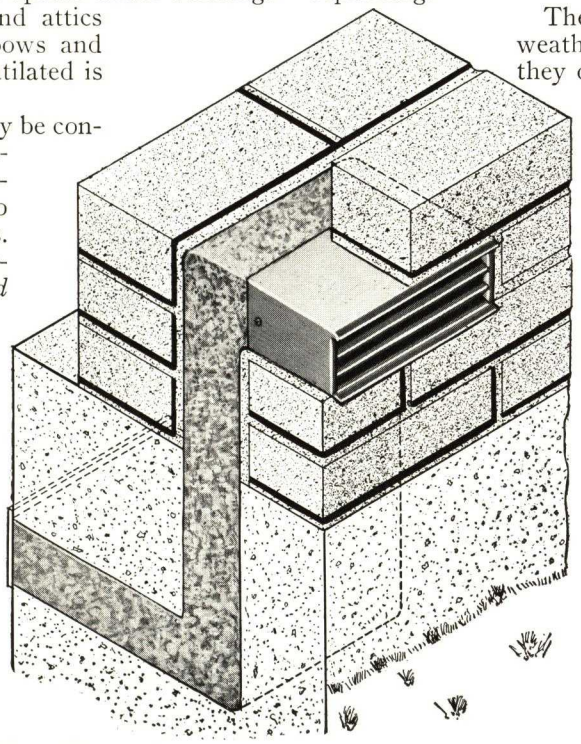
Types "B" and "D" are designed to meet general ventilating requirements for cellars, air spaces and attics, etc., to allow a circulation of air and prevent dry rot.

Ventilating bricks used in kitchens prevent discoloration of the walls and obviate the necessity of frequent repainting.

They are designed to be absolutely weatherproof, and economical because they do not deteriorate—the first cost is the only cost.

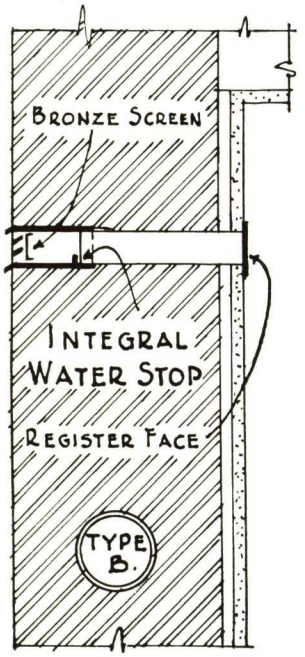
Specifications

Specify under masonry heading: Install Ventilating Bricks as manufactured by BENJAMIN RIESNER, 353 East 78th Street, New York, N. Y., in the walls 6 ins. below finished ceiling. (Specify type, location, wall thickness and whether cast iron or bronze.)



Type "B" with Duct to Ventilate Under Buildings and Special Rooms in Cellars

Type "D" can also be used where more ventilation is required



Type "B" Showing Integral Water Stop

Also bronze screen and register face in place

Prices, Cast Iron, for 12-in. Walls

Type "A" with a brass wall flange.....$ 5.50 each
Type "B" with 3x8¼-in. register face..... 6.50 each
Type "C" with a brass wall flange..... 11.50 each
Type "D" with 5⅞x9¼-in. register..... 12.50 each

Type "D" can be supplied with one piece damper with register face at additional charge.

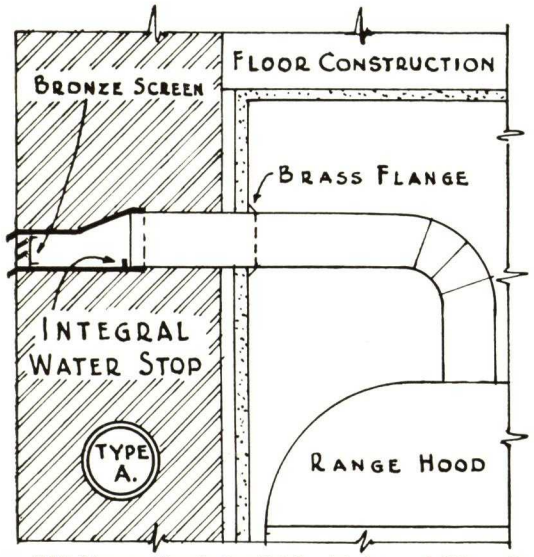
Cast bronze prices on application.

All prices net, f.o.b. New York, N. Y.

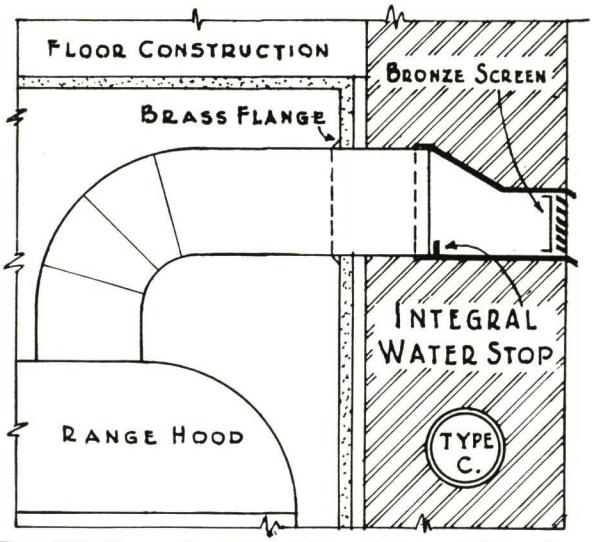
Estimates furnished promptly for special duct and elbow work.

Type "D" Showing Integral Water Stop

Also bronze screen and register face in place



Type "A" Riesner Ventilating Brick with Integral Water Stop Attached to Gas Range Hood by Means of a Flue Pipe



Type "C" Riesner Ventilating Brick with Integral Water Stop Attached to a Gas Range Hood by Means of a Flue Pipe

MEMORANDA